

# **GAP**

Release 4.3  
06 May 2002

# **Index**

The GAP Group

<http://www.gap-system.org>

# Full Index

This index covers the five main books of the GAP manual, pages are given with respect to each manual: **Ref**, **Tut**, **Prg**, **New**, and **Ext**. A page number in *italics* refers to a whole section which is devoted to the indexed subject. Keywords are sorted with case and spaces ignored, e.g., “**PermutationCharacter**” comes before “permutation group”.

- (Near-)Additive Magma Categories, *R 539*
- (Near-)Additive Magma Generation, *R 540*
- +, *R 48*
- , *R 48*
- A, *R 30*
- B, *R 31*
- C, *R 31*
- D, *R 31*
- K, *R 29*
- L, *R 30*
- M, *R 31*
- N, *R 31*
- O, *R 31*
- P, *R 31*
  - on Macintosh, *R 32*
- R, *R 30*
- T, *R 31*
- U, *R 31*
- W, *R 31*
  - on Macintosh, *R 32*
- X, *R 31*
- Y, *R 31*
- a, *R 30*
  - on Macintosh, *R 32*
- b, *R 28*
- e, *R 28*
  - on Macintosh, *R 32*
- f, *R 28*
  - on Macintosh, *R 32*
- g, *R 29*
- g -g, *R 29*
- h, *R 28*
- i, *R 31*
- l, *R 29*
- m, *R 29*
- n, *R 28*
  - on Macintosh, *R 32*
- o, *R 29*
  - on Macintosh, *R 32*
- q, *R 28*
- r, *R 30*
- x, *R 28*
- y, *R 29*
- z, *R 31*
  - on Macintosh, *R 32*
- ., *E 17*
- .gaprc, *R 34*
- /, *R 48*
  - for character tables, *R 698*
- %, *E 25*
- %display, *E 25*
- %enddisplay, *E 25*
- \*, *R 48*
  - for character tables, *R 698*
- \', *R 242*
- \., *E 17*
- \>, *E 17*
- \Appendices, *E 14*
- \BeginningOfBook, *E 13*
- \Bibliography, *E 14*
- \C, *E 21*
- \Chapter, *E 15*
- \Chapters, *E 12*
- \Colophon, *E 12*
- \Day, *E 14*
- \Declaration, *E 28*
- \EndOfBook, *E 14*
- \F, *E 21*
- \FileHeader, *E 28*
- \FrontMatter, *E 12*
- \Index, *E 12*
- \Mailto, *E 17*
- \Month, *E 14*
- \N, *E 21*

`\OneColumnTableOfContents`, E 13  
`\Package`, E 17  
`\PseudoInput`, E 14  
`\Q`, E 21  
`\R`, E 21  
`\Section`, E 15  
`\TableOfContents`, E 13  
`\TitlePage`, E 12  
`\Today`, E 14  
`\URL`, E 17  
`\UseGapDocReferences`, E 13  
`\UseReferences`, E 12  
`\XYZ`, R 242  
`\Year`, E 14  
`\Z`, E 21  
`\,`, R 242  
`\,`, R 242  
`\accent127`, E 17  
`\atindex`, E 17  
`\b`, R 242  
`\beginexample`, E 23  
     indicating unstable output, E 23  
`\beginitems`, E 21  
`\beginlist`, E 21  
`\beginntt`, E 23  
`\c`, R 242  
`\calR`, E 21  
`\endexample`, E 23  
`\enditems`, E 21  
`\endlist`, E 21  
`\endtt`, E 23  
`\fmark`, E 17  
`\in`, operation for testing membership, R 264  
`\index`, E 17  
`\indextt`, E 17  
`\item`, E 21  
`\itemitem`, E 21  
`\kernttindent`, E 17  
`\lq`, E 17  
`\matrix`, E 24  
`\n`, R 242  
`\nolabel`, use in index and label suppression, E 16  
`\null`, use in index suppression, E 16  
`\package`, E 12  
`\pif`, E 17  
`\r`, R 242  
`\rq`, E 17  
`ˆ`, R 48

    for class functions, R 740  
 1-Cohomology, *R 363*  
 2-Cohomology and Extensions, *R 441*  
 4.2BSD, R 800  
 4.3BSD, R 800

## A

A, Attribute mark-up, E 17  
 AbelianGroup, R 493  
 AbelianInvariants, for character tables, R 701  
     for groups, R 352  
 Abelian Invariants for Subgroups, *R 461*  
 AbelianInvariantsMultiplier, R 366  
 AbelianInvariantsNormalClosureFpGroup, R 461  
 AbelianInvariantsNormalClosureFpGroupRrs, R 461  
 AbelianInvariantsSubgroupFpGroup, R 461  
 AbelianInvariantsSubgroupFpGroupMtc, R 461  
 AbelianInvariantsSubgroupFpGroupRrs, R 461  
 AbelianNumberField, R 570  
 abelian number field, R 570  
 abelian number fields, Galois group, R 571  
 AbelianSubfactorAction, R 388  
 About Functions, *T 24*  
 About Group Actions, *R 380*  
 AbsInt, R 126  
 AbsoluteValue, R 155  
 absolute value of an integer, R 126  
 abstract word, R 314  
 AbstractWordTietzeWord, R 470  
 accessing, list elements, R 170  
     record elements, R 251  
 Accessing a Module, *R 665*  
 Accessing Record Elements, *R 251*  
 Accessing Subgroups via Tables of Marks, *R 685*  
 Accessing Weak Pointer Objects as Lists, *E 54*  
 Acknowledgements, *T 13*  
 AClosestVectorCombinationsMatFFVecFFE, R 212  
 ActingAlgebra, R 608  
 ActingDomain, R 392  
 Acting OnRight and OnLeft, *R 418*  
 Action, R 386  
 action, by conjugation, R 381  
     on blocks, R 381  
     on sets, R 381  
 ActionHomomorphism, R 386  
 Action of a group on itself, *R 387*

- Action on Subfactors Defined by a PcgS, *R 432*
- actions, *R 381*
- Actions of Groups, *T 47*
- Actions of Matrix Groups, *R 415*
- ActorOfExternalSet, *R 394*
- Add, *R 173*
- add, an element to a set, *R 191*
- AddCoeffs, *R 211*
- AddGenerator, *R 472*
- AddGenerators, *R 333*
- AddGeneratorsExtendSchreierTree, *R 411*
- AddHashEntry, *N 11*
- Adding a new Attribute, *P 35*
- Adding a new Operation, *P 34*
- Adding a new Representation, *P 35*
- Adding new Concepts, *P 37*
- addition, *R 48*
  - list and non-list, *R 181*
  - matrices, *R 216*
  - matrix and scalar, *R 216*
  - operation, *R 285*
  - rational functions, *R 644*
  - scalar and matrix, *R 216*
  - scalar and matrix list, *R 217*
  - scalar and vector, *R 209*
  - vector and scalar, *R 209*
  - vectors, *R 208*
- Addition of a Method, *P 32*
- Additive Arithmetic for Lists, *R 180*
- AdditiveInverse, *R 283*
- AdditiveInverseAttr, *R 283*
- AdditiveInverseImmutable, *R 283*
- AdditiveInverseMutable, *R 283*
- AdditiveInverseOp, *R 283*
- AdditiveInverseSameMutability, *R 283*
- AdditiveInverseSM, *R 283*
- AdditiveNeutralElement, *R 541*
- AddRelator, *R 472*
- AddRowVector, *R 211*
- AddRule, *R 333*
- AddRuleReduced, *R 333*
- AddSet, *R 191*
- AdjointAssociativeAlgebra, *R 625*
- AdjointBasis, *R 598*
- AdjointMatrix, *R 625*
- AdjointModule, *R 610*
- administrator, *R 820*
- Advanced Features of GAP, *R 30*
- Advanced List Manipulations, *R 199*
- Advanced Methods for Dixon-Schneider Calculations, *R 718*
- AffineAction, *R 433*
- AffineActionLayer, *R 433*
- AffineOperation, *R 433*
- AffineOperationLayer, *R 433*
- A First Attempt to Implement Elements of Residue Class Rings, *P 42*
- Agemo, *R 349*
- AgGroup, *T 78*
- Algebra, *R 589*
- AlgebraByStructureConstants, *R 592*
- AlgebraGeneralMappingByImages, *R 602*
- AlgebraHomomorphismByImages, *R 603*
- AlgebraHomomorphismByImagesNC, *R 603*
- AlgebraicExtension, *R 660*
- Algebraic Structure, *T 68*
- Algebras, *T 61*
- AlgebraWithOne, *R 589*
- AlgebraWithOneGeneralMappingByImages, *R 603*
- AlgebraWithOneHomomorphismByImages, *R 604*
- AlgebraWithOneHomomorphismByImagesNC, *R 604*
- AllBlocks, *R 391*
- AllIrreducibleSolvableGroups, *R 510*
- AllLibraryGroups, *R 499*
- ALLPKG, *E 36*, *R 822*
- AllPrimitiveGroups, *R 499*
- AllSmallGroups, *R 502*
- AllTransitiveGroups, *R 499*
- Alpha, *R 790*
- AlternatingGroup, *R 493*
- and, *R 166*
  - for filters, *R 167*
- An Example of Advanced Dixon-Schneider Calculations, *R 719*
- An Example of a GAP Package, *E 37*
- ANFAutomorphism, *R 571*
- AntiSymmetricParts, *R 757*
- antisymmetric relation, *R 304*
- Append, *R 173*
- AppendTo, *R 94*
  - for streams, *R 100*
- Apple, *R 811*
- ApplicableMethod, *R 78*, *T 75*
- ApplicableMethod, *R 78*
- Applicable Methods and Method Selection, *P 13*
- ApplicableMethodTypes, *R 78*

- Apply, R 194
- ApplyFunc, T 78
- ApplySimpleReflection, R 622
- ApproximateSuborbitsStabilizerPermGroup, R 409
- ARCH\_IS\_MAC, R 814
- ARCH\_IS\_UNIX, R 814
- ARCH\_IS\_WINDOWS, R 814
- arg, special function argument, R 56
- ArithmeticElementCreator, P 39
- Arithmetic for External Representations of Polynomials, R 658
- Arithmetic for Lists, R 178
- Arithmetic Issues in the Implementation of New Kinds of Lists, P 25
- Arithmetic Operations for Class Functions, R 738
- Arithmetic Operations for Elements, R 284
- Arithmetic Operations for General Mappings, R 297
- Arithmetic Operators, R 48
- Arrangements, R 145
- arrow notation for functions, R 57
- AsAlgebra, R 598
- AsAlgebraWithOne, R 599
- AsBinaryRelationOnPoints, R 305
- AsBlockMatrix, R 230
- AscendingChain, R 355
- AsDivisionRing, R 560
- AsDuplicateFreeList, R 193
- A Second Attempt to Implement Elements of Residue Class Rings, P 43
- AsField, R 560
- AsFreeLeftModule, R 557
- AsGroup, R 336
- AsGroupGeneralMappingByImages, R 369
- AsLeftIdeal, R 547
- AsLeftModule, R 555
- AsList, R 259
- AsMagma, R 309
- AsMonoid, R 527
- AsPolynomial, R 646
- AsRightIdeal, R 547
- AsRing, R 544
- AsSemigroup, R 520
- Assert, R 81
- AssertionLevel, R 81
- Assertions, R 81
- AsSet, R 260
- AssignGeneratorVariables, R 321
- assignment, T 22
  - to a list, R 171
  - to a record, R 252
  - variable, R 49
- Assignments, R 49
- AssignNiceMonomorphismAutomorphismGroup, R 376
- AssociatedPartition, R 150
- AssociatedReesMatrixSemigroupOfDClass, R 526
- Associates, R 550
- associativity, R 48
- AssocWordByLetterRep, R 326
- AsSomething, T 70
- AsSortedList, R 260
- AsSSortedList, R 260
- AsStruct, R 277
- AsSubalgebra, R 599
- AsSubalgebraWithOne, R 599
- AsSubgroup, R 337
- AsSubgroupOfWholeGroupByQuotient, R 459
- AsSubmagma, R 309
- AsSubmonoid, R 527
- AsSubsemigroup, R 520
- AsSubspace, R 574
- AsSubstruct, R 280
- AsTransformation, R 537
- AsTransformationNC, R 537
- AsTwoSidedIdeal, R 547
- AsVectorSpace, R 573
- at exit functions, R 72
- ATLAS Irrationalities, R 157
- AtlasIrrationality, R 159
- atomic irrationalities, R 157
- Attributes, R 120, T 72
- Attributes and Operations for Algebras, R 597
- Attributes and Properties for (Near-)Additive Magmas, R 541
- Attributes and Properties for Collections, R 261
- Attributes and Properties for Magmas, R 311
- Attributes and Properties for Matrix Groups, R 414
- Attributes and Properties of Character Tables, R 699
- Attributes and Properties of Elements, R 281
- Attributes of and Operations on Equivalence Relations, R 306
- Attributes of Tables of Marks, R 675
- Attributes vs. Record Components, T 80
- AttributeValueNotSet, R 121

AugmentationIdeal, R 637  
 AugmentedCosetTableInWholeGroup, R 454  
 AugmentedCosetTableMtc, R 454  
 AugmentedCosetTableRrs, R 454  
 Augmented Coset Tables and Rewriting, *R 454*  
 Authorship and Maintenance, *T 12*  
 AUTOLOAD\_PACKAGES, R 822  
 automatic loading of gap packages, R 821  
 AutomorphismDomain, R 375  
 AutomorphismGroup, R 375  
     for groups with pcgs, R 434  
 automorphism group, of number fields, R 571  
 Automorphisms and Equivalence of Character  
     Tables, *R 726*  
 AutomorphismsOfTable, R 702

## B

$b_N$ , R 157  
 backslash character, R 242  
 backspace character, R 242  
 Backtrace, T 85  
     GAP3 name for Where, R 70  
 Backtrack, *R 411*  
 BaseFixedSpace, R 223  
 BaseMat, R 225  
 BaseMatDestructive, R 225  
 BaseOfGroup, N 21, R 408  
 BaseOrthogonalSpaceMat, R 225  
 BasePointOfSchreierTransversal, N 17  
 Bases of Vector Spaces, *R 575*  
 BaseStabChain, R 408  
 BaseSteinitzVectors, R 226  
 Basic Actions, *R 381*  
 Basic Groups, *R 492*  
 Basic Operations for Class Functions, *R 737*  
 Basic Operations for Lists, *R 169*  
 BasicWreathProductOrdering, R 273  
 Basis, R 576  
 BasisNC, R 576  
 BasisVectors, R 577  
 Bell, R 143  
 Bernoulli, R 144  
 BestQuoInt, R 128  
 BestSplittingMatrix, R 718  
 BiAlgebraModule, R 607  
 BiAlgebraModuleByGenerators, R 606  
 bibtex, E 27  
 BilinearFormMat, R 620

binary relation, R 303  
 BinaryRelationByElements, R 303  
 BinaryRelationOnPoints, R 304  
 BinaryRelationOnPointsNC, R 304  
 Binary Relations on Points, *R 304*  
 BinaryRelationTransformation, R 538  
 BindGlobal, P 29, R 45  
 Binomial, R 143  
 blank, R 40  
 BlistList, R 204  
 Block Matrices, *R 230*  
 BlockMatrix, R 230  
 Blocks, R 390  
 BlocksInfo, R 707  
 Block Systems, *R 390*  
 BlownUpMat, R 227  
 BlownUpVector, R 227  
 BlowUpIsomorphism, R 415  
 BNF, R 58  
 body, R 55  
 BombieriNorm, R 651  
 Boolean Lists Representing Subsets, *R 204*  
 bound, R 42  
 Brauer character, R 744  
 BrauerCharacterValue, R 767  
 BrauerTable, R 693  
 BrauerTableOp, R 693  
 BravaisGroup, R 418  
 BravaisSubgroups, R 418  
 BravaisSupergroups, R 418  
 Break, *R 54*  
 break loop message, R 69  
 Break Loops, *R 67*  
 break loops, T 20  
**break** statement, R 54  
 browsing backwards, R 23  
 browsing backwards one chapter, R 23  
 browsing forward, R 23  
 browsing forward one chapter, R 23  
 browsing the next section browsed, R 23  
 browsing the previous section browsed, R 23  
 Browsing through the Sections, *R 23*  
 BSD, R 800  
 bug reports, see If Things Go Wrong, R 818  
 Building new orderings, *R 269*  
 buildman.pe, E 28

## C

- C, Category mark-up, E 17
- $c_N$ , R 157
- Calculating with Group Automorphisms, R 376
- Calendar Arithmetic, R 248
- CallFuncList, R 61
- Calling a function with a list argument that is interpreted as several arguments, R 61
- Calling of and Communication with External Binaries, E 39
- Cancellation Tests for Rational Functions, R 658
- CanComputeIndex, R 367
- CanComputeIsSubset, R 367
- CanComputeSize, R 366
- CanComputeSizeAnySubgroup, R 367
- candidates, for permutation characters, R 762
- CanEasilyCompareElements, R 284
- CanEasilyCompareElementsFamily, R 284
- CanEasilyComputePcgs, R 421
- CanEasilySortElements, R 284
- CanEasilySortElementsFamily, R 284
- CanEasilyTestMembership, R 366
- CanonicalBasis, R 576
- canonical basis, for matrix spaces, R 583
  - for row spaces, R 583
- CanonicalElt, N 15
- CanonicalGenerators, R 620
- CanonicalPcElement, R 423
- CanonicalPcgs, R 426
- CanonicalPcgsByGeneratorsWithImages, R 428
- CanonicalRepresentativeDeterminatorOf-ExternalSet, R 393
- CanonicalRepresentativeOfExternalSet, R 393
- CanonicalRightCosetElement, R 341
- Carmichael's lambda function, R 134
- carriage return character, R 242
- CartanMatrix, R 620
- CartanSubalgebra, R 617
- Cartesian, R 195
- CAS, R 728
- CAS format, R 728
- CASString, R 728
- CAS tables, R 728
- Categories, R 117
- Categories and Properties of Algebras, R 596
- Categories for Streams and the StreamsFamily, R 96
- Categories of Associative Words, R 319
- Categories of Matrices, R 215
- CategoriesOfObject, R 119
- Categories of Words and Nonassociative Words, R 314
- CategoryCollections, P 17, R 257
- CategoryFamily, P 17
- Catering for Plain Text and HTML Formats, E 25
- Center, R 312
- center, R 311
- CentralCharacter, R 747
- central character, R 747
- CentralIdempotentsOfAlgebra, R 601
- centraliser, R 311
- Centralizer, R 311
  - for groups with pcgs, R 434
- CentralizerInGLnZ, R 418
- CentralizerModulo, R 356
- CentralizerSizeLimitConsiderFunction, R 435
- Centre, R 312
  - for groups with pcgs, R 434
- centre, of a character, R 746
- CentreOfCharacter, R 746
- ChainHomomorphicImage, N 21
- ChainStatistics, N 21
- ChainSubgroup, N 20
- ChainSubgroupByDirectProduct, N 22
- ChainSubgroupByHomomorphism, N 21
- ChainSubgroupByProjectionFunction, N 21
- ChainSubgroupByPSubgroupOfAbelian, N 22
- ChainSubgroupBySiftFunction, N 22
- ChainSubgroupByStabiliser, N 21
- ChainSubgroupByTrivialSubgroup, N 22
- ChainSubgroupQuotient, N 22
- ChangedBaseGroup, N 21
- Changed Command Line Options, T 77
- Changed Functionality, T 77
- Changed Variable Names, T 78
- Changes from Earlier Versions, T 13
- ChangeStabChain, R 410
- Changing Presentations, R 471
- Changing the Help Viewer, R 24
- Changing the Representation, R 278
- Changing the Structure, R 277, T 70
- Chapters and Sections, E 15
- Character, R 742
- CharacterDegrees, R 699
- Character Degrees and Derived Length, R 790
- Characteristic, R 281
- characteristic, for class functions, R 741
- CharacteristicPolynomial, R 226

- characteristic polynomial, for field elements, R 562
- CharacterNames**, R 703
- characters, R 735
  - permutation, R 762
  - symmetrizations of, R 756
- CharacterTable**, R 693
- Character Table Categories, *R 694*
- CharacterTableDirectProduct**, R 721
- CharacterTableFactorGroup**, R 722
- CharacterTableIsoclinic**, R 723
- character tables, R 692
  - access to, R 692
  - calculate, R 692
  - infix operators, R 698
  - of groups, R 692
- CharacterTableWithSortedCharacters**, R 724
- CharacterTableWithSortedClasses**, R 724
- CharacterTableWreathSymmetric**, R 723
- character value, of group element using powering operator, R 740
- CharsFamily**, R 243
- CharTable**, T 78
- CheckFixedPoints**, R 781
- CheckForHandlingByNiceBasis**, R 588
- CheckPermChar**, R 788
- ChevalleyBasis**, R 619
- ChiefSeries**, R 352
- ChiefSeriesThrough**, R 352
- ChiefSeriesUnderAction**, R 353
- ChineseRem**, R 129
- Chinese remainder, R 129
- Chomp**, R 247
- CIUnivPols**, R 643
- ClassElementLattice**, R 358
- classes, real, R 704
- ClassesSolvableGroup**, R 434
- ClassFunction**, R 742
- class function, R 735
- class function objects, R 735
- class functions, R 777
  - as ring elements, R 739
- ClassFunctionSameType**, R 743
- Class Fusions between Character Tables, *R 773*
- Classical Groups, *R 494*
- ClassMultiplicationCoefficient**, for character tables, R 711
- class multiplication coefficient, R 711
- ClassNames**, R 703
- ClassNamesTom**, R 676
- ClassOrbit**, R 704
- ClassPermutation**, R 725
- ClassPositionsOfAgemo**, R 705
- ClassPositionsOfCentre**, for characters, R 746
  - for character tables, R 705
- ClassPositionsOfDerivedSubgroup**, R 705
- ClassPositionsOfDirectProduct-Decompositions**, R 705
- ClassPositionsOfElementaryAbelianSeries**, R 705
- ClassPositionsOfFittingSubgroup**, R 705
- ClassPositionsOfKernel**, R 746
- ClassPositionsOfLowerCentralSeries**, R 705
- ClassPositionsOfMaximalNormalSubgroups**, R 704
- ClassPositionsOfNormalClosure**, R 705
- ClassPositionsOfNormalSubgroup**, R 733
- ClassPositionsOfNormalSubgroups**, R 704
- ClassPositionsOfSupersolvableResiduum**, R 705
- ClassPositionsOfUpperCentralSeries**, R 705
- ClassRoots**, R 704
- ClassStructureCharTable**, R 711
- ClassTypesTom**, R 676
- CleanedTailPcElement**, R 423
- ClearCacheStats**, R 84
- ClearProfile**, R 82
- clone, an object, R 113
- CloseMutableBasis**, R 581
- CloseStream**, R 97
- ClosureGroup**, R 338
- ClosureGroupAddElm**, R 338
- ClosureGroupCompare**, R 338
- ClosureGroupDefault**, R 338
- ClosureGroupIntest**, R 338
- ClosureLeftModule**, R 556
- ClosureNearAdditiveGroup**, R 541
- Closure Operations and Other Constructors, *R 305*
- ClosureRing**, R 544
- Closures of (Sub)groups, *R 338*
- ClosureSomething**, T 70
- ClosureStruct**, R 277
- ClosureSubgroup**, R 338
- ClosureSubgroupNC**, R 338
- Coboundaries**, R 630
- Cochain**, R 629
- CochainSpace**, R 629
- Cocycles**, R 630



- cocycles, R 363
- CodePcGroup, R 444
- CodePcgs, R 444
- Coding a Pc Presentation, *R 444*
- coefficient, binomial, R 143
- Coefficient List Arithmetic, *R 211*
- Coefficients, R 577
- coefficients, for cyclotomics, R 155
- CoefficientsAndMagmaElements, R 638
- CoefficientsFamily, R 655
- CoefficientsMultiadic, R 129
- CoefficientsOfLaurentPolynomial, R 652
- CoefficientsOfUnivariatePolynomial, R 646
- CoefficientsOfUnivariateRationalFunction, R 646
- CoefficientsQadic, R 129
- CoefficientsRing, R 653
- CoeffsCyc, R 155
- CoeffsMod, R 211
- cohomology, R 363
- COHORTS\_PRIMITIVE\_GROUPS, R 510
- cokernel, T 55
- CoKernelOfAdditiveGeneralMapping, R 300
- CoKernelOfMultiplicativeGeneralMapping, R 299
- CollapsedMat, R 784
- Collected, R 193
- Collection Families, *R 257*
- CollectionsFamily, P 20, R 257
- ColumnIndexOfReesMatrixSemigroupElement, R 526
- ColumnIndexOfReesZeroMatrixSemigroupElement, R 526
- Combinations, R 145
- Combinations, Arrangements and Tuples, *R 145*
- CombinatorialCollector, R 439
- Combinatorial Numbers, *R 143*
- Comm, R 285
  - for words, R 322
- Command Line Options, *R 28*
- command mark-up, E 17
- comments, R 40, T 19
- CommutativeDiagram, R 780
- CommutatorFactorGroup, R 356
- CommutatorLength, R 346
  - for character tables, R 701
- CommutatorSubgroup, R 345
- Compacted, R 193
- CompanionMat, R 228
- CompareVersionNumbers, R 823
- comparison, fp semigroup elements, R 532
  - operation, R 284
  - rational functions, R 644
- Comparison of Associative Words, *R 322*
- Comparison of Class Functions, *R 738*
- Comparison of Elements of Finitely Presented Groups, *R 447*
- Comparison of Elements of Finitely Presented Semigroups, *R 532*
- Comparison of Permutations, *R 396*
- Comparison of Rational Functions, *R 644*
- Comparison of Words, *R 315*
- Comparison Operations for Elements, *R 284*
- Comparisons, *R 47*
  - of booleans, R 165
  - of lists, R 177
- Comparisons of Booleans, *R 165*
- Comparisons of Cyclotomics, *R 157*
- Comparisons of Lists, *R 177*
- Comparisons of Records, *R 254*
- Comparisons of Strings, *R 244*
- Compatibility Mode, *T 86*
- Compatibility of Residue Class Rings with Prime Fields, *P 53*
- CompatibleConjugacyClasses, R 697
- CompatiblePairs, R 443
- Compiling Library Code, *R 36*
- Complementclasses, R 345
- ComplementclassesEA, R 365
- ComplementSystem, R 348
- CompleteSchreierTransversal, N 18
- Completion Files, *R 34*
- ComplexConjugate, R 571
  - for class functions, R 741
- ComplexificationQuat, R 593
- Component Objects, *P 21*
- Components of a Dixon Record, *R 719*
- Components versus Attributes, *P 37*
- CompositionMapping, R 293
  - for Frobenius automorphisms, R 568
- CompositionMapping2, R 293
- CompositionMaps, R 778
- CompositionOfStraightLinePrograms, R 330
- CompositionSeries, R 353
  - for groups with pcgs, R 434
- ComputedBrauerTables, R 693

- ComputedClassFusions, R 774
- ComputedIndicators, R 710
- ComputedIsPSolvableCharacterTables, R 710
- ComputedPowerMaps, R 769
- ComputedPrimeBlockss, R 706
- Computing a Pcg, *R 420*
- Computing a Permutation Representation, *R 400*
- Computing Pc Groups, *R 440*
- Computing Possible Permutation Characters, *R 762*
- Computing the Irreducible Characters of a Group, *R 715*
- Concatenation, R 193
- concatenation, of lists, R 193
- Conductor, R 155
- ConfluentRws, R 333
- Congruences, for character tables, R 786
- Congruences for semigroups, *R 522*
- ConjugacyClass, R 343
- Conjugacy Classes, *R 343*
- ConjugacyClasses, attribute, R 343
  - for character tables, R 696
  - for groups with pcgs, R 434
  - for linear groups, R 497
- ConjugacyClassesByOrbits, R 344
- ConjugacyClassesByRandomSearch, R 343
- Conjugacy Classes in Classical Groups, *R 497*
- Conjugacy Classes in Solvable Groups, *R 434*
- ConjugacyClassesMaximalSubgroups, R 357
- ConjugacyClassesPerfectSubgroups, R 360
- ConjugacyClassesSubgroups, R 357
- ConjugacyClassSubgroups, R 356
- conjugate, matrix, R 217
  - of a word, R 322
- ConjugateDominantWeight, R 622
- ConjugateDominantWeightWithWord, R 622
- ConjugateGroup, R 336
- Conjugates, R 563
- ConjugateSubgroup, R 338
- ConjugateSubgroups, R 338
- conjugation, R 381
- ConjugatorAutomorphism, R 373
- ConjugatorAutomorphismNC, R 373
- ConjugatorIsomorphism, R 373
- ConjugatorOfConjugatorIsomorphism, R 374
- ConnectGroupAndCharacterTable, R 697
- ConsiderKernels, R 786
- ConsiderSmallerPowerMaps, R 786
- ConsiderTableAutomorphisms, R 788
- constants, T 20
- ConstantTimeAccessList, R 189
- constituent, of a group character, R 745
- ConstituentsCompositionMapping, R 293
- ConstituentsOfCharacter, R 746
- Constructing Algebras as Free Algebras, *R 590*
- Constructing Algebras by Generators, *R 589*
- Constructing Algebras by Structure Constants, *R 591*
- Constructing Character Tables from Others, *R 721*
- Constructing Domains, *R 276*
- Constructing Lie algebras, *R 614*
- Constructing Pc Groups, *R 438*
- Constructing Subdomains, *R 280*
- Constructing Tables of Marks, *R 671*
- Constructing Vector Spaces, *R 573*
- Construction of Stabilizer Chains, *R 405*
- Constructors for Basic Groups, *R 498*
- ContainedCharacters, R 784
- ContainedDecomposables, R 784
- ContainedMaps, R 779
- ContainedPossibleCharacters, R 783
- ContainedPossibleVirtualCharacters, R 783
- ContainedSpecialVectors, R 783
- ContainedTom, R 680
- ContainingTom, R 680
- continuation, E 25
- continue statement, R 55
- Conventions for Character Tables, *R 696*
- convert, to a string, R 243
- Converting Groups to Finitely Presented Groups, *R 455*
- ConvertToCharacterTable, R 694
- ConvertToCharacterTableNC, R 694
- ConvertToMatrixRep, R 229
- ConvertToRangeRep, R 202
- ConvertToStringRep, R 243
- ConvertToTableOfMarks, R 675
- ConvertToVectorRep, R 210
- ConwayPolynomial, R 569
- Conway Polynomials, *R 569*
- coprime, R 48
- Copy, *T 80*
- copy, R 113
  - an object, R 113
- Copying Weak Pointer Objects, *E 55*
- CopyOptionsDefaults, R 410
- Copyright of GAP for MacOS, *R 811*

- Copyright of GAP for Windows, *R 806*
- CopyStabChain, *R 410*
- Core, *R 345*
- CorrespondingGeneratorsByModuloPcgs, *R 428*
- coset, *R 340*
- CosetLeadersMatFFE, *R 212*
- Cosets, *R 340*
- CosetTable, *R 449*
- CosetTableBySubgroup, *R 450*
- CosetTableDefaultLimit, *R 452*
- CosetTableDefaultMaxLimit, *R 451*
- CosetTableFromGensAndRelS, *R 451*
- CosetTableInWholeGroup, *R 453*
- CosetTableOfFpSemigroup, *R 535*
- Coset Tables and Coset Enumeration, *R 449*
- Coset tables for subgroups in the whole group, *R 453*
- CosetTableStandard, *R 453*
- CRC, *R 37*
- CrcFile, *R 94*
  - example, *R 37*
- CRC Numbers, *R 37*
- CreateCompletionFiles, *R 35*
- CreateCompletionFilesPkg, *E 41*
- Creating Attributes and Properties, *P 18*
- Creating Categories, *P 17*
- Creating Character Tables, *R 692*
- Creating Class Functions from Values Lists, *R 742*
- Creating Class Functions using Groups, *R 743*
- Creating Families, *P 19*
- Creating Finite Fields, *R 567*
- Creating Finitely Presented Groups, *R 447*
- Creating Finitely Presented Semigroups, *R 531*
- Creating Group Homomorphisms, *R 368*
- Creating Groups, *R 335*
- Creating hom cosets and quotient groups, *N 15*
- Creating Mappings, *R 292*
- Creating Objects, *P 21*
- Creating Operations, *P 19*
- Creating Other Filters, *P 19*
- Creating Own Arithmetic Objects, *P 39*
- Creating Permutations, *R 398*
- Creating Presentations, *R 464*
- Creating Representations, *P 17*
- Creating Types, *P 21*
- Creation of Algebraic Extensions, *R 660*
- Creation of Rational Functions, *R 657*
- Credit, *R 22*
- CrystGroupDefaultAction, *R 419*
- Cycle, *R 389*
- CycleLength, *R 389*
- CycleLengths, *R 389*
- Cycles, *R 389*
- CycleStructureClass, *R 747*
- CycleStructurePerm, *R 398*
- CyclicExtensionsTom, *R 680*
- CyclicGroup, *R 492*
- CyclotomicField, *R 570*
- cyclotomic field elements, *R 153*
- CyclotomicPolynomial, *R 650*
- Cyclotomic Polynomials, *R 650*
- Cyclotomics, *R 153*
- D**
- $d_N$ , *R 157*
- Darstellungsgruppe, see *EpimorphismSchurCover*, *R 365*
- DataType, *R 124*
- data type, unknown, *R 163*
- DayDMY, *R 249*
- DaysInMonth, *R 248*
- DaysInYear, *R 248*
- Debugging, *T 85*
- Debugging Recursion, *R 84*
- DEC, *R 235*
- Declaration and Implementation Part, *E 40, P 30*
- DeclareAttribute, *P 29*
  - example, *P 35*
- DeclareAutoPackage, *R 822*
- DeclareCategory, *P 29*
- DeclareFilter, *P 29*
- DeclareGlobalFunction, *P 29*
- DeclareGlobalVariable, *P 29*
- DeclareHandlingByNiceBasis, *R 587*
- DeclareInfoClass, *R 80*
- DeclareOperation, *P 29*
- DeclarePackage, *R 822*
- DeclarePackageAutoDocumentation, *R 822*
- DeclarePackageDocumentation, *R 822*
- DeclareProperty, *P 29*
- DeclareRepresentation, *P 29*
  - belongs to implementation part, *P 31*
  - example, *P 35*
- DeclareSynonym, *P 30*
- DeclareSynonymAttr, *P 30*
- DecodeTree, *R 481*
- DecodeTree, *R 481*

- decompose, a group character, R 745
- DecomposedFixedPointVector, R 681
- DecomposeTensorProduct, R 630
- Decomposition, R 236
- DecompositionInt, R 236
- DecompositionMatrix, R 708
- decomposition matrix, R 235
- Decompositions, *R 235*
- Decreased, R 754
- DefaultField, R 559
  - for cyclotomics, R 156
  - for finite field elements, R 567
- DefaultFieldByGenerators, R 560
- DefaultFieldOfMatrix, R 218
- DefaultFieldOfMatrixGroup, R 414
- DefaultRing, R 543
  - for finite field elements, R 567
- DefaultRingByGenerators, R 544
- DefaultStabChainOptions, R 407
- Defining a Pcgs Yourself, *R 421*
- DefiningPolynomial, R 561
- DefiningQuotientHomomorphism, R 459
- DegreeFFE, R 566
- DegreeIndeterminate, R 648
- DegreeOfBinaryRelation, R 304
- DegreeOfCharacter, R 745
- DegreeOfLaurentPolynomial, R 647
- DegreeOfTransformation, R 536
- DegreeOfTransformationSemigroup, R 522
- DegreeOverPrimeField, R 561
- Delta, R 791
- Denominator, T 78
- denominator, of a rational, R 142
- DenominatorCyc, R 155
- DenominatorOfModuloPcgs, R 427
- DenominatorOfRationalFunction, R 645
- DenominatorRat, R 142
- DenseHashTable, N 12
- Dense hash tables, *N 12*
- DenseIntKey, N 12
- DepthOfPcElement, R 423
- DepthOfUpperTriangularMatrix, R 226
- DepthVector, T 78
- Derangements, R 147
- Derivations, R 615
- Derivative, R 649
- DerivedLength, R 353
- DerivedSeriesOfGroup, R 353
- DerivedSubgroup, R 346
- DerivedSubgroupsTom, R 679
- DerivedSubgroupsTomPossible, R 679
- DerivedSubgroupsTomUnique, R 679
- DerivedSubgroupTom, R 679
- DescriptionOfRootOfUnity, R 156
- Designing new Multiplicative Objects, *P 61*
- Determinant, R 218
- determinant character, R 747
- DeterminantMat, R 218
- DeterminantMatDestructive, R 219
- DeterminantMatDivFree, R 219
- DeterminantOfCharacter, R 747
- Developing rewriting systems, *R 334*
- DiagonalizeIntMatNormDriven, R 232
- DiagonalizeMat, R 224
- DiagonalMat, R 220
- DiagonalOfMat, R 226
- Dictionaries, *N 10*
- DictionaryByPosition, N 11
- Difference, R 264
- DifferenceBlist, R 205
- Different Notions of Generation, *T 81*
- DihedralGroup, R 493
- Dimension, R 557
- DimensionOfHighestWeightModule, R 631
- DimensionOfMatrixGroup, R 414
- DimensionOfVectors, R 582
- DimensionsLoewyFactors, R 354
- DimensionsMat, R 218
- Directories, *R 90*
- DirectoriesLibrary, R 90
- DirectoriesPackageLibrary, R 823
- DirectoriesPackagePrograms, R 823
- DirectoriesSystemPrograms, R 91
- Directory, R 90
- DirectoryCurrent, R 90
- DirectoryTemporary, R 90
- DirectProduct, R 487
- Direct product chain subgroups, *N 22*
- DirectProductOp, R 487
- Direct Products, *R 487*
- DirectSumDecomposition, R 601
  - for Lie algebras, R 619
- Direct Sum Decompositions, *R 618*
- DirectSumOfAlgebraModules, R 612
  - for Lie algebras, R 634
- DirectSumOfAlgebras, R 600

- DisableAttributeValueStoring, R 122
  - disable automatic loading, R 821
  - Discriminant, R 649
  - Display, R 66
    - for character tables, R 712
    - for tables of marks, R 673
  - DisplayCacheStats, R 83
  - DisplayCompositionSeries, R 353
  - DisplayEggBoxOfDCClass, R 524
  - DisplayImfInvariants, R 513
  - DisplayInformationPerfectGroups, R 506
  - DisplayOptions, R 713
  - DisplayOptionsStack, R 87
  - DisplayProfile, R 82
  - DisplayRevision, R 84
  - DistancesDistributionMatFFVecFFE, R 212
  - DistancesDistributionVecFFesVecFFE, R 212
  - DistanceVecFFE, R 212
  - Distinguished Subalgebras, *R 616*
  - division, R 48
    - operation, R 285
  - DivisionRingByGenerators, R 560
  - division rings, R 559
  - divisors, of an integer, R 132
  - DivisorsInt, R 132
  - Dixon-Schneider algorithm, R 717
  - DixonInit, R 718
  - DixonRecord, R 718
  - DixonSplit, R 718
  - DixontinI, R 718
  - DMYDay, R 249
  - DMYhmsSeconds, R 250
  - DnLattice, R 755
  - DnLatticeIterative, R 756
  - do, R 52
  - document formats, for help books, E 45
  - document formats (text, dvi, ps, pdf, html), R 24
  - Domain, R 281
  - DomainByGenerators, R 281
  - Domain Categories, *R 278*
  - Domain Constructors, *T 69*
  - Domains, *R 110*
  - Domains as Sets, *T 68*
  - Domains Generated by Class Functions, *R 768*
  - Domains of Subspaces of Vector Spaces, *R 574*
  - DominantCharacter, R 630
  - DominantWeights, R 630
  - DoubleCoset, R 342
  - DoubleCosetRepsAndSizes, R 342
  - Double Cosets, *R 342*
  - DoubleCosets, operation, R 342
  - DoubleCosetsNC, operation, R 342
  - DoubleHashArraySize, N 12
  - doublequote character, R 242
  - doublequotes, R 240
  - DownEnv, R 71, T 85
  - Dummy Streams, *R 105*
  - duplicate free, R 188
  - DuplicateFreeList, R 193
  - Duplication of Lists, *R 175*
  - Duplication of Objects, *R 113*
  - DxIncludeIrreducibles, R 719
- ## E
- E, R 153
  - $e_N$ , R 157
  - Earns, R 390
  - EB, R 157
  - EC, R 157
  - Echelonized Matrices, *R 224*
  - ED, R 157
  - Edit, R 74
  - Editing Files, *R 74*
  - Editor Support, *R 75*
  - EE, R 157
  - EF, R 157
  - Efficiency of Homomorphisms, *R 371*
  - EG, R 157
  - EggBoxOfDCClass, R 524
  - EH, R 157
  - EI, R 158
  - Eigenspaces, R 223
  - Eigenvalues, R 223
  - EigenvaluesChar, R 748
  - Eigenvectors, R 223
  - Eigenvectors and eigenvalues, *R 223*
  - EJ, R 158
  - EK, R 158
  - EL, R 158
  - ElementaryAbelianGroup, R 493
  - ElementaryAbelianSeries, R 353
  - ElementaryAbelianSeriesLargeSteps, R 353
  - Elementary Divisors, *R 223*
  - ElementaryDivisorsMat, R 223
  - Elementary Operations for a PcgS, *R 422*

- Elementary Operations for a PcgS and an Element,  
  *R 422*
- Elementary Operations for Integers, *R 125*
- Elementary Operations for Rationals, *R 141*
- Elementary Tietze Transformations, *R 475*
- ElementOfFpGroup, *R 449*
- ElementOfFpSemigroup, *R 533*
- ElementOfMagmaRing, *R 638*
- ElementOrdersPowerMap, *R 771*
- ElementProperty, *R 411*
- Elements, *R 261*, *T 78*
- elements, *T 23*
  - definition, *R 109*
  - of a list or collection, *R 261*
- Elements as equivalence classes, *R 109*
- ElementsFamily, *P 21*, *R 257*
- Elements in Algebraic Extensions, *R 660*
- Elements of Finitely Presented Groups, *T 84*
- Elements of Free Magma Rings, *R 637*
- Elements of pc groups, *R 437*
- ElementsStabChain, *R 409*
- Elements with Prescribed Images, *R 385*
- element test, for lists, *R 177*
- elif, *R 51*
- EliminatedWord, *R 324*
- ElmWPObj, *E 54*
- else, *R 51*
- EM, *R 158*
- emacs, *R 75*
- email addresses, *T 17*
- Embedding, *R 294*
  - example for direct products, *R 487*
  - example for semidirect products, *R 489*
  - example for wreath products, *R 490*
  - for group products, *R 491*
  - for Lie algebras, *R 614*
  - for magma rings, *R 638*
- embeddings, find all, *R 377*
- Embeddings and Projections for Group Products,  
  *R 491*
- EmptyBinaryRelation, *R 303*
- EmptyMatrix, *R 219*
- EmptySCTable, *R 591*
- EmptyStabChain, *R 410*
- EnableAttributeValueStoring, *R 122*
- End, *R 585*
- end, *R 55*
- Enforcing Property Tests, *P 33*
- Enlarging Internally Represented Lists, *R 177*
- Enumerator, *R 258*
- enumerator, *T 49*
- EnumeratorByBasis, *R 578*
- Enumerators, *R 203*
- EnumeratorSorted, *R 258*
- environment, *R 55*
- EpimorphismNilpotentQuotient, *R 461*
- EpimorphismPGroup, *R 460*
- EpimorphismQuotientSystem, *R 460*
- epimorphisms, find all, *R 377*
- EpimorphismSchurCover, *R 365*
- equality, associative words, *R 322*
  - elements of finitely presented groups, *R 447*
  - nonassociative words, *R 315*
  - of records, *R 254*
  - operation, *R 284*
  - pcwords, *R 437*
- Equality and Comparison of Domains, *R 276*
- equality test, *R 47*
  - for permutations, *R 396*
- equivalence class, *R 306*
- Equivalence Classes, *R 306*
- EquivalenceClasses, attribute, *R 307*
- EquivalenceClassOfElement, *R 307*
- EquivalenceClassOfElementNC, *R 307*
- EquivalenceClassRelation, *R 307*
- equivalence relation, *R 304*
- EquivalenceRelationByPairs, *R 306*
- EquivalenceRelationByPairsNC, *R 306*
- EquivalenceRelationByPartition, *R 306*
- EquivalenceRelationByPartitionNC, *R 306*
- EquivalenceRelationByProperty, *R 306*
- EquivalenceRelationByRelation, *R 306*
- EquivalenceRelationPartition, *R 306*
- Equivalence Relations, *R 305*
- ER, *R 158*
- Error, *R 72*
- Error, *R 72*
- ErrorCount, *R 72*
- ErrorCount, *R 72*
- ErrorNoTraceBack, *R 68*
- errors, syntax, *R 64*
- ES, *R 158*
- escaped characters, *R 242*
- escaping non-special characters, *R 242*
- ET, *R 158*
- EU, *R 158*

- EuclideanDegree, R 551
  - EuclideanQuotient, R 551
  - EuclideanRemainder, R 551
  - Euclidean Rings, *R 551*
  - Euler's totient function, R 134
  - EulerianFunction, R 352
  - EulerianFunctionByTom, R 681
  - EV, R 158
  - EvalStraightLineProgElm, R 331
  - EvalString, R 248
  - evaluation, R 42
    - strings, R 247
  - EW, R 158
  - EX, R 158
  - ExactSizeConsiderFunction, R 362
  - Example: Groups with a decomposition as semidirect product, *P 39*
  - Example: Groups with a word length, *P 38*
  - Example: M-groups, *P 38*
  - Examples, Lists, and Verbatim, *E 21*
  - Exec, R 108
  - Exec, *R 108*
  - execution, R 49
  - exit, R 72
  - expanded form of monomials, R 656
  - Expert Windows installation, *R 809*
  - Exponent, R 352
    - for character tables, R 701
  - exponent, of the prime residue group, R 134
  - exponentiation, operation, R 285
  - ExponentOfPcElement, R 422
  - ExponentsConjugateLayer, R 424
  - ExponentsOfCommutator, R 424
  - ExponentsOfConjugate, R 424
  - ExponentsOfPcElement, R 422
  - ExponentsOfRelativePower, R 424
  - Exponents of Special Products, *R 424*
  - ExponentSumWord, R 323
  - ExponentSyllable, R 324
  - Expressing Group Elements as Words in Generators, *R 339*
  - Expressions, *R 42*
  - ExtendedGroup, N 21
  - ExtendedPcgs, R 426
  - Extending the Range of Definition of an Existing Operation, *P 33*
  - ExtendSchreierTransversal, N 18
  - ExtendSchreierTransversalShortCube, N 18
  - ExtendSchreierTransversalShortTree, N 18
  - ExtendStabChain, R 410
  - Extension, R 442
  - ExtensionNC, R 442
  - ExtensionRepresentatives, R 443
  - Extensions, R 442
  - Extensions of the p-adic Numbers, *R 663*
  - ExteriorPowerOfAlgebraModule, R 634
  - ExternalOrbit, R 393
  - ExternalOrbits, R 393
  - ExternalOrbitsStabilizers, R 393
  - External Representation, *P 26*
  - External Representation for Nonassociative Words, *R 318*
  - external representation of polynomials, R 656
  - ExternalSet, E 50, R 392
  - external set, T 48
  - External Sets, *R 391*
  - ExternalSubset, R 392
  - Extract, R 752
  - ExtraspecialGroup, R 493
  - ExtRepDenominatorRatFun, R 657
  - ExtRepNumeratorRatFun, R 657
  - ExtRepOfObj, P 26
    - external representation, for cyclotomics, R 156
  - ExtRepPolynomialRatFun, R 657
  - EY, R 158
- ## F
- F, Function mark-up, E 17
  - $f_N$ , R 157
  - FactorCosetAction, R 387
    - for fp groups, R 450
  - FactorCosetOperation, R 450
  - FactorFreeSemigroupByRelations, R 531
  - FactorGroup, R 355
  - FactorGroupFpGroupByRels, R 447
  - FactorGroupNC, R 355
  - FactorGroupNormalSubgroupClasses, R 733
  - Factor Groups, *R 355*
  - Factor Groups of Polycyclic Groups - Modulo Pcgs, *R 426*
  - Factor Groups of Polycyclic Groups in their Own Representation, *R 428*
  - FactorGroupTom, R 682
  - Factorial, R 143
  - Factorization, R 340
  - factorization, R 339

- Factors, R 551
  - of univariate polynomial, R 650
- FactorsInt, R 131
- FactorsSquarefree, R 651
- Fail, *R 165, T 77*
- fail, R 165
- fail instead of false, T 77
- FaithfulModule, R 611
  - for Lie algebras, R 628
- Families, *R 115*
- FamiliesOfGeneralMappingsAndRanges, R 302
- FamiliesOfRows, R 728
- family, T 31
- FamilyForOrdering, R 270
- FamilyObj, R 115
- FamilyPcgs, R 436
- FamilyRange, R 302
- FamilySource, R 302
- FAQ, R 817
- Fast access to last hash index, *N 12*
- features, under UNIX, R 28
- fi, R 51
- Fibonacci, R 151
- Fibonacci and Lucas Sequences, *R 151*
- Field, R 559
- FieldExtension, R 561
- field homomorphisms, Frobenius, R 568
- FieldOfMatrixGroup, R 414
- FieldOverItselfByGenerators, R 560
- fields, R 559
- File Access, *R 92*
- FileDescriptorOfStream, R 97
- Filename, R 91
- Filename, *R 91*
- File Operations, *R 93*
- File Streams, *R 102*
- File Structure, *E 33*
- File Types, *E 33*
- Filtered, R 196
- Filters, *R 116*
- filters, *T 73*
- Filters Controlling the Arithmetic Behaviour of Lists, *R 179*
- Finding Implementations in the Library, *E 34*
- Finding Positions in Lists, *R 185*
- Finding Submodules, *R 666*
- FindS12, R 626
- Finite Field Elements, *R 565*
- Finitely Presented Lie Algebras, *R 626*
- Finitely presented monoids, *R 533*
- finiteness test, for a list or collection, R 261
- Finite Perfect Groups, *R 504*
- First, R 197
- FittingSubgroup, R 346
- Flat, R 194
- FlushCaches, P 30
- flush character, R 242
- foa triples, E 48
- For, *R 52*
- ForAll, R 198
- For and While Loops, *T 33*
- ForAny, R 198
- for loop, R 52
- Forming Closures of Domains, *T 70*
- FpElmComparisonMethod, R 448
- FpGroupPresentation, R 464
- FpGrpMonSmgOfFpGrpMonSmgElement, R 531
- FpLieAlgebraByCartanMatrix, R 627
- frame, R 757
- FrattniSubgroup, R 346
  - for groups with pcgs, R 434
- FreeAlgebra, R 590
- FreeAlgebraWithOne, R 590
- FreeAssociativeAlgebra, R 590
- FreeAssociativeAlgebraWithOne, R 590
- FreeGeneratorsOfFpGroup, R 448
- FreeGeneratorsOfFpSemigroup, R 532
- FreeGeneratorsOfWholeGroup, R 448
- FreeGroup, R 319
- FreeGroupOfFpGroup, R 448
- Free Groups, Monoids and Semigroups, *R 319*
- FreeLeftModule, R 557
- FreeLieAlgebra, R 615
- FreeMagma, R 317
- FreeMagmaRing, R 636
- Free Magma Rings, *R 636*
- Free Magmas, *R 317*
- FreeMagmaWithOne, R 317
- Free Modules, *R 556*
- FreeMonoid, R 527
  - with example, R 320
- FreeMonoidOfRewritingSystem, R 535
- FreeSemigroup, R 320
  - with examples, R 521
- FreeSemigroupOfFpSemigroup, R 532
- FreeSemigroupOfRewritingSystem, R 535



Frobenius automorphism, R 568  
 FrobeniusAutomorphism, R 568  
 FrobeniusAutomorphism, R 568  
 FrobeniusCharacterValue, R 766  
 ftp, R 798  
 FullMatrixAlgebra, R 593  
 FullMatrixAlgebraCentralizer, R 601  
 FullMatrixLieAlgebra, R 615  
 FullMatrixModule, R 558  
 FullMatrixSpace, R 582  
 FullRowModule, R 558  
 FullRowSpace, R 582  
 Function, R 55  
 function, R 55  
 FunctionAction, R 392  
 function call, R 46  
     with arguments, R 46  
     with options, R 46  
 Function Calls, R 46  
 FunctionOperation, R 394  
 functions, R 61  
     definition by arrow notation, R 57  
     definition of, R 55  
     recursive, R 55  
     with a variable number of arguments, R 56  
 FunctionsFamily, R 63  
 Functions for Coding Theory, R 212  
 Functions for GAP Packages, R 822  
 Functions that do nothing, R 62  
 Function that Modify Boolean Lists, R 206  
 Function Types, R 62  
 Further Improvements in Implementing Residue  
     Class Rings, P 59  
 Further Information about Domains, T 71  
 Further Information about Functions, T 43  
 Further Information about GAP, T 16  
 Further Information about Groups and  
     Homomorphisms, T 57  
 Further Information about Lists, T 38  
 Further Information about Vector Spaces and  
     Algebras, T 67  
 Further Information introducing the System, T 26  
 FusionCharTableTom, R 688  
 FusionConjugacyClasses, R 773  
 FusionConjugacyClassesOp, R 773  
 fusions, R 773  
 FusionsAllowedByRestrictions, R 788  
 FusionsTom, R 677

## G

G-sets, E 50, R 391  
 $g_N$ , R 157  
 gac, R 35  
 Galois Action, R 561  
 Galois Conjugacy of Cyclotomics, R 159  
 GaloisCyc, R 159  
     for class functions, R 741  
 GaloisField, R 567  
 GaloisGroup, of field, R 562  
     of rational class of a group, R 344  
 Galois Groups of Abelian Number Fields, R 571  
 GaloisMat, R 161  
 GaloisStabilizer, R 571  
 gap-trouble, email address, R 818, T 17  
 gap.rc, R 34  
 GAP3, R 34  
 Gap3CatalogueIdGroup, R 502  
 GAP\_ROOT\_PATHS, E 37, R 90  
 GAPChars, R 732  
 GAP for MacOS, R 811  
 GAP for UNIX, R 800  
 GAP for Windows, R 806  
 GapInputPcGroup, R 441  
 GapInputSCTable, R 591  
 gapmacro.tex, E 12  
 GAP package, permissions, R 820  
 GAP Root Directory, R 89  
 Gaussian algorithm, R 222  
 GaussianIntegers, R 572  
 GaussianRationals, R 570  
 Gaussians, R 572  
 Gcd, R 552  
 Gcd and Lcm, R 552  
 Gcdex, R 128  
 GcdInt, R 128  
 GcdOp, R 552  
 GcdRepresentation, R 552  
 GcdRepresentationOp, R 552  
 General Binary Relations, R 303  
 General hash table definitions and operations, N 11  
 General Hash Tables, N 11  
 GeneralisedEigenspaces, R 223  
 GeneralisedEigenvalues, R 223  
 generalized characters, R 735  
 Generalized Conjugation Technique, E 56  
 generalized conjugation technique, E 56  
 GeneralizedEigenspaces, R 223

- GeneralizedEigenvalues, R 223
- GeneralLinearGroup, R 494
- GeneralMappingByElements, R 292
- General Mappings, *R 301*
- GeneralMappingsFamily, R 302
- General operations on transversals, *N 17*
- GeneralOrthogonalGroup, R 496
- GeneralUnitaryGroup, R 495
- Generating Fields, *R 559*
- Generating modules, *R 555*
- Generating Rings, *R 543*
- GeneratingSetIsComplete, N 20
- generator, of the prime residue group, R 136
- GeneratorsOfAdditiveGroup, R 541
- GeneratorsOfAdditiveMagma, R 541
- GeneratorsOfAdditiveMagmaWithZero, R 541
- GeneratorsOfAlgebra, R 597
- GeneratorsOfAlgebraModule, R 607
- GeneratorsOfAlgebraWithOne, R 597
- GeneratorsOfDivisionRing, R 560
- GeneratorsOfDomain, R 280
- GeneratorsOfEquivalenceRelationPartition, R 306
- GeneratorsOfField, R 560
- GeneratorsOfGroup, R 336
- GeneratorsOfIdeal, R 546
- GeneratorsOfLeftIdeal, R 547
- GeneratorsOfLeftModule, R 555
- GeneratorsOfLeftOperatorAdditiveGroup, R 555
- GeneratorsOfLeftVectorSpace, R 574
- GeneratorsOfMagma, R 311
- GeneratorsOfMagmaWithInverses, R 311
- GeneratorsOfMagmaWithOne, R 311
- GeneratorsOfMonoid, R 527
- GeneratorsOfNearAdditiveGroup, R 541
- GeneratorsOfNearAdditiveMagma, R 541
- GeneratorsOfNearAdditiveMagmaWithZero, R 541
- GeneratorsOfPresentation, R 464
- GeneratorsOfRightIdeal, R 547
- GeneratorsOfRightModule, R 556
- GeneratorsOfRightOperatorAdditiveGroup, R 555
- GeneratorsOfRing, R 544
- GeneratorsOfRingWithOne, R 548
- GeneratorsOfRws, R 333
- GeneratorsOfSemigroup, R 520
- GeneratorsOfSomething, T 69
- GeneratorsOf *Struct*, R 277
- GeneratorsOfTwoSidedIdeal, R 546
- GeneratorsOfVectorSpace, R 574
- GeneratorsPrimeResidues, R 135
- GeneratorsSmallest, R 362
- GeneratorsSubgroupsTom, R 685
- GeneratorSyllable, R 324
- Generic Construction of Tables of Marks, *R 689*
- GetFusionMap, R 775
- GetHashEntry, N 11
- GetHashEntryAtLastIndex, N 13
- GetHashEntryIndex, N 12
- getter, of an attribute, T 72
- Getting GAP, *R 798*
- getting help, R 23
- GL, R 494
- GL and SL, *R 415*
- Global Variables in the Library, *P 29*
- GModuleByMats, R 665
- GO, R 496
- GQuotients, R 377
- Grading, R 602
- Green's Relations, *R 523*
- GreensDClasses, R 524
- GreensDClassOfElement, R 524
- GreensDRelation, R 523
- GreensHClasses, R 524
- GreensHClassOfElement, R 524
- GreensHRelation, R 523
- GreensJClasses, R 524
- GreensJClassOfElement, R 524
- GreensJRelation, R 523
- GreensLClasses, R 524
- GreensLClassOfElement, R 524
- GreensLRelation, R 523
- GreensRClasses, R 524
- GreensRClassOfElement, R 524
- GreensRRelation, R 523
- Group, R 335
- group actions, R 381
  - operations syntax, R 380
- group algebra, R 636
- Group Automorphisms, *R 373*
- GroupByRws, R 439
- GroupByRwsNC, R 439
- group characters, R 735
- Group Elements, *R 335*
- group general mapping, T 55
  - single-valued, T 55

- total, *T* 55
- GroupGeneralMappingByImages, *R* 369
- GroupHClassOfGreensDClass, *R* 525
- GroupHomomorphismByFunction, *R* 369
- GroupHomomorphismByImages, *R* 368
- GroupHomomorphismByImagesNC, *R* 368
- GroupHomomorphismByImages vs. GroupGeneralMappingByImages, *T* 55
- Group Homomorphisms, Group Homomorphisms, by Images, *T* 54
- GroupOfPcgs, *R* 422
- group operations, *R* 394
- Group Properties, *R* 349
- GroupRing, *R* 636
- group ring, *R* 636
- Groups of Automorphisms, *R* 375
- GroupStabChain, *R* 409
- GroupWithGenerators, *R* 336
- GU, *R* 495
- H**
- $h_N$ , *R* 157
- HallSubgroup, *R* 348
- HallSystem, *R* 349
  - for groups with pcgs, *R* 434
- Handling of Streams in the Background, *R* 105
- HasAbelianFactorGroup, *R* 356
- HasChainHomomorphicImage, *N* 21
- HasElementaryAbelianFactorGroup, *R* 356
- HashFunct, *N* 12
- HashKeyEnumerator, *N* 11
- Hash keys, *N* 11
- HasIndeterminateName, *R* 643
- HasParent, *R* 279
- HasseDiagramBinaryRelation, *R* 305
- HeadPcElementByNumber, *R* 424
- Help, *T* 25
- HELP\_ADD\_BOOK, *E* 44
- HenselBound, *R* 651
- HermiteNormalFormIntegerMat, *R* 234
- HermiteNormalFormIntegerMatInverse-Transforms, *R* 234
- HermiteNormalFormIntegerMatTransforms, *R* 234
- HeuristicCancelPolynomials, *R* 659
- HexStringInt, *R* 245
- HighestWeightModule, *R* 633
- History of Character Theory Stuff in GAP, *R* 692
- HMSMSec, *R* 249
- HNFCheuCollins, *R* 233
- HNFLLLDriven, *R* 233
- HNFCNormDriven, *R* 233
- Hom, *R* 585
- HomCoset, *N* 15
- Hom coset chain subgroups, *N* 21
- HomCosetWithImage, *N* 15
- HomeEnumerator, *R* 392
- Homomorphism, for quotient groups by homomorphisms, *N* 15
  - for subgroup transversals, *N* 18
- homomorphism, action, *T* 48
  - natural, *T* 45
  - operation, *T* 48
- Homomorphism for very large groups, *R* 372
- HomomorphismQuotientSemigroup, *R* 523
- homomorphisms, find all, *R* 376
- homomorphisms, Frobenius, field, *R* 568
- Homomorphisms of Algebras, *R* 602
- Homomorphisms vs. Factor Structures, *T* 83
- Homomorphisms vs. General Mappings, *T* 83
- HomomorphismTransformationSemigroup, *R* 522
- HomTransversal, *N* 18
- How to Implement New Kinds of Vector Spaces, *R* 587
- HP-UX, *R* 800
- HTML Font Setup, *R* 816
- HumanReadableDefinition, *R* 683
- I**
- $i_N$ , *R* 158
- Ideal, *R* 545
- IdealByGenerators, *R* 546
- IdealNC, *R* 546
- Ideals, *R* 595
- Ideals in Rings, *R* 545
- Ideals of semigroups, *R* 522
- Idempotents, *R* 312
- IdempotentsTom, *R* 677
- IdempotentsTomInfo, *R* 677
- Identical Lists, *R* 174, *T* 29
- Identical Objects, *R* 110
- Identical Records, *R* 253
- IdentificationOfConjugacyClasses, *R* 697
- Identifier, for character tables, *R* 703
  - for tables of marks, *R* 677
- identifier, *T* 22
- Identifiers, *R* 41

- Identity, R 281
- IdentityBinaryRelation, R 303
- IdentityFromSCTable, R 592
- IdentityMapping, R 294
- IdentityMat, R 219
- IdentityTransformation, R 536
- IdFunc, R 62
- IdGap3SolvableGroup, R 502
- IdGroup, R 502
- IdSmallGroup, R 502
- IdsOfAllSmallGroups, R 502
- If, *R 51*
- if statement, R 51
- If Statements, *T 40*
- If Things Go Wrong, *R 817*
- Image, R 295
  - for Frobenius automorphisms, R 568
- image, vector under matrix, R 217
- ImageElm, R 295
- ImageElt, N 15
- ImageGroup, N 18
- ImageListOfTransformation, R 536
- Images, R 296
- ImagesElm, R 295
- ImageSetOfTransformation, R 537
- ImagesRepresentative, R 295
- ImagesSet, R 295
- ImagesSmallestGenerators, R 372
- ImagesSource, N 15, R 295
- Images under Mappings, *R 295*
- ImfInvariants, R 515
- ImfMatrixGroup, R 516
- ImfNumberQCClasses, R 513
- ImfNumberQQClasses, R 513
- ImfNumberZClasses, R 513
- Immediate Methods, *P 14*
- Immutability, *T 30*
- Immutable, R 112
- ImmutableBasis, R 580
- ImmutableMatrix, R 228
- Immutable Objects, *T 80*
- Implementing New List Objects, *P 24*
- in, for collections, R 264
  - for lists, R 177
  - for strictly sorted lists, R 191
  - operation for, R 264
- IndependentGeneratorsOfAbelianGroup, R 363
- Indeterminate, R 642
- IndeterminateName, R 643
- Indeterminateness, R 782
- IndeterminateNumberOfLaurentPolynomial, R 652
- IndeterminateNumberOfUnivariateRationalFunction, R 643
- IndeterminateOfUnivariateRationalFunction, R 643
- Indeterminates, *R 642*
- IndeterminatesOfPolynomialRing, R 653
- Index, R 337
- indexing commands, E 17
- IndexInWholeGroup, R 337
- IndexNC, R 337
- Indicator, R 710
- IndicatorOp, R 710
- IndicesInvolutaryGenerators, R 452
- IndicesNormalSteps, R 429
- IndicesOfAdjointBasis, R 598
- IndicesStabChain, R 409
- Indirected, R 779
- Induced Actions, *R 667*
- InducedAutomorphism, R 375
- InducedClassFunction, R 749
- InducedClassFunctions, R 749
- InducedCyclic, R 750
- InducedPcgs, R 425
- InducedPcgsByGenerators, R 425
- InducedPcgsByGeneratorsNC, R 425
- InducedPcgsByPcSequence, R 425
- InducedPcgsByPcSequenceAndGenerators, R 425
- InducedPcgsByPcSequenceNC, R 425
- InducedPcgsWrtFamilyPcgs, R 436
- InducedPcgsWrtSpecialPcgs, R 432
- Inequalities, R 766
- inequality, of records, R 254
- inequality test, R 47
- InertiaSubgroup, R 746
- Infinity, *R 156*
- infinity, R 156
- inflated class functions, R 748
- Info, R 80
- InfoAlgebra, R 589
- InfoAttributes, R 122
- InfoBckt, R 412
- InfoCharacterTable, R 695
- InfoCoh, R 365
- InfoComplement, R 345

- InfoCoset, R 343
- InfoFpGroup, R 447
- Info Functions, *R 80*
- InfoGroup, R 336
- InfoLattice, R 360
- InfoLevel, R 80
- InfoMatrix, R 215
- InfoMonomial, R 790
- InfoNumtheor, R 134
- InfoOptions, R 87
- InfoPcSubgroup, R 362
- Information about a function, *R 61*
- Information about the version used, *R 84*
- InfoText, R 703
- InfoTom, R 675
- InfoWarning, R 81
- init.g, for a GAP package, *E 40*
- InitFusion, R 787
- InitPowerMap, R 785
- Injection, N 19
- InjectionZeroMagma, R 310
- InnerAutomorphism, R 374
- InnerAutomorphismNC, R 374
- InnerAutomorphismsAutomorphismGroup, R 375
- inner product, of group characters, R 745
- In Parent Attributes, *E 49*
- InParentFOA, *E 49*
- Input-Output Streams, *R 103*
- InputLogTo, R 94
  - for streams, R 101
  - stop logging input, R 94
- InputOutputLocalProcess, R 104
- InputTextFile, R 102
- InputTextNone, R 105
- InputTextString, R 103
- InputTextUser, R 103
- InsertTrivialStabilizer, R 410
- InstallAtExit, R 73
- installation, R 797
- installation, under UNIX, R 800
  - under Windows, R 807
- Installation for the Impatient, *R 797*
- Installation of GAP for MacOS, *R 811*
- Installation of GAP for UNIX, *R 800*
- Installation of GAP for Windows, *R 807*
- Installation of GAP Package Binaries, *E 38*
- InstallCharReadHookFunc, R 105
- InstalledPackageVersion, R 823
- InstallFactorMaintenance, R 287
- InstallFlushableValue, P 30
- InstallGlobalFunction, P 29
- InstallHandlingByNiceBasis, R 587
- InstallImmediateMethod, P 14
- Installing a GAP Package in your home directory, *R 820*
- Installing a Help Book, *E 44*
- Installing GAP Packages, *R 819*
- InstallIsomorphismMaintenance, R 287
- InstallMethod, P 12
- InstallOtherMethod, P 13
- InstallSubsetMaintenance, R 287
- InstallTrueMethod, P 15
- InstallValue, P 30
- Int, R 125
  - for cyclotomics, R 154
  - for strings, R 247
- integer part of a quotient, R 128
- Integers, R 125
- Integral Bases for Abelian Number Fields, *R 570*
- IntegralizedMat, R 236
- IntegratedStraightLineProgram, R 330
- Interface to the CAS System, *R 728*
- Interface to the MOC System, *R 729*
- IntermediateGroup, R 355
- IntermediateSubgroups, R 355
- Internally Represented Cyclotomics, *R 162*
- Internally Represented Strings, *R 243*
- InterpolatedPolynomial, R 554
- IntersectBlist, R 206
- Intersection, R 263
  - for groups with pcgs, R 434
- intersection, of collections, R 263
  - of sets, R 192
- Intersection2, R 263
- IntersectionBlist, R 205
- IntersectionsTom, R 681
- IntersectSet, R 192
- IntFFE, R 567
- IntHexString, R 247
- Introducing new Viewer for the Online Help, *E 46*
- IntScalarProducts, R 783
- IntVecFFE, R 567
- InvariantBilinearForm, R 416
- InvariantElementaryAbelianSeries, R 354
- Invariant Forms, *R 416*
- InvariantLattice, R 417

- InvariantQuadraticForm, R 416
- InvariantSesquilinearForm, R 416
- InvariantSubgroupsElementaryAbelianGroup, R 360
- Inverse, R 283
- inverse, group homomorphism, R 370
  - matrix, R 217
  - of class function, R 740
- InverseAttr, R 283
- InverseClasses, R 704
- InverseGeneralMapping, R 293
- InverseImmutable, R 283
- InverseMap, R 778
- InverseMatMod, R 230
- InverseMutable, R 283
- InverseOp, R 283
- InverseRepresentative, R 409
- InverseSameMutability, R 283
- InverseSM, R 283
- Invoking the Help, *R 23*
- IRIX, R 800
- Irr, R 699
- irrationalities, R 153
- IrrBaumClausen, R 715
- IrrConlon, R 715
- IrrDixonSchneider, R 715
- Irreducibility Tests, *R 666*
- irreducible character, R 744
- irreducible characters, computation, R 718
- IrreducibleDifferences, R 751
- Irreducible Maximal Finite Integral Matrix Groups, *R 511*
- IrreducibleModules, for groups with pcgs, R 434
- IrreducibleRepresentations, R 716
- IrreducibleRepresentationsDixon, R 717
- IrreducibleSolvableGroup, R 511
- IrreducibleSolvableGroupMS, R 510
- Irreducible Solvable Matrix Groups, *R 510*
- Is16BitsFamily, R 326
- Is32BitsFamily, R 326
- Is8BitsFamily, R 326
- IsAbelian, R 312
  - for character tables, R 701
- IsAbelianNumberField, R 570
- IsAbelianNumberFieldPolynomialRing, R 653
- IsAbelianTom, R 679
- IsAdditiveElement, R 288
- IsAdditiveElementWithInverse, R 288
- IsAdditiveElementWithZero, R 288
- IsAdditiveGroup, R 540
- IsAdditiveGroupGeneralMapping, R 300
- IsAdditiveGroupHomomorphism, R 300
- IsAdditivelyCommutative, R 541
- IsAdditivelyCommutativeElement, R 290
- IsAdditivelyCommutativeElementCollColl, R 290
- IsAdditivelyCommutativeElementCollection, R 290
- IsAdditivelyCommutativeElementFamily, R 290
- IsAdditiveMagma, R 539
- IsAdditiveMagmaWithInverses, R 540
- IsAdditiveMagmaWithZero, R 539
- IsAlgebra, R 596
- IsAlgebraGeneralMapping, R 301
- IsAlgebraHomomorphism, R 301
- IsAlgebraicElement, R 661
- IsAlgebraicExtension, R 660
- IsAlgebraModuleElement, R 608
- IsAlgebraModuleElementCollection, R 608
- IsAlgebraModuleElementFamily, R 608
- IsAlgebraWithOne, R 596
- IsAlgebraWithOneGeneralMapping, R 301
- IsAlgebraWithOneHomomorphism, R 301
- IsAlphaChar, R 244
- IsAlternatingGroup, R 402
- IsAnticommutative, R 549
- IsAntisymmetricBinaryRelation, R 304
- IsAssociated, R 549
- IsAssociative, R 312
- IsAssociativeElement, R 290
- IsAssociativeElementCollColl, R 290
- IsAssociativeElementCollection, R 290
- IsAssocWord, R 319
- IsAssocWordWithInverse, R 319
- IsAssocWordWithOne, R 319
- IsAttributeStoringRep, P 35
- IsAutomorphismGroup, R 375
- IsBasicWreathLessThanOrEqual, R 322
- IsBasicWreathProductOrdering, R 274
- IsBasis, R 576
- IsBasisByNiceBasis, R 587
- IsBasisOfAlgebraModuleElementSpace, R 609
- IsBergerCondition, R 791
- IsBijection, T 78
- IsBijective, R 295
- IsBinaryRelation, R 303

- same as `IsEndoGeneralMapping`, R 303
- `IsBLetterAssocWordRep`, R 325
- `IsBLetterWordsFamily`, R 325
- `IsBlist`, R 204
- `IsBlockMatrixRep`, R 230
- `IsBool`, R 165
- `IsBound`, for lists, R 173
- `IsBound` and `Unbind` for Lists, R 173
- `IsBound` and `Unbind` for Records, R 255
- `IsBoundElmWPObj`, E 54
- `IsBoundGlobal`, R 45
- `IsBrauerTable`, R 694
- `IsBravaisGroup`, R 418
- `IsBuiltFromAdditiveMagmaWithInverses`, R 334
- `IsBuiltFromGroup`, R 334
- `IsBuiltFromMagma`, R 334
- `IsBuiltFromMagmaWithInverses`, R 334
- `IsBuiltFromMagmaWithOne`, R 334
- `IsBuiltFromSemigroup`, R 334
- `IsCanonicalBasis`, R 579
- `IsCanonicalBasisFullMatrixModule`, R 583
- `IsCanonicalBasisFullRowModule`, R 583
- `IsCanonicalNiceMonomorphism`, R 373
- `IsCanonicalPcgs`, R 426
- `IsCentral`, R 312
- `IsChainTypeGroup`, N 20
- `IsChar`, R 240
- `IsCharacter`, R 744
- `IsCharacteristicSubgroup`, R 337
- `IsCharacterTable`, R 694
- `IsCharacterTableInProgress`, R 694
- `IsCharCollection`, R 240
- `IsClassFunction`, R 735
- `IsClassFusionOfNormalSubgroup`, R 710
- `IsClosedStream`, R 96
- `IsCochain`, R 628
- `IsCochainCollection`, R 628
- `IsCollection`, R 257
- `IsCollectionFamily`, R 257
- `IsCommutative`, R 312
- `IsCommutativeElement`, R 290
- `IsCommutativeElementCollColl`, R 290
- `IsCommutativeElementCollection`, R 290
- `IsComponentObjectRep`, P 35
- `IsCompositionMappingRep`, R 293
- `IsConfluent`, R 332
  - for pc groups, R 439
- `IsConjugacyClassSubgroupsByStabilizerRep`, R 356
- `IsConjugacyClassSubgroupsRep`, R 356
- `IsConjugate`, R 344
- `IsConjugatorAutomorphism`, R 374
- `IsConjugatorIsomorphism`, R 374
- `IsConstantRationalFunction`, R 646
- `IsConstantTimeAccessGeneralMapping`, R 301
- `IsConstantTimeAccessList`, R 169
- `IsContainedInSpan`, R 581
- `IsCopyable`, R 111
- `IsCyc`, R 153
- `IsCyclic`, R 349
  - for character tables, R 701
- `IsCyclicTom`, R 679
- `IsCyclotomic`, R 153
- `IsCyclotomicMatrixGroup`, R 417
- `IsDenseList`, R 168
- `IsDiagonalMat`, R 219
- `IsDictionary`, N 10
- `IsDigitChar`, R 244
- `IsDirectoryPath`, R 92
- `IsDistributive`, R 549
- `IsDivisionRing`, R 559
- `IsDomain`, R 280
- `IsDoneIterator`, R 267
- `IsDoubleCoset`, R 342
- `IsDuplicateFree`, R 188
- `IsDuplicateFreeList`, R 188
- `IsDxLargeGroup`, R 719
- `IsElementaryAbelian`, R 349
- `IsElementOfFpMonoid`, R 531
- `IsElementOfFpSemigroup`, R 531
- `IsElementOfFreeMagmaRing`, R 637
- `IsElementOfFreeMagmaRingCollection`, R 637
- `IsElementOfFreeMagmaRingFamily`, R 637
- `IsElementOfMagmaRingModuloRelations`, R 639
- `IsElementOfMagmaRingModuloRelations-Collection`, R 639
- `IsElementOfMagmaRingModuloRelationsFamily`, R 639
- `IsElementOfMagmaRingModuloSpanOfZeroFamily`, R 639
- `IsEmpty`, R 261
- `IsEmptyString`, R 243
- `IsEndOfStream`, R 99
- `IsEndoGeneralMapping`, R 301
  - same as `IsBinaryRelation`, R 303

- IsEqualSet, R 191
- IsEquivalenceClass, R 306
- IsEquivalenceRelation, R 304
- IsEuclideanRing, R 551
- IsEvenInt, R 126
- IsExecutableFile, R 92
- IsExistingFile, R 92
- IsExtAElement, R 288
- IsExternalOrbit, R 393
- IsExternalSet, R 391
- IsExternalSubset, R 392
- IsExtLElement, R 288
- IsExtRElement, R 288
- IsFamilyPcgs, R 436
- IsFFE, R 565
- IsFFECollColl, R 565
- IsFFECollection, R 565
- IsField, R 559
- IsFieldControlledByGaloisGroup, R 562
- IsFieldHomomorphism, R 301
- IsFinite, R 261
  - for character tables, R 701
- IsFiniteDimensional, R 557
  - for matrix algebras, R 597
- IsFiniteFieldPolynomialRing, R 653
- IsFinitelyGeneratedGroup, R 351
- IsFiniteOrderElement, R 290
- IsFiniteOrderElementCollColl, R 290
- IsFiniteOrderElementCollection, R 290
- IsFiniteOrdersPcgs, R 422
- IsFixedStabilizer, R 411
- IsFLMLOR, R 596
- IsFLMLORWithOne, R 596
- IsFpGroup, R 447
- IsFpMonoid, R 531
- IsFpSemigroup, R 530
- IsFreeGroup, R 320
- IsFreeLeftModule, R 556
- IsFreeMagmaRing, R 637
- IsFreeMagmaRingWithOne, R 637
- IsFromFpGroupGeneralMappingByImages, R 379
- IsFromFpGroupHomomorphismByImages, R 379
- IsFromFpGroupStdGensGeneralMappingByImages, R 379
- IsFromFpGroupStdGensHomomorphismByImages, R 379
- IsFullHomModule, R 586
- IsFullMatrixModule, R 558
- IsFullRowModule, R 558
- IsFullSubgroupGLorSLRespectingBilinearForm, R 416
- IsFullSubgroupGLorSLRespectingQuadraticForm, R 416
- IsFullSubgroupGLorSLRespectingSesquilinearForm, R 416
- IsFunc, T 78
- IsFunction, R 63
- IsGaussianIntegers, R 572
- IsGaussianRationals, R 570
- IsGaussianSpace, R 581
- IsGaussInt, R 156
- IsGaussRat, R 156
- IsGeneralizedDomain, R 280
- IsGeneralizedRowVector, R 179
- IsGeneralLinearGroup, R 415
- IsGeneralMapping, R 301
- IsGeneralMappingFamily, R 302
- IsGeneratorsOfStruct, R 277
- IsGL, R 415
- IsGreensClass, R 524
- IsGreensDClass, R 524
- IsGreensDRelation, R 523
- IsGreensHClass, R 524
- IsGreensHRelation, R 523
- IsGreensJClass, R 524
- IsGreensJRelation, R 523
- IsGreensLClass, R 524
- IsGreensLessThanOrEqual, R 524
- IsGreensLRelation, R 523
- IsGreensRClass, R 524
- IsGreensRelation, R 523
- IsGreensRRelation, R 523
- IsGroup, R 336
- IsGroupGeneralMapping, R 299
- IsGroupGeneralMappingByAsGroupGeneralMappingByImages, R 378
- IsGroupGeneralMappingByImages, R 378
- IsGroupGeneralMappingByPcgs, R 379
- IsGroupHClass, R 525
- IsGroupHomomorphism, R 299
- IsGroupOfAutomorphisms, R 375
- IsGroupRing, R 637
- IsHandledByNiceBasis, R 558
  - for vector spaces, R 587
- IsHandledByNiceMonomorphism, R 373
- IsHash, N 11



- IsHasseDiagram, R 304
- IsHomCoset, N 14
- IsHomCosetOfAdditiveElt, N 14
- IsHomCosetOfFp, N 14
- IsHomCosetOfMatrix, N 14
- IsHomCosetOfPerm, N 14
- IsHomCosetOfTuple, N 14
- IsHomCosetToAdditiveElt, N 14
- IsHomCosetToAdditiveEltRep, N 14
- IsHomCosetToFp, N 14
- IsHomCosetToFpRep, N 14
- IsHomCosetToMatrix, N 14
- IsHomCosetToMatrixRep, N 14
- IsHomCosetToObjectRep, N 14
- IsHomCosetToPerm, N 14
- IsHomCosetToPermRep, N 14
- IsHomCosetToTuple, N 14
- IsHomCosetToTupleRep, N 14
- IsHomogeneousList, R 169
- IsIdempotent, R 283
- IsIdenticalObj, R 110, T 24
- IsInChain, N 20
- IsIncomparableUnder, R 270
- IsInducedFromNormalSubgroup, R 793
- IsInducedPcgs, R 425
- IsInducedPcgsWrtSpecialPcgs, R 432
- IsInfBitsFamily, R 326
- IsInfinity, R 156
- IsInjective, R 294
- IsInnerAutomorphism, R 374
- IsInputOutputStream, R 104
- IsInputStream, R 96
- IsInputTextNone, R 96
- IsInputTextStream, R 96
- IsInt, R 125
- IsIntegerMatrixGroup, R 417
- IsIntegers, R 125
- IsIntegralBasis, R 579
- IsIntegralCyclotomic, R 154
- IsIntegralRing, R 548
- IsInternallyConsistent, R 114
  - for character tables, R 709
  - for tables of marks, R 679
- IsIrreducibleCharacter, R 744
- IsIrreducibleRingElement, R 550
- IsIterator, R 267
- IsJacobianElement, R 290
- IsJacobianElementCollColl, R 290
- IsJacobianElementCollection, R 290
- IsJacobianRing, R 549
- IsLaurentPolynomial, R 646
- IsLaurentPolynomialDefaultRep, R 657
- IsLDistributive, R 548
- IsLeftAlgebraModuleElement, R 608
- IsLeftAlgebraModuleElementCollection, R 608
- IsLeftIdeal, R 546
- IsLeftIdealInParent, R 546
- IsLeftModule, R 555
- IsLeftModuleGeneralMapping, R 300
- IsLeftModuleHomomorphism, R 300
- IsLeftOperatorAdditiveGroup, R 555
- IsLeftSemigroupIdeal, R 522
- IsLeftSemigroupIdealEnumerator, R 522
- IsLeftVectorSpace, R 573
- IsLessThanOrEqualUnder, R 270
- IsLessThanUnder, R 270
- IsLetterAssocWordRep, R 325
- IsLetterWordsFamily, R 325
- IsLexicographicallyLess, R 194
- IsLieAbelian, R 618
- IsLieAlgebra, R 596
- IsLieMatrix, R 216
- IsLieNilpotent, R 618
- IsLieObject, R 613
- IsLieObjectCollection, R 613
- IsLieSolvable, R 618
- IsLinearMapping, R 300
- IsLinearMappingsModule, R 586
- IsList, R 168
- IsListDefault, R 179
- IsListOrCollection, R 258
- IsLookupDictionary, N 10
- IsLowerAlphaChar, R 244
- IsLowerTriangularMat, R 219
- IsMagma, R 308
- IsMagmaHomomorphism, R 298
- IsMagmaRingModuloRelations, R 639
- IsMagmaRingModuloSpanOfZero, R 639
- IsMagmaWithInverses, R 308
- IsMagmaWithInversesIfNonzero, R 308
- IsMagmaWithOne, R 308
- IsMapping, R 294
- IsMat, T 78
- IsMatchingSublist, R 188
- IsMatrix, R 215
- IsMatrixGroup, R 414

- IsMatrixModule, R 558
- IsMatrixSpace, R 581
- IsMinimalNonmonomial, R 796
- IsModuloPcgs, R 427
- IsMonoid, R 527
- IsMonomial, for characters, R 793
  - for character tables, R 701
  - for groups, R 793
  - for positive integers, R 794
- IsMonomialGroup, R 350
- IsMonomialMatrix, R 219
- IsMonomialNumber, R 794
- IsMultiplicativeElement, R 288
- IsMultiplicativeElementWithInverse, R 289
- IsMultiplicativeElementWithOne, R 288
- IsMultiplicativeElementWithZero, R 288
- IsMultiplicativeGeneralizedRowVector, R 179
- IsMultiplicativeZero, R 312
- IsMutable, R 112
- IsMutableBasis, R 580
- IsNaturalAlternatingGroup, R 401
- IsNaturalGL, R 415
- IsNaturalGLnZ, R 417
- IsNaturalSL, R 416
- IsNaturalSLnZ, R 417
- IsNaturalSymmetricGroup, R 401
- IsNearAdditiveElement, R 288
- IsNearAdditiveElementWithInverse, R 288
- IsNearAdditiveElementWithZero, R 288
- IsNearAdditiveGroup, R 539
- IsNearAdditiveMagma, R 539
- IsNearAdditiveMagmaWithInverses, R 539
- IsNearAdditiveMagmaWithZero, R 539
- IsNearlyCharacterTable, R 694
- IsNearRingElement, R 289
- IsNearRingElementWithInverse, R 289
- IsNearRingElementWithOne, R 289
- IsNegRat, R 141
- IsNilpotent, for character tables, R 701
  - for groups with pcgs, R 434
- IsNilpotentElement, R 625
- IsNilpotentGroup, R 349
- IsNilpotentTom, R 679
- IsNonassocWord, R 315
- IsNonassocWordCollection, R 315
- IsNonassocWordWithOne, R 315
- IsNonassocWordWithOneCollection, R 315
- IsNonnegativeIntegers, R 125
- IsNonSPGeneralMapping, R 302
- IsNonTrivial, R 261
- IsNormal, R 337
- IsNormalBasis, R 579
- IsNotIdenticalObj, R 111
- IsNumberField, R 570
- IsObject, R 109
- IsOddInt, R 126
- isomorphic, pc group, R 440
- IsomorphicSubgroups, R 377
- IsomorphismFpAlgebra, R 605
- IsomorphismFpGroup, R 455
  - for subgroups of fp groups, R 458
- IsomorphismFpGroupByGenerators, R 456
- IsomorphismFpGroupByGeneratorsNC, R 456
- IsomorphismFpGroupByPcgs, R 438
- IsomorphismFpSemigroup, R 531
- IsomorphismGroups, R 376
- IsomorphismMatrixAlgebra, R 605
- IsomorphismPcGroup, R 440
- IsomorphismPermGroup, R 400
  - for Imf matrix groups, R 517
- IsomorphismPermGroupImfGroup, R 518
- IsomorphismReesMatrixSemigroup, R 526
- IsomorphismRefinedPcGroup, R 440
- IsomorphismRepStruct, R 278
- isomorphisms, find all, R 377
- IsomorphismSCAlgebra, R 605
- IsomorphismSimplifiedFpGroup, R 458
- IsomorphismSpecialPcGroup, R 441
- Isomorphisms vs. Isomorphic Structures, *T* 84
- IsomorphismTransformationSemigroup, R 522
- IsomorphismTypeInfoFiniteSimpleGroup, R 350
- IsOne, R 282
- IsOperation, R 63
- IsOrdering, R 269
- IsOrderingOnFamilyOfAssocWords, R 270
- IsOrdinaryMatrix, R 215
- IsOrdinaryTable, R 694
- IsOutputStream, R 96
- IsOutputTextNone, R 97
- IsOutputTextStream, R 96
- IsPadicExtensionNumber, R 663
- IsPadicExtensionNumberFamily, R 663
- IsParentPcgsFamilyPcgs, R 436
- IsPartialOrderBinaryRelation, R 304
- IsPcGroup, R 437
- IsPcGroupGeneralMappingByImages, R 379

- IsPcGroupHomomorphismByImages, R 379
- IsPcgs, R 421
- IsPcgsCentralSeries, R 429
- IsPcgsElementaryAbelianSeries, R 429
- IsPcgsPCentralSeriesPGroup, R 429
- IsPerfect, for character tables, R 701
- IsPerfectGroup, R 350
- IsPerfectTom, R 679
- IsPerm, R 396
- IsPermCollColl, R 396
- IsPermCollection, R 396
- IsPermGroup, R 400
- IsPermGroupGeneralMappingByImages, R 379
- IsPermGroupHomomorphismByImages, R 379
- IsPGroup, R 351
- IsPNilpotent, R 351
- IsPolycyclicGroup, R 350
- IsPolynomial, R 646
- IsPolynomialDefaultRep, R 657
- IsPolynomialRing, R 653
- IsPosInt, R 125
- IsPositiveIntegers, R 125
- IsPosRat, R 141
- IsPreimagesByAsGroupGeneralMappingByImages, R 379
- IsPreOrderBinaryRelation, R 304
- IsPrime, R 550
- IsPrimeField, R 561
- IsPrimeInt, R 130
- IsPrimeOrdersPcgs, R 422
- IsPrimePowerInt, R 130
- IsPrimitive, R 390
- IsPrimitiveCharacter, R 792
- IsPrimitivePolynomial, R 647
- IsPrimitiveRootMod, R 136
- IsProbablyPrimeInt, R 130
- IsPseudoCanonicalBasisFullHomModule, R 586
- IsPSolvable, R 351
- IsPSolvableCharacterTable, R 710
- IsPSolvableCharacterTableOp, R 710
- IsPurePadicNumber, R 662
- IsPurePadicNumberFamily, R 662
- IsQuasiPrimitive, R 792
- IsQuaternion, R 597
- IsQuaternionCollColl, R 597
- IsQuaternionCollection, R 597
- IsQuickPositionList, R 203
- IsQuotientSemigroup, R 523
- IsRange, R 202
- IsRat, R 141
- IsRationalFunction, R 645
- IsRationalFunctionDefaultRep, R 656
- IsRationalFunctionsFamily, R 655
- IsRationalMatrixGroup, R 417
- IsRationals, R 141
- IsRationalsPolynomialRing, R 653
- IsRDistributive, R 549
- IsReadableFile, R 92
- IsReadOnlyGlobal, R 44
- IsRec, T 78
- IsRecord, R 251
- IsRecordCollColl, R 251
- IsRecordCollection, R 251
- IsReduced, R 333
- IsReductionOrdering, R 271
- IsReesCongruence, R 523
- IsReesCongruenceSemigroup, R 521
- IsReesMatrixSemigroup, R 525
- IsReesMatrixSemigroupElement, R 525
- IsReesZeroMatrixSemigroup, R 525
- IsReesZeroMatrixSemigroupElement, R 525
- IsReflexiveBinaryRelation, R 303
- IsRegular, R 390
- IsRegularDClass, R 525
- IsRegularSemigroup, R 521
- IsRegularSemigroupElement, R 521
- IsRelativelySM, R 795
- IsRestrictedLieAlgebra, R 623
- IsRewritingSystem, R 332
- IsRightAlgebraModuleElement, R 608
- IsRightAlgebraModuleElementCollection, R 608
- IsRightCoset, R 341
- IsRightIdeal, R 546
- IsRightIdealInParent, R 546
- IsRightModule, R 555
- IsRightOperatorAdditiveGroup, R 555
- IsRightSemigroupIdeal, R 522
- IsRightSemigroupIdealEnumerator, R 522
- IsRing, R 543
- IsRingElement, R 289
- IsRingElementWithInverse, R 289
- IsRingElementWithOne, R 289
- IsRingGeneralMapping, R 301
- IsRingHomomorphism, R 301
- IsRingWithOne, R 547
- IsRingWithOneGeneralMapping, R 301

- IsRingWithOneHomomorphism, R 301
- IsRootSystem, R 619
- IsRootSystemFromLieAlgebra, R 620
- IsRowModule, R 558
- IsRowSpace, R 581
- IsRowVector, R 208
- IsScalar, R 289
- IsSemiEchelonized, R 582
- IsSemigroup, R 520
- IsSemigroupCongruence, R 523
- IsSemigroupIdeal, R 522
- IsSemigroupIdealEnumerator, R 522
- IsSemiRegular, R 389
- IsSet, R 189, T 78
- IsShortLexLessThanOrEqual, R 322
- IsShortLexOrdering, R 272
- IsSimple, for character tables, R 701
- IsSimpleAlgebra, R 596
- IsSimpleGroup, R 350
- IsSimpleSemigroup, R 521
- IsSingleValued, R 294
- IsSL, R 415
- IsSolvable, for character tables, R 701
- IsSolvableGroup, R 350
- IsSolvableTom, R 679
- IsSortedList, R 188
- IsSpecialLinearGroup, R 415
- IsSpecialPcgs, R 431
- IsSPGeneralMapping, R 302
- IsSSortedList, R 189
- IsStandardGeneratorsOfGroup, R 684
- IsStraightLineProgElm, R 331
- IsStraightLineProgram, R 327
- IsStream, R 96
- IsString, R 240
- IsStringRep, R 243
- IsStruct, R 278
- IsSubgroup, R 337
- IsSubgroupFpGroup, R 447
- IsSubgroupOfWholeGroupByQuotientRep, R 459
- IsSubgroupSL, R 416
- IsSubmonoidFpMonoid, R 530
- IsSubnormal, R 338
- IsSubnormallyMonomial, R 795
- IsSubsemigroupFpSemigroup, R 530
- IsSubset, R 262
- IsSubsetBlist, R 205
- IsSubsetLocallyFiniteGroup, R 351
- IsSubsetSet, R 191
- IsSubspacesVectorSpace, R 574
- IsSubstruct, R 280
- IsSupersolvable, for character tables, R 701
  - for groups with pcgs, R 434
- IsSupersolvableGroup, R 350
- IsSurjective, R 295
- IsSyllableAssocWordRep, R 326
- IsSyllableWordsFamily, R 326
- IsSymmetricBinaryRelation, R 303
- IsSymmetricGroup, R 402
- IsTable, R 169
- IsTableOfMarks, R 675
- IsTableOfMarksWithGens, R 686
- IsToPcGroupGeneralMappingByImages, R 379
- IsToPcGroupHomomorphismByImages, R 379
- IsToPermGroupGeneralMappingByImages, R 379
- IsToPermGroupHomomorphismByImages, R 379
- IsTotal, R 294
- IsTotalOrdering, R 270
- IsTransformation, R 536
- IsTransformationCollection, R 536
- IsTransformationMonoid, R 522
- IsTransformationSemigroup, R 522
- IsTransitive, for characters, R 747
  - for class functions, R 747
  - for group actions, R 389
- IsTransitiveBinaryRelation, R 303
- IsTranslationInvariantOrdering, R 270
- IsTrivial, R 261
- IsTuple, R 292
- IsTwoSidedIdeal, R 546
- IsTwoSidedIdealInParent, R 546
- IsUEALatticeElement, R 631
- IsUEALatticeElementCollection, R 631
- IsUEALatticeElementFamily, R 631
- IsUniqueFactorizationRing, R 548
- IsUnit, R 549
- IsUnivariatePolynomial, R 646
- IsUnivariatePolynomialRing, R 654
- IsUnivariateRationalFunction, R 646
- IsUnknown, R 163
- IsUpperAlphaChar, R 244
- IsUpperTriangularMat, R 219
- IsValidIdentifier, R 42
- IsVector, R 289
- IsVectorSpace, R 573
- IsVirtualCharacter, R 744

IsWeightLexOrdering, R 273  
 IsWeightRepElement, R 632  
 IsWeightRepElementCollection, R 632  
 IsWeightRepElementFamily, R 632  
 IsWellFoundedOrdering, R 269  
 IsWeylGroup, R 621  
 IsWholeFamily, R 261  
 IsWLetterAssocWordRep, R 325  
 IsWLetterWordsFamily, R 325  
 IsWord, R 314  
 IsWordCollection, R 315  
 IsWordWithInverse, R 314  
 IsWordWithOne, R 314  
 IsWreathProductOrdering, R 274  
 IsWritableFile, R 92  
 IsZero, R 282  
 IsZeroGroup, R 521  
 IsZeroSimpleSemigroup, R 521  
 IsZeroSquaredElement, R 290  
 IsZeroSquaredElementCollColl, R 290  
 IsZeroSquaredElementCollection, R 290  
 IsZeroSquaredRing, R 549  
 IsZmodnZObj, R 133  
 IsZmodnZObjNonprime, R 133  
 IsZmodpZObj, R 133  
 IsZmodpZObjLarge, R 133  
 IsZmodpZObjSmall, R 133  
 Iterated, R 199  
 Iterator, R 266  
 IteratorByBasis, R 578  
 IteratorList, R 267  
 Iterators, R 266  
 IteratorSorted, R 267

## J

$j_N$ , R 158  
 Jacobi, R 136  
 JenningsLieAlgebra, R 624  
 JenningsSeries, R 354  
 JoinEquivalenceRelations, R 306  
 JoinStringsWithSeparator, R 246  
 JordanDecomposition, R 227

## K

$k_N$ , R 158  
 KappaPerp, R 625  
 kernel, T 55  
 KernelOfAdditiveGeneralMapping, R 300  
 KernelOfCharacter, R 746

KernelOfMultiplicativeGeneralMapping, R 299  
 KernelOfTransformation, R 537  
 KeyDependentOperation, E 48  
 Key Dependent Operations, E 48  
 Keywords, R 41  
 KillingMatrix, R 625  
 KnownAttributesOfObject, R 120, T 75  
 Known Problems of the Configure Process, R 805  
 KnownPropertiesOfObject, R 123, T 75  
 KnownTruePropertiesOfObject, R 123, T 75  
 KnowsDictionary, N 10  
 KnowsHowToDecompose, R 367  
 KnuthBendixRewritingSystem, R 534  
 Krasner-Kaloujnine theorem, R 491  
 KroneckerProduct, R 220  
 KuKGenerators, R 491

## L

$l_N$ , R 158  
 Labels and References, E 16  
 Lambda, R 134  
 Language Overview, R 39  
 larger or equal, R 47  
 larger test, R 47  
 LargestElementGroup, R 363  
 LargestElementStabChain, R 409  
 LargestMovedPoint, R 397  
 LargestUnknown, R 163  
 last, R 64, T 23  
 last2, T 23  
 last3, T 23  
 LastSystemError, R 89  
 LaTeXStringDecompositionMatrix, R 708  
 lattice base reduction, R 237  
 lattice basis reduction, for virtual characters, R 751  
 LatticeByCyclicExtension, R 360  
 LatticeGeneratorsInUEA, R 631  
 Lattice Reduction, R 236  
 LatticeSubgroups, R 358  
 LatticeSubgroupsByTom, R 672  
 LaurentPolynomialByCoefficients, R 652  
 LaurentPolynomialByExtRep, R 658  
 Laurent Polynomials, R 651  
 LClassOfHClass, R 524  
 Lcm, R 553  
 LcmInt, R 129  
 LcmOp, R 553  
 LeadCoeffsIGS, R 426

- LeadingCoefficient, R 648
- LeadingExponentOfPcElement, R 423
- LeadingMonomial, R 648
- LeadingMonomialPosExtRep, R 655
- Leaving GAP, *R 72*
- leaving GAP, T 18
- LeftActingAlgebra, R 608
- LeftActingDomain, R 556
- LeftActingRingOfIdeal, R 547
- LeftAlgebraModule, R 607
- LeftAlgebraModuleByGenerators, R 606
- left cosets, R 341
- LeftDerivations, R 615
- LeftIdeal, R 545
- LeftIdealByGenerators, R 546
- LeftIdealNC, R 546
- LeftModuleByGenerators, R 556
- LeftModuleByHomomorphismToMatAlg, R 610
- LeftModuleGeneralMappingByImages, R 584
- LeftModuleHomomorphismByImages, R 584
- LeftModuleHomomorphismByImagesNC, R 584
- LeftModuleHomomorphismByMatrix, R 585
- LeftQuotient, R 285
  - for words, R 322
- LeftShiftRowVector, R 212
- Legacy Operations, *R 394*
- Legendre, R 136
- Length, R 189
  - of an associative word, R 323
- length, of a word, R 323
- LengthsTom, R 676
- LengthWord, T 78
- LengthWPObj, E 54
- LenstraBase, R 570
- LessThanFunction, R 270
- LessThanOrEqualFunction, R 270
- LetterRepAssocWord, R 326
- LevelsOfGenerators, R 274
- LeviMalcevDecomposition, R 602
  - for Lie algebras, R 618
- Lexical Structure, *R 40*
- LexicographicOrdering, R 271
- LGFirst, R 431
- LGLayers, R 431
- LGLength, R 431
- LGWeights, R 431
- library tables, R 692
- LieAlgebra, R 614
- LieAlgebraByStructureConstants, R 614
- LieBracket, R 285
- LieCenter, R 616
- LieCentralizer, R 616
- LieCentre, R 616
- LieCoboundaryOperator, R 629
- LieDerivedSeries, R 617
- LieDerivedSubalgebra, R 616
- LieFamily, R 613
- LieLowerCentralSeries, R 617
- LieNilRadical, R 617
- LieNormalizer, R 616
- LieObject, R 613
- Lie objects, *R 613*
- LieSolvableRadical, R 617
- LieUpperCentralSeries, R 617
- LiftedInducedPcgs, R 428
- LiftedPcElement, R 428
- LinearAction, R 432
- LinearActionLayer, R 432
- LinearCharacters, R 700
- LinearCombination, R 578
- LinearCombinationPcgs, R 423
- LinearIndependentColumns, R 236
- Linear Mappings, *R 300*
- LinearOperation, R 432
- LinearOperationLayer, R 432
- Line Editing, *R 73*
- line editing, T 19
- LinesOfStraightLineProgram, R 328
- Linux, R 800
- List, R 196
- list and non-list, difference, R 181
  - left quotient, R 184
  - mod, R 183
  - product, R 182
  - quotient, R 183
- List Assignment, *R 171*
- list assignment, operation, R 170
- ListBlist, R 204
- list boundedness test, operation, R 170
- List Categories, *R 168*
- list element, access, R 170
  - assignment, R 171
  - operation, R 170
- List Elements, *R 170*
- list environment, compact description, E 21
  - description, E 21

- ordered, E 22
- unordered, E 22
- list equal, comparison, R 177
- ListN, R 199
- list of available books, R 24
- List Operations, *T 35*
- ListPerm, R 398
- lists, dense, T 28
  - strictly sorted, T 31
- lists, identical, *T 29*
  - plain, *T 27*
- Lists and Collections, *R 258*
- list smaller, comparison, R 178
- ListStabChain, R 409
- list unbind, operation, R 170
- ListWithIdenticalEntries, R 185
- ListX, R 199
- LLL, R 751
- LLL algorithm, for Gram matrices, R 237
  - for vectors, R 236
  - for virtual characters, R 751
- LLReducedBasis, R 236
- LLReducedGramMat, R 237
- LoadDynamicModule, R 35
- LOADED\_PACKAGES, E 41
- Loading a GAP Package, *R 821*
- loading a saved workspace, R 37
- local, R 55
- Local Variables, *T 41*
- logarithm, discrete, R 135
  - of a root of unity, R 156
- LogFFE, R 567
- logical, R 165
- Logical Implications, *P 15*
- logical operations, R 166
- LogInt, R 127
- LogMod, R 135
- LogTo, R 94
  - for streams, R 101
  - stop logging, R 94
- LongestWeylWordPerm, R 622
- LookupDictionary, N 10
- loop, read eval print, R 64
- loop, for, R 52
  - repeat, R 52
  - while, R 51
- loop over iterator, R 54
- loop over object, R 54

- loop over range, R 53
- loops, leaving, R 54
  - restarting, R 55
- loops, for, *T 33*
  - while, *T 33*
- LowercaseString, R 245
- LowerCentralSeriesOfGroup, R 354
- Low Index Subgroups, *R 454*
- LowIndexSubgroupsFpGroup, R 454
- Low Level Access Functions for Weak Pointer Objects, *E 54*
- Low Level Routines to Modify and Create Stabilizer Chains, *R 410*
- Lucas, R 151

## M

- $m_N$ , R 158
- Macintosh, R 811
- MacOS, R 811
- Magma, R 308
- MagmaByGenerators, R 309
- MagmaByMultiplicationTable, R 310
- Magma Categories, *R 308*
- MagmaElement, R 310
- Magma Generation, *R 308*
- MagmaHomomorphismByFunctionNC, R 298
- Magma Homomorphisms, *R 298*
- MagmaRingModuloSpanOfZero, R 639
- Magma Rings modulo Relations, *R 639*
- Magma Rings modulo the Span of a Zero Element, *R 639*
- Magmas Defined by Multiplication Tables, *R 310*
- MagmaWithInverses, R 309
- MagmaWithInversesByGenerators, R 309
- MagmaWithInversesByMultiplicationTable, R 310
- MagmaWithOne, R 308
- MagmaWithOneByGenerators, R 309
- MagmaWithOneByMultiplicationTable, R 310
- Main Loop, *R 64*
- MakeConfluent, R 333
- MakeHomChain, N 22
- MakeImmutable, R 112
- makeindex, E 27
- MAKElb11, R 729
- MakeReadOnlyGlobal, R 44
- MakeReadWriteGlobal, R 44
- Making transformation semigroups, *R 522*

- manual.bbl, E 27
- manual.bib, E 27
- manual.dvi, E 27
- manual.lab, E 27
- manual.mst, E 27
- manual.six, E 27
- manual.tex, E 27
- Manual Conventions, *R 21*
- manualindex, E 27
- map, parametrized, *R 777*
- MappedWord, *R 316*
- MappingByFunction, *R 292*
- MappingPermListList, *R 398*
- Mappings that Respect Addition, *R 299*
- Mappings that Respect Multiplication, *R 298*
- Mappings which are Compatible with Algebraic Structures, *R 298*
- maps, *R 769*
- maps-to operator, *T 24*
- MarksTom, *R 675*
- MatAlgebra, *R 593*
- MatClassMultCoeffsCharTable, *R 712*
- mathematics alignments, *E 24*
- mathematics displays, *E 24*
- MathieuGroup, *R 494*
- MatLieAlgebra, *R 615*
- matrices, *T 36*
  - commutator, *R 217*
- Matrices as Basis of a Row Space, *R 225*
- Matrices as Linear Mappings, *R 226*
- Matrices over Finite Fields, *R 228*
- Matrices Representing Linear Equations and the Gaussian Algorithm, *R 222*
- MatrixAlgebra, *R 593*
- MatrixAutomorphisms, *R 726*
- matrix automorphisms, *R 772*
- MatrixByBlockMatrix, *R 230*
- Matrix Constructions, *R 219*
- Matrix Groups in Characteristic 0, *R 417*
- MatrixLieAlgebra, *R 615*
- MatrixOfAction, *R 609*
- matrix spaces, *R 581*
- MatScalarProducts, *R 745*
- MatTom, *R 678*
- MaximalAbelianQuotient, *R 356*
- MaximalBlocks, *R 390*
- MaximalNormalSubgroups, *R 357*
- MaximalSubgroupClassReps, *R 357*
- MaximalSubgroups, *R 357*
  - for groups with pcgs, *R 434*
- MaximalSubgroupsLattice, *R 358*
- MaximalSubgroupsTom, *R 682*
- Maximum, *R 195*
- MaximumList, *R 195*
- MeatAxe Modules, *R 665*
- MeetEquivalenceRelations, *R 306*
- MeetMaps, *R 780*
- MeetPartitionStrat, *E 61*
- meet strategy, *E 61*
- Membership Test for Collections, *R 264*
- Membership Test for Lists, *R 177*
- method, *P 12*
- Method Installation, *P 12*
- methods, *T 72*
  - immediate, *T 74*
  - selection, *T 73*
  - true, *T 74*
- MinimalElementCosetStabChain, *R 409*
- MinimalGeneratingSet, *R 363*
  - for groups with pcgs, *R 434*
- MinimalNonmonomialGroup, *R 796*
- Minimal Nonmonomial Groups, *R 796*
- MinimalPolynomial, *R 650*
  - over a field, *R 562*
  - over a ring, *R 650*
- Minimal Polynomials, *R 650*
- MinimalStabChain, *R 407*
- MinimalSupergroupsLattice, *R 359*
- MinimalSupergroupsTom, *R 682*
- MinimizedBombieriNorm, *R 651*
- Minimum, *R 195*
- MinimumList, *R 195*
- MinusCharacter, *R 786*
- Miscellaneous, *R 139*
- MOCChars, *R 732*
- MOCString, *R 731*
- MOCTable, *R 730*
- mod, integers, *R 132*
  - laurent polynomials, *R 644*
  - lists, *R 183*
  - rationals, *R 48*
- mod, *R 48*
  - arithmetic operators, *R 48*
  - for character tables, *R 698*
  - residue class rings, *R 132*
- modular inverse, *R 48*



- modular remainder, R 48
- modular roots, R 138
- ModuleByRestriction, R 611
- Module Homomorphisms, R 667
- ModuleOfExtension, R 442
- Modules over Lie Algebras and Their Cohomology, R 628
- Modules over Semisimple Lie Algebras, R 630
- modulo, R 48
  - arithmetic operators, R 48
  - for pcgs, R 427
  - residue class rings, R 132
- ModuloPcgs, R 427
- MoebiusMu, R 138
- MoebiusTom, R 678
- Molien Series, R 758
- MolienSeries, R 758
- MolienSeriesInfo, R 759
- MolienSeriesWithGivenDenominator, R 760
- Monoid, R 527
- MonoidByGenerators, R 527
- MonoidByMultiplicationTable, R 528
- MonoidOfRewritingSystem, R 534
- MonomialRevLexicoLess, R 655
- MonomialTotalDegreeLess, R 654
- monomorphisms, find all, R 377
- MorClassLoop, R 377
- More about Boolean Lists, R 206
- More About Global Variables, R 44
- More about Tables of Marks, R 670
- MostFrequentGeneratorFpGroup, R 452
- MovedPoints, R 397
- Moved Points of Permutations, R 397
- MTX.BasesCompositionSeries, R 666
- MTX.BasesMaximalSubmodules, R 666
- MTX.BasesMinimalSubmodules, R 666
- MTX.BasesMinimalSupermodules, R 666
- MTX.BasesSubmodules, R 666
- MTX.BasisRadical, R 666
- MTX.BasisSocle, R 666
- MTX.CollectedExceptions, R 667
- MTX.CompositionFactors, R 666
- MTX.DegreeSplittingField, R 666
- MTX.Dimension, R 665
- MTX.Distinguish, R 668
- MTX.Field, R 665
- MTX.Generators, R 665
- MTX.Homomorphism, R 667
- MTX.Homomorphisms, R 668
- MTX.InducedAction, R 667
- MTX.InducedActionFactorMatrix, R 667
- MTX.InducedActionFactorModule, R 667
- MTX.InducedActionMatrix, R 667
- MTX.InducedActionMatrixNB, R 667
- MTX.InducedActionSubmodule, R 667
- MTX.InducedActionSubmoduleNB, R 667
- MTX.IsAbsolutelyIrreducible, R 666
- MTX.IsEquivalent, R 667
- MTX.IsIrreducible, R 666
- MTX.Isomorphism, R 667
- MTX.NormedBasisAndBaseChange, R 667
- MTX.ProperSubmoduleBasis, R 666
- MTX.SubmoduleGModule, R 666
- multiplication, R 48
  - matrices, R 217
  - matrix and matrix list, R 218
  - matrix and scalar, R 216
  - matrix and vector, R 217
  - operation, R 285
  - scalar and matrix, R 216
  - scalar and matrix list, R 217
  - scalar and vector, R 209
  - vector and matrix, R 216
  - vector and matrix list, R 218
  - vector and scalar, R 209
  - vectors, R 209
- MultiplicationTable, R 310
- Multiplicative Arithmetic for Lists, R 182
- Multiplicative Arithmetic Functions, R 138
- MultiplicativeNeutralElement, R 312
- multiplicative order of an integer, R 135
- MultiplicativeZero, R 312
- MultiplicativeZeroOp, R 282
- multiplicity, of constituents of a group character, R 745
- multiplier, R 366
- multisets, R 190
- Multivariate Polynomials, R 649
- MultRowVector, R 211
- Murnaghan components, R 757
- Mutability and Copyability, R 111
- Mutability and Copying, P 27
- Mutability Status and List Arithmetic, R 184
- Mutable Bases, R 579
- MutableBasis, R 580
- MutableBasisOfClosureUnderAction, R 599

MutableBasisOfIdealInNonassociativeAlgebra,  
R 600  
MutableBasisOfNonassociativeAlgebra, R 600  
MutableIdentityMat, R 221  
MutableNullMat, R 221

## N

$n_k$ , R 158  
Name, R 114  
NameFunction, R 61  
NameRNam, R 256  
NamesFilter, R 117  
NamesGVars, R 45  
NamesOfComponents, P 22  
NamesOfFusionSources, R 776  
NamesSystemGVars, R 45  
NamesUserGVars, R 45  
Naming Conventions, *T* 79  
NaturalCharacter, R 743  
Natural Embeddings related to Magma Rings, *R* 638  
NaturalHomomorphismByGenerators, R 298  
NaturalHomomorphismByIdeal, R 604  
NaturalHomomorphismByNormalSubgroup, R 355  
NaturalHomomorphismByNormalSubgroupNC, R 355  
NaturalHomomorphismBySubAlgebraModule, R 611  
NaturalHomomorphismBySubspace, R 585  
NearAdditiveGroup, R 540  
NearAdditiveGroupByGenerators, R 540  
NearAdditiveMagma, R 540  
NearAdditiveMagmaByGenerators, R 540  
NearAdditiveMagmaWithZero, R 540  
NearAdditiveMagmaWithZeroByGenerators, R 540  
NearlyCharacterTablesFamily, R 696  
negative number, R 48  
NegativeRoots, R 620  
NegativeRootVectors, R 620  
NestingDepthA, R 180  
NestingDepthM, R 180  
New Arithmetic Operations vs. New Objects, *P* 61  
NewAttribute, P 18  
    example, P 35  
    mutable, P 18  
NewCategory, P 17  
NewDictionary, N 10  
NewFamily, P 20  
NewFilter, P 19  
NewInfoClass, R 80  
newline, R 40  
newline character, R 242  
NewmanInfinityCriterion, R 463  
NewOperation, P 19  
New Presentations and Presentations for Subgroups,  
    *R* 458  
NewProperty, P 18  
NewRepresentation, P 17  
    example, P 35  
NewType, P 21  
NextIterator, R 267  
NextPrimeInt, R 130  
NiceBasis, R 587  
NiceBasisFiltersInfo, R 588  
NiceFreeLeftModule, R 586  
NiceFreeLeftModuleInfo, R 587  
NiceMonomorphism, R 373  
NiceMonomorphismAutomGroup, R 376  
Nice Monomorphisms, *R* 372, *T* 56  
NiceObject, R 373  
NiceVector, R 586  
NilpotencyClassOfGroup, R 349  
NilpotentQuotientOfFpLieAlgebra, R 627  
NK, R 158  
NOAUTO, R 822  
NOfCyc, *T* 78  
NonnegativeIntegers, R 125  
NonnegIntScalarProducts, R 783  
NonNilpotentElement, R 625  
Norm, R 562  
    of character, R 745  
NormalBase, R 563  
NormalClosure, R 345  
NormalFormIntMat, R 234  
Normal Forms over the Integers, *R* 232  
NormalIntersection, R 345  
NormalizedElementOfMagmaRingModulo-  
    Relations, R 639  
NormalizedWhitespace, R 246  
Normalizer, R 345  
normalizer, R 344  
NormalizerInGLnZ, R 418  
NormalizerInGLnZBravaisGroup, R 418  
NormalizersTom, R 680  
NormalizerTom, R 680  
NormalizeWhitespace, R 246  
NormalSeriesByPcgs, R 429  
Normal Structure, *R* 344  
NormalSubgroupClasses, R 733

- NormalSubgroupClassesInfo, R 732
  - NormalSubgroups, R 357
  - NormedRowVector, R 209
  - NormedRowVectors, R 583
  - not, R 167
  - Notions of Generation, *T* 69
  - NrArrangements, R 145
  - NrBasisVectors, R 580
  - NrCombinations, R 145
  - NrConjugacyClasses, R 344
    - for character tables, R 701
  - NrConjugacyClassesGL, R 498
  - NrConjugacyClassesGU, R 498
  - NrConjugacyClassesPGL, R 498
  - NrConjugacyClassesPGU, R 498
  - NrConjugacyClassesPSL, R 498
  - NrConjugacyClassesPSU, R 498
  - NrConjugacyClassesSL, R 498
  - NrConjugacyClassesSLIsogeneous, R 498
  - NrConjugacyClassesSU, R 498
  - NrConjugacyClassesSUIsogeneous, R 498
  - NrDerangements, R 148
  - NrInputsOfStraightLineProgram, R 328
  - NrMovedPoints, R 397
  - NrOrderedPartitions, R 149
  - NrPartitions, R 149
  - NrPartitionsSet, R 148
  - NrPartitionTuples, R 151
  - NrPermutationsList, R 147
  - NrPolyhedralSubgroups, R 711
  - NrPrimitiveGroups, R 509
  - NrRestrictedPartitions, R 150
  - NrSubsTom, R 676
  - NrTransitiveGroups, R 500
  - NrTuples, R 147
  - NrUnorderedTuples, R 146
  - NullAlgebra, R 593
  - NullMat, R 219
  - NullspaceMat, R 222
  - NullspaceMatDestructive, R 222
  - NullspaceModQ, R 230
  - Number, R 197
  - number, Bell, R 144
    - binomial, R 143
    - Stirling, of the first kind, R 144
    - Stirling, of the second kind, R 145
  - NumberArgumentsFunction, R 61
  - NumberFFVector, R 211
  - number field, R 570
  - number fields, Galois group, R 571
  - NumberIrreducibleSolvableGroups, R 510
  - NumberPerfectGroups, R 505
  - NumberPerfectLibraryGroups, R 505
  - NumberSmallGroups, R 502
  - NumberSyllables, R 324
  - Numerator, T 78
  - numerator, of a rational, R 142
  - NumeratorOfModuloPcgs, R 427
  - NumeratorOfRationalFunction, R 645
  - NumeratorRat, R 142
  - Numerical Group Attributes, *R* 352
- ## O
- O, Operation mark-up, E 17
  - $O_p(G)$ , see PCore, R 345
  - ObjByExtRep, P 26, R 632
  - Objectify, P 21
  - ObjectifyWithAttributes, P 21
  - Objects, *R* 109
  - objects, T 22
  - objects, vs. elements, *T* 23
    - vs. variables, *T* 22
  - OCOneCocycles, R 365
  - octal character codes, R 242
  - OctaveAlgebra, R 593
  - od, R 52
  - OldGeneratorsOfPresentation, R 480
  - Omega, R 349
  - ONanScottType, R 402
  - OnBreak, R 68
  - OnBreakMessage, R 69
  - One, N 18, R 281
  - OneAttr, R 281
  - OneCoboundaries, R 364
  - OneCocycles, R 363
  - one cohomology, R 363
  - OneFactorBound, R 651
  - OneImmutable, R 281
  - OneIrreducibleSolvableGroup, R 511
  - OneLibraryGroup, R 500
  - OneMutable, R 281
  - OneOfPcgs, R 422
  - OneOp, R 281
  - OnePrimitiveGroup, R 500
  - OneSameMutability, R 281
  - OneSM, R 281

- OneSmallGroup, R 502
- OneTransitiveGroup, R 500
- OnIndeterminates, R 650
  - as a permutation action, R 382
- OnLeftInverse, R 381
- OnLines, R 382
  - example, R 495
- OnPairs, R 381
- OnPoints, R 381
- OnRight, R 381
- OnSets, R 381
- OnSetsDisjointSets, R 381
- OnSetsSets, R 381
- OnSetsTuples, R 381
- OnSubspacesByCanonicalBasis, R 383
- OnTuples, R 381
- OnTuplesSets, R 381
- OnTuplesTuples, R 382
- Operation, R 394
- operation, P 12
- OperationAlgebraHomomorphism, R 605
- Operational Structure of Domains, R 275
- Operation Functions, E 50
- OperationHomomorphism, R 394
- operations, T 75
  - for booleans, R 166
- Operations and Attributes for Vector Spaces, R 574
- Operations and Mathematical Terms, P 15
- Operations and Methods, P 12
- Operations applicable to All Streams, R 97
- Operations Concerning Blocks, R 706
- Operations for (Near-)Additive Magmas, R 541
- Operations for Abelian Number Fields, R 570
- operations for algebraic elements, R 660
- Operations for Associative Words, R 322
- Operations for Associative Words by their Syllables, R 324
- Operations for Booleans, R 166
- Operations for Brauer Characters, R 766
- Operations for Class Functions, R 744
- Operations for Collections, R 262
- Operations for Cyclotomics, R 153
- Operations for Domains, R 280
- Operations for Finite Field Elements, R 566
- Operations for Finitely Presented Groups, R 449
- Operations for Group Homomorphisms, R 370
- Operations for Input Streams, R 97
- Operations for Lists, R 192
- Operations for Output Streams, R 100
- Operations for Pc Groups, R 441
- Operations for Rational Functions, R 644
- Operations for Special Kinds of Bases, R 579
- Operations for Stabilizer Chains, R 408
- Operations for Vector Space Bases, R 577
- Operations for Words, R 316
- Operations on elements of the algebra, R 333
- Operations on hom cosets, N 15
- Operations on rewriting systems, R 332
- Operations Records, T 81
- Operations to Evaluate Strings, R 247
- Operations to Produce or Manipulate Strings, R 245
- Operations vs. Dispatcher Functions, T 82
- Operations which have Special Methods for Groups
  - with Pcgs, R 434
- operators, R 42, T 20
  - arithmetic, R 48
  - associativity, R 49
  - for cyclotomics, R 157
  - for lists, R 178
  - precedence, R 48
- Operators for Character Tables, R 698
- Operators for Matrices, R 216
- Operators for Row Vectors, R 208
- Optimization and Compiler Options, R 805
- options, R 797
  - command line, filenames, R 30
  - command line, internal, R 31
- options, under UNIX, R 28
- or, R 166
- Orbit, R 383, T 77
- OrbitFusions, R 777
- OrbitGenerators, N 17
- OrbitGeneratorsInv, N 17
- OrbitGeneratorsOfGroup, N 21
- OrbitishF0, E 51
- OrbitLength, R 384
- OrbitLengths, R 384
- OrbitLengthsDomain, R 384
- OrbitPerms, R 400
- OrbitPowerMaps, R 772
- Orbits, E 50
  - operation/attribute, R 383
- Orbits, R 383
- OrbitsDomain, R 383
- OrbitsishOperation, E 50
- OrbitsPerms, R 400

- OrbitStabChain, R 409
  - OrbitStabilizer, R 384
  - OrbitStabilizerAlgorithm, R 385
  - Orbit Stabilizer Methods for Polycyclic Groups,  
R 433
  - Order, R 284, T 78
    - of a class function, R 741
  - order, of a group, R 335
    - of a list, collection or domain, R 262
    - of the prime residue group, R 134
  - OrderedPartitions, R 149
  - ordered partitions, E 57
  - ordering, booleans, R 165
    - of records, R 254
  - OrderingByLessThanFunctionNC, R 269
  - OrderingByLessThanOrEqualFunctionNC, R 269
  - OrderingOfRewritingSystem, R 332
  - OrderingOnGenerators, R 271
  - OrderingsFamily, R 269
  - Orderings on families of associative words, R 270
  - OrderMod, R 135
  - OrderOfRewritingSystem, R 332
  - OrdersClassRepresentatives, R 702
  - OrdersTom, R 676
  - Ordinal, R 248
  - ordinary character, R 744
  - OrdinaryCharacterTable, R 700
  - OrthogonalComponents, R 757
  - Orthogonal Embeddings, R 238
  - OrthogonalEmbeddings, R 238
  - OrthogonalEmbeddingsSpecialDimension, R 753
  - OSF, R 800
  - Other Filters, R 123
  - Other Operations Applicable to any Object, R 114
  - Other Operations for Character Tables, R 709
  - Other Operations for Tables of Marks, R 679
  - output, suppressing, R 64
  - OutputLogTo, R 94
    - for streams, R 101
    - stop logging output, R 94
  - OutputTextFile, R 102
  - OutputTextNone, R 105
  - OutputTextString, R 103
  - OutputTextUser, R 103
  - overload, P 15
- P**
- P, Property mark-up, E 17
  - $p$ -group, R 351
  - package, R 819
  - Package Completion, E 41
  - PadicCoefficients, R 236
  - PadicExtensionNumberFamily, R 663
  - PadicNumber, R 663
    - for pure padics, R 662
  - Pager, R 26
  - Parametrized, R 779
  - Parametrized Maps, R 777
  - parametrized maps, R 769
  - Parent, R 279
  - ParentPcgs, R 425
  - Parents, R 279
  - Parents and Subgroups, T 82
  - Partial Methods, P 13
  - partial order, R 304
  - PartialOrderByOrderingFunction, R 305
  - PartialOrderOfHasseDiagram, R 304
  - Partitions, R 149
  - partitions, improper, of an integer, R 149
    - ordered, of an integer, R 149
    - restricted, of an integer, R 150
  - PartitionsGreatestEQ, R 150
  - PartitionsGreatestLE, R 150
  - PartitionsSet, R 148
  - PartitionTuples, R 151
  - PcElementByExponents, R 423
  - PcElementByExponentsNC, R 423
  - PCentralLieAlgebra, R 624
  - PCentralSeries, R 354
  - PcGroupCode, R 444
  - PcGroupCodeRec, R 444
  - PcGroupFpGroup, R 438
  - Pc groups versus fp groups, R 437
  - PcGroupWithPcgs, R 440
  - Pcgs, R 421
  - Pcgs.OrbitStabilizer, R 433
  - Pcgs and Normal Series, R 428
  - PcgsByPcSequence, R 421
  - PcgsByPcSequenceNC, R 421
  - PcgsCentralSeries, R 429
  - PcgsChiefSeries, R 429
  - PcgsElementaryAbelianSeries, R 429
  - PcgsPCentralSeriesPGroup, R 429
  - PClassPGroup, R 351
  - PCore, R 345
  - PcSeries, R 422

- PerfectGroup, R 504
- perfect groups, R 504
- PerfectIdentification, R 505
- PerfectResiduum, R 347
- Permanent, R 152
- Permanent of a Matrix, *R 152*
- PermBounds, R 766
- PermCharInfo, R 761
- PermCharInfoRelative, R 762
- PermChars, R 762
- PermCharsTom, R 688
- PermComb, R 766
- PermGroupOps.ElementProperty, T 78
- PermLeftQuoTransformation, R 538
- PermList, R 398
- PermListList, R 194
- Permutation, R 388
- PermutationCharacter, R 743
- permutation character, R 788
- permutation characters, possible, R 760
- PermutationCycle, R 388
- Permutation groups, *T 44*
- PermutationMat, R 220
- PermutationsFamily, R 396
- Permutations Induced by Elements and Cycles, *R 388*
- PermutationsList, R 147
- PermutationTom, R 674
- Permuted, R 196
  - as a permutation action, R 382
  - for class functions, R 741
- PGL, R 497
- PGU, R 497
- Phi, R 134
- Plain Lists, *T 27*
- Plain Records, *T 38*
- point stabilizer, R 384
- Polycyclic Generating Systems, *R 420*
- PolynomialByExtRep, R 657
- PolynomialCoefficientsOfPolynomial, R 648
- Polynomial Factorization, *R 650*
- Polynomial Reduction, *R 654*
- PolynomialReduction, function, R 654
- PolynomialRing, R 652
- Polynomial Rings, *R 652*
- Polynomials, *T 84*
- Polynomials as Univariate Polynomials in one Indeterminate, *R 648*
- Polynomials over the Rationals, *R 651*
- PopOptions, R 87
- Portability, *R 89*
- Porting GAP, *R 814*
- Position, R 185, T 78
- Positional Objects, *P 23*
- PositionBound, R 187
- PositionCanonical, R 185
- PositionNonZero, R 187
- PositionNot, R 187
- PositionNthOccurrence, R 186
- PositionProperty, R 187
- PositionSet, R 186
- PositionSorted, R 186
- PositionStream, R 99
- PositionSublist, R 188
- Position vs. PositionCanonical, T 49
- PositionWord, R 323
- PositiveIntegers, R 125
- positive number, R 48
- PositiveRoots, R 620
- PositiveRootVectors, R 620
- PossibleClassFusions, R 776
- PossibleFusionsCharTableTom, R 688
- Possible Permutation Characters, *R 760*
- possible permutation characters, R 762
- PossiblePowerMaps, R 770
- power, R 48
  - matrix, R 217
  - meaning for class functions, R 740
  - of words, R 322
- PowerMap, R 769
- PowerMapByComposition, R 772
- PowerMapOp, R 769
- Power Maps, *R 769*
- PowerMapsAllowedBySymmetrizations, R 787
- PowerMod, R 553
- PowerModCoeffs, R 213
- PowerModInt, R 129
- PowerPartition, R 151
- powerset, R 145
- PowerSubalgebraSeries, R 598
- PQuotient, R 460
- precedence, R 48
- precedence test, for permutations, R 396
- PreferredGenerators, N 18
- PrefrattiniSubgroup, R 346
  - for groups with pcgs, R 434

- PreImage, R 297
- PreImageElm, R 296
- PreImages, R 297
- PreImagesElm, R 296
- Preimages in the Free Group, *R 448*
- Preimages in the Free Semigroup, *R 532*
- PreimagesOfTransformation, R 537
- PreImagesRange, R 296
- PreImagesRepresentative, R 297
- PreImagesSet, R 297
- Preimages under Homomorphisms from an FpGroup, *R 459*
- Preimages under Mappings, *R 296*
- preorder, R 304
- PresentationFpGroup, R 464
- PresentationNormalClosure, R 469
- PresentationNormalClosureRrs, R 469
- PresentationSubgroup, R 466
- PresentationSubgroupMtc, R 468
- PresentationSubgroupRrs, R 467
- PresentationViaCosetTable, R 465
- previous result, R 64
- PrevPrimeInt, R 131
- PrimaryGeneratorWords, R 468
- primary subgroup generators, R 482
- PrimeBlocks, R 706
- PrimeBlocksOp, R 706
- PrimeField, R 561
- Prime Integers and Factorization, *R 129*
- PrimePGroup, R 351
- PrimePowersInt, R 132
- prime residue group, R 134
  - exponent, R 134
  - generator, R 136
  - order, R 134
- Prime Residues, *R 134*
- PrimeResidues, function, R 134
- Primes, R 129
- primitive, R 390
- PrimitiveElement, R 561
- PrimitiveGroup, R 509
- Primitive Groups, *R 402*
- PrimitiveGroupsIterator, R 509
- PrimitiveIdentification, R 509
- PrimitiveIndexIrreducibleSolvableGroup, R 511
- Primitive Permutation Groups, *R 508*
- PrimitivePolynomial, R 651
- PrimitiveRoot, R 568
- PrimitiveRootMod, R 136
- primitive root modulo an integer, R 136
- Primitive Roots and Discrete Logarithms, *R 135*
- Primitivity of Characters, *R 791*
- Print, R 65, T 78
- PrintAmbiguity, R 782
- PrintArray, R 221
- PrintCharacterTable, R 714
- PrintFactorsInt, R 131
- PrintFormattingStatus, R 101
- PrintHashWithNames, N 11
- Printing Character Tables, *R 712*
- Printing Class Functions, *R 741*
- Printing Presentations, *R 470*
- Printing Tables of Marks, *R 672*
- PrintObj, R 66
  - for character tables, R 712
  - for tables of marks, R 673
- PrintTo, R 94, T 78
  - for streams, R 100
- problems, R 817
- Problems on Particular Systems, *R 805*
- procedure call, R 50
- Procedure Calls, *R 50*
- procedure call with arguments, R 50
- Process, R 107
- Process, *R 107*
- Producing a Manual, *E 27*
- Product, R 198
- product, of words, R 322
  - rational functions, R 644
- ProductCoeffs, R 213
- ProductSpace, R 598
- ProductX, R 201
- ProfileFunctions, R 82
- ProfileGlobalFunctions, R 82
- ProfileMethods, R 82
- ProfileOperations, R 82
- ProfileOperationsAndMethods, R 82
- PROFILETHRESHOLD, R 82
- Profiling, *R 81*
- ProjectedInducedPcgs, R 428
- ProjectedPcElement, R 428
- Projection, N 19, R 294
  - example for direct products, R 487
  - example for semidirect products, R 489
  - example for subdirect products, R 489

- example for wreath products, R 490
- for group products, R 491
- ProjectionMap, R 779
- projections, find all, R 377
- ProjectiveActionHomomorphismMatrixGroup, R 415
- ProjectiveActionOnFullSpace, R 415
- ProjectiveGeneralLinearGroup, R 497
- ProjectiveGeneralUnitaryGroup, R 497
- ProjectiveOrder, R 230
- ProjectiveSpecialLinearGroup, R 497
- ProjectiveSpecialUnitaryGroup, R 497
- ProjectiveSymplecticGroup, R 497
- prompt, R 64
  - partial, R 64
- Properties, *R 123*
- Properties and Attributes for Lists, *R 188*
- Properties and Attributes of (General) Mappings, *R 294*
- Properties and Attributes of Binary Relations, *R 303*
- Properties and Attributes of Matrices, *R 218*
- Properties and Attributes of Rational Functions, *R 645*
- Properties and basic functionality, *R 269*
- Properties and Filters, *T 73*
- Properties of a Lie Algebra, *R 618*
- Properties of rewriting systems, *R 333*
- Properties of Rings, *R 548*
- Properties of Tables of Marks, *R 678*
- PRump, R 347
- PseudoRandom, R 265
- PSL, R 497
- PSP, R 497
- PSp, R 497
- PSU, R 497
- PthPowerImage, R 624
- PthPowerImages, R 623
- Pure p-adic Numbers, *R 662*
- PurePadicNumberFamily, R 662
- PushOptions, R 87

## Q

- Quadratic, R 160
- quadratic residue, R 137
- QuaternionAlgebra, R 593
- QUIT, emergency quit, R 73
- quit, in emergency, R 72
- quit, R 67, T 18

- QUITTING, R 73
- QuoInt, R 127
- Quotient, R 544
- quotient, for finitely presented groups, R 447
  - matrices, R 217
  - matrix and matrix list, R 218
  - matrix and scalar, R 217
  - of free monoid, R 533
  - of free semigroup, R 531
  - of words, R 322
  - rational functions, R 644
  - scalar and matrix, R 217
  - scalar and matrix list, R 217
  - vector and matrix, R 217
- QuotientFromSCTable, R 592
- QuotientGroup, N 18
- QuotientGroupByChainHomomorphicImage, N 21
- QuotientGroupByHomomorphism, N 15
- QuotientGroupByImages, N 15
- QuotientGroupByImagesNC, N 15
- QuotientGroupHom, N 15
- Quotient Methods, *R 459*
- QuotientMod, R 553
- QuotientPolynomialsExtRep, R 658
- QuotientRemainder, R 551
- Quotients, *R 523*
- Quotients and Remainders, *R 127*
- QuotientSemigroupCongruence, R 523
- QuotientSemigroupHomomorphism, R 523
- QuotientSemigroupPreimage, R 523
- QuotRemLaurpols, R 652

## R

- R, Representation mark-up, E 17
- $r_N$ , R 158
- RadicalGroup, R 347
- RadicalOfAlgebra, R 601
- Random, R 264
  - for integers, R 127
  - for rationals, R 142
- RandomBinaryRelationOnPoints, R 305
- random element, of a list or collection, R 264
- Random Elements, *R 264*
- RandomHashKey, N 11
- RandomInvertibleMat, T 78
- RandomInvertibleMat, R 221
- RandomIsomorphismTest, R 445
- Random Isomorphism Testing, *R 445*



- Randomized Methods for Permutation Groups,  
  *R 404*
- RandomList, *R 266*
- RandomMat, *R 221*
- Random Matrices, *R 221*
- RandomSchreierSims, *N 21*
- random seed, *R 266*
- RandomTransformation, *R 536*
- RandomUnimodularMat, *R 221*
- Range, *N 15, R 295*
- range, *R 201*
- Ranges, *R 201, T 32*
- RankAction, *R 389*
- RankFilter, *R 116*
- RankMat, *R 222*
- RankOfTransformation, *R 537*
- RankPGroup, *R 351*
- Rat, *R 142*
  - for strings, *R 247*
- RationalClass, *R 344*
- RationalClasses, *R 344*
- RationalFunctionByExtRep, *R 657*
- RationalFunctionByExtRepWithCancellation,  
  *R 658*
- Rational Function Families, *R 655*
- RationalFunctionsFamily, *R 655*
- RationalizedMat, *R 161*
- Rationals, *R 141*
- RClassOfHClass, *R 524*
- Read, *R 93*
  - for streams, *R 97*
- read.g, for a GAP package, *E 40*
- ReadAll, *R 99*
- ReadAllLine, *R 104*
- ReadAsFunction, *R 93*
  - for streams, *R 98*
- ReadByte, *R 98*
- read eval print loop, *R 64*
- read evaluate print loop, *T 19*
- ReadLine, *R 98*
- README, for a GAP package, *E 42*
- ReadPkg, *R 823*
- ReadTest, *R 84*
  - for streams, *R 98*
- RealClasses, *R 704*
- RealizableBrauerCharacters, *R 767*
- RecFields, *T 78*
- RecNames, *R 251*
- Recognizing Characters, *R 244*
- record, component access, *R 251*
  - component assignment, *R 252*
  - component variable, *R 252*
  - component variable assignment, *R 253*
- Record Access Operations, *R 255*
- Record Assignment, *R 252*
- record assignment, operation, *R 256*
- record boundness test, operation, *R 256*
- record component, operation, *R 256*
- record unbind, operation, *R 256*
- Recovery from NoMethodFound-Errors, *R 77*
- Recursion, *T 42*
- recursion, *R 55*
- Redispatching, *P 14*
- RedispatchOnCondition, *P 14*
- redisplay a help section, *R 24*
- redisplay with next help viewer, *R 24*
- ReduceCoeffs, *R 213*
- ReduceCoeffsMod, *R 213*
- ReducedAdditiveInverse, *R 333*
- ReducedCharacters, *R 750*
- ReducedClassFunctions, *R 750*
- ReducedComm, *R 333*
- ReducedConfluentRewritingSystem, *R 533*
- ReducedConjugate, *R 333*
- ReducedDifference, *R 333*
- ReducedForm, *R 332*
- ReducedInverse, *R 333*
- ReducedLeftQuotient, *R 333*
- ReducedOne, *R 333*
- ReducedPcElement, *R 423*
- ReducedPower, *R 333*
- ReducedProduct, *R 333*
- ReducedQuotient, *R 333*
- ReducedScalarProduct, *R 333*
- ReducedSum, *R 333*
- ReducedZero, *R 333*
- ReduceRules, *R 333*
- ReduceStabChain, *R 410*
- Reducing Virtual Characters, *R 750*
- Ree, *R 494*
- ReeGroup, *R 494*
- ReesCongruenceOfSemigroupIdeal, *R 522*
- ReesMatrixSemigroup, *R 525*
- ReesMatrixSemigroupElement, *R 525*
- Rees Matrix Semigroups, *R 525*
- ReesZeroMatrixSemigroup, *R 525*

- ReesZeroMatrixSemigroupElement, R 525
- ReesZeroMatrixSemigroupElementIsZero, R 526
- reference to a label, E 16
- RefinedPcGroup, R 440
- ReflectionMat, R 221
- ReflexiveClosureBinaryRelation, R 305
- reflexive relation, R 303
- regular, R 390
- regular action, R 386
- RegularActionHomomorphism, R 387
- relations, R 292
- Relations Between Domains, *R 285*
- RelationsOfFpSemigroup, R 532
- RelativeBasis, R 577
- RelativeBasisNC, R 577
- relatively prime, R 48
- RelativeOrderOfPcElement, R 422
- RelativeOrders, of a pcgs, R 422
- Relators in a Presentation, *R 469*
- RelatorsOfFpGroup, R 448
- remainder, operation, R 285
- remainder of a quotient, R 128
- RemInt, R 128
- remove, an element from a set, R 192
- RemoveFile, R 94
- RemoveOuterCoeffs, R 212
- RemoveRelator, R 472
- RemoveSet, R 192
- RemoveStabChain, R 410
- Repeat, *R 52*
- repeat loop, R 52
- ReplacedString, R 246
- Representation, *R 119*
- representation, as a sum of two squares, R 139
- Representations for Associative Words, *R 325*
- Representations for Group Homomorphisms, *R 378*
- Representations of Algebras, *R 606*
- RepresentationsOfObject, R 119
- Representative, R 262
- representative, of a list or collection, R 262
- RepresentativeAction, R 385
- RepresentativeLinearOperation, R 606
- RepresentativeOperation, R 394
- RepresentativesContainedRightCosets, R 342
- RepresentativesFusions, R 777
- RepresentativeSmallest, R 262
- RepresentativesMinimalBlocks, R 391
- RepresentativesPerfectSubgroups, R 359
- RepresentativesPowerMaps, R 772
- RepresentativesSimpleSubgroups, R 359
- RepresentativeTom, R 687
- RepresentativeTomByGenerators, R 687
- RepresentativeTomByGeneratorsNC, R 687
- Requesting one GAP Package from within Another, *E 40*
- RequirePackage, R 821
- Reread, R 95
- REREADING, R 95
- RereadPkg, E 37
- ResetFilterObj, P 19
- ResetOptionsStack, R 87
- residue, quadratic, R 136
- Residue Class Rings, *R 132*
- RespectsAddition, R 299
- RespectsAdditiveInverses, R 299
- RespectsInverses, R 299
- RespectsMultiplication, R 298
- RespectsOne, R 299
- RespectsScalarMultiplication, R 300
- RespectsZero, R 300
- RestoreStateRandom, R 265
- Restricted and Induced Class Functions, *R 748*
- RestrictedClassFunction, R 748
- RestrictedClassFunctions, R 749
- Restricted Lie algebras, *R 623*
- RestrictedMapping, R 294
- RestrictedPartitions, R 150
- RestrictedPerm, R 398
- RestrictedTransformation, R 537
- Resultant, R 649
- ResultOfStraightLineProgram, R 328
- Return, *R 58*
- return, R 68
  - no value, R 58
  - with value, R 58
- ReturnFail, R 62
- ReturnFalse, R 62
- return from break loop, R 68
- ReturnTrue, R 62
- Reversed, R 194
- RewindStream, R 99
- RewriteWord, R 454
- Rewriting Systems and the Knuth-Bendix Procedure, *R 533*
- RightActingAlgebra, R 608
- RightActingRingOfIdeal, R 547

RightAlgebraModule, R 607  
 RightAlgebraModuleByGenerators, R 606  
 RightCoset, R 340  
 RightCosets, R 340  
 right cosets, R 340  
 RightCosetsNC, R 340  
 RightDerivations, R 615  
 RightIdeal, R 545  
 RightIdealByGenerators, R 546  
 RightIdealNC, R 546  
 RightModuleByHomomorphismToMatAlg, R 610  
 RightShiftRowVector, R 212  
 RightTransversal, R 341  
 right transversal, T 48  
 Ring, R 543  
 RingByGenerators, R 544  
 Ring Homomorphisms, *R 301*  
 Rings With One, *R 547*  
 RingWithOne, R 547  
 RingWithOneByGenerators, R 547  
 RNameObj, R 256  
 root, of 1 modulo an integer, R 138  
     of an integer, R 127  
     of an integer, smallest, R 127  
     of an integer modulo another, R 137  
 RootInt, R 127  
 RootMod, R 137  
 RootOfDefiningPolynomial, R 561  
 RootsMod, R 137  
 Roots Modulo Integers, *R 136*  
 roots of unity, R 153  
 RootsOfUPol, R 648  
 RootsUnityMod, R 137  
 RootSystem, R 620  
 RoundCyc, R 155  
 Row and Matrix Spaces, *R 581*  
 RowIndexOfReesMatrixSemigroupElement, R 526  
 RowIndexOfReesZeroMatrixSemigroupElement,  
     R 526  
 row spaces, R 581  
 Row Vectors over Finite Fields, *R 210*  
 RS/6000, R 800  
 Rules, R 332  
 Running GAP under MacOS, *R 31*  
 Runtime, R 81

## S

$s_N$ , R 158

SameBlock, R 707  
 SandwichMatrixOfReesMatrixSemigroup, R 526  
 SandwichMatrixOfReesZeroMatrixSemigroup,  
     R 526  
 save, R 37  
 SaveOnExitFile, R 73  
 SaveWorkspace, R 37  
 Saving and Loading a Workspace, *R 37*  
 Saving a Pc Group, *R 441*  
 saving on exit, R 72  
 ScalarProduct, for characters, R 745  
 ScanMOC, R 732  
 Schreier, R 466  
 Schreier-Sims, random, R 404  
 SchreierTransversal, N 17  
 SchreierTreeDepth, N 18  
 SchurCover, R 365  
 Schur Covers and Multipliers, *R 365*  
 Schur multiplier, R 366  
 scope, R 42  
 ScriptFromString, R 683  
 Searching for Homomorphisms, *R 376*  
 SecHMSM, R 249  
 secondary subgroup generators, R 482  
 SecondsDMYhms, R 249  
 SeekPositionStream, R 100  
 Selecting a Different MeatAxe, *R 665*  
 Selection Functions, *R 499*  
 SemidirectProduct, R 488  
 Semidirect Products, *R 487*  
 SemiEchelonBasis, R 583  
 SemiEchelonBasisNC, R 583  
 SemiEchelonMat, R 224  
 SemiEchelonMatDestructive, R 224  
 SemiEchelonMats, R 225  
 SemiEchelonMatsDestructive, R 225  
 SemiEchelonMatTransformation, R 224  
 Semigroup, R 520  
 semigroup, R 520  
 SemigroupByGenerators, R 520  
 SemigroupByMultiplicationTable, R 521  
 SemigroupIdealByGenerators, R 522  
 SemigroupOfRewritingSystem, R 534  
 semiregular, R 389  
 Semisimple Lie Algebras and Root Systems, *R 619*  
 SemiSimpleType, R 619  
 sequence, Bernoulli, R 144  
     Fibonacci, R 151

- Lucas, R 152
- Series of Ideals, *R 617*
- Set, R 259
- SetAssertionLevel, R 81
- SetCommutator, R 439
- SetConjugate, R 439
- SetCrystGroupDefaultAction, R 419
- set difference, of collections, R 264
- SetElmWPObj, E 54
- SetEntrySCTable, R 591
- SetFilterObj, P 19
- SetHashEntry, N 13
- SetHashEntryAtLastIndex, N 13
- SetHelpViewer, R 25
- SetIndeterminateName, R 643
- SetInfoLevel, R 80
- SetName, R 114
- Set Operations via Boolean Lists, *R 205*
- SetParent, R 279
- SetPower, R 439
- SetPrintFormattingStatus, R 101
- SetRecursionTrapInterval, R 85
- Sets, *R 109, T 31*
- sets, R 168
- Sets of Subgroups, *R 356*
- set stabilizer, R 384
- Setter, R 121
- setter, R 120
  - of an attribute, T 72
- Setter and Tester for Attributes, *R 120*
- SetX, R 200
- ShallowCopy, R 113, T 80
  - for lists, R 175
- ShiftedCoeffs, R 213
- ShiftedPadicNumber, R 662
- Shifting and Trimming Coefficient Lists, *R 211*
- ShortestVectors, R 239
- ShortLexOrdering, R 272
- short vectors spanning a lattice, R 751
- ShowArgument, R 77
- ShowArguments, R 77
- ShowDetails, R 77
- ShowImpliedFilters, R 117
- ShowMethods, R 77
- ShowOtherMethods, R 78
- ShrinkCoeffs, R 214
- ShrinkRowVector, R 212
- Sift, for chains of subgroups, N 20
- SiftedPcElement, R 423
- SiftedPermutation, R 409
- SiftedVector, R 584
- SiftOneLevel, for chains of subgroups, N 20
  - for subgroup transversals, N 17
- Sigma, R 138
- sign, of an integer, R 126
- Sign and Cycle Structure, *R 398*
- SignInt, R 126
- SignPartition, R 150
- SignPerm, R 398
- SimpleLieAlgebra, R 615
- SimpleSystem, R 620
- SimplifiedFpGroup, R 466
- SimplifiedFpGroup, *R 466*
- SimplifyPresentation, R 473
- SimsNo, R 510
- SimultaneousEigenvalues, R 230
- SingleCollector, R 439
- singlequote character, R 242
- singlequotes, R 240
- Size, R 262
  - for character tables, R 701
  - for groups with pcgs, R 434
- size, of a list or collection, R 262
- SizeBlist, R 205
- SizeConsiderFunction, R 362
- SizeNumbersPerfectGroups, R 505
- SizeOfChainOfGroup, N 20
- SizeOfFieldOfDefinition, R 767
- SizesCentralizers, R 702
- SizesConjugacyClasses, R 702
- SizeScreen, R 75
- SizeScreen, *R 75*
- SizesPerfectGroups, R 504
- SizeStabChain, R 409
- SL, R 495
- smaller, associative words, R 322
  - elements of finitely presented groups, R 447
  - nonassociative words, R 315
  - pcwords, R 437
  - rational functions, R 644
- SmallerDegreePermutationRepresentation, R 401
- smaller or equal, R 47
- smaller test, R 47
- SmallestGeneratorPerm, R 397
- SmallestMovedPoint, R 397

- SmallestRootInt, R 127
- SmallGeneratingSet, R 363
- SmallGroup, R 502
- Small Groups, *R 501*
- SmallGroupsInformation, R 502
- Smash MeatAxe Flags, *R 669*
- SmithNormalFormIntegerMat, R 233
- SmithNormalFormIntegerMatInverseTransforms, R 233
- SmithNormalFormIntegerMatTransforms, R 233
- SMTX.AbsoluteIrreducibilityTest, R 668
- SMTX.AlgEl, R 669
- SMTX.AlgElCharPol, R 669
- SMTX.AlgElCharPolFac, R 669
- SMTX.AlgElMat, R 669
- SMTX.AlgElNullspaceDimension, R 669
- SMTX.AlgElNullspaceVec, R 669
- SMTX.CentMat, R 669
- SMTX.CentMatMinPoly, R 669
- SMTX.CompleteBasis, R 669
- SMTX.Getter, R 668
- SMTX.GoodElementGModule, R 668
- SMTX.IrreducibilityTest, R 668
- SMTX.MatrixSum, R 669
- SMTX.MinimalSubGModule, R 669
- SMTX.MinimalSubGModules, R 668
- SMTX.RandomIrreducibleSubGModule, R 668
- SMTX.Setter, R 668
- SMTX.SortHomGModule, R 668
- SMTX.Subbasis, R 669
- SNFChouCollins, R 232
- SNFLLDriven, R 232
- SNFNormDriven, R 232
- SNFofREF, R 233
- SO, R 496
- Socle, R 347
- SocleTypePrimitiveGroup, R 402
- Solaris, R 800
- SolutionMat, R 223
- SolutionMatDestructive, R 223
- Some Remarks about Character Theory in GAP, *R 691*
- Some Special Algebras, *R 593*
- Something, T 69
- Sort, R 189
- SortedCharacters, R 724
- SortedCharacterTable, R 725
- Sorted Character Tables, *R 724*
- SortedList, R 259
- sorted list, R 188
- Sorted Lists and Sets, *R 190*
- sorted lists as collections, R 258
- SortedSparseActionHomomorphism, R 387
- SortedTom, R 674
- Sortex, R 190
- Sorting Lists, *R 189*
- SortingPerm, R 190
- Sorting Tables of Marks, *R 674*
- SortParallel, R 189
- Source, N 15, R 295
- SourceElt, N 15
- SP, R 496
- Sp, R 496
- space, R 40
- SparseActionHomomorphism, R 387
- SparseCartanMatrix, R 621
- SparseHashTable, N 12
- Sparse hash tables, *N 12*
- SparseIntKey, N 12
- Special Characters, *R 242*
- special character sequences, R 242
- Special Filenames, *R 91*
- Special Generating Sets, *R 362*
- SpecialLinearGroup, R 495
- SpecialOrthogonalGroup, R 496
- Special Pcgs, *R 430*
- SpecialPcgs, attribute, R 431
- SpecialUnitaryGroup, R 496
- Specific and Parametrized Subgroups, *R 345*
- Specific Methods for Subgroup Lattice Computations, *R 360*
- SplitCharacters, R 719
- SplitExtension, R 442
- SplitExtensions, R 443
- SplitString, R 245
- SplittingField, R 647
- Sqrt, R 285
- square root, of an integer, R 127
- SquareRoots, R 312
- SSortedList, R 259
- StabChain, R 405
- StabChainBaseStrongGenerators, R 407
- StabChainImmutable, R 405
- StabChainMutable, R 405
- StabChainOp, R 405
- StabChainOptions, R 407

- Stabiliser chain subgroups, *N 21*
- Stabilizer, *R 384*
- Stabilizer Chain Records, *R 407*
- Stabilizer Chains, *R 403*
- Stabilizer Chains for Automorphisms Acting on Enumerators, *E 63*
- StabilizerOfExternalSet, *R 393*
- StabilizerPcgs, *R 433*
- Stabilizers, *R 384*
- Standalone Programs in a GAP Package, *E 38*
- StandardAssociate, *R 550*
- StandardGeneratorsFunctions, *R 684*
- StandardGeneratorsInfo, for groups, *R 682*  
for tables of marks, *R 687*
- StandardGeneratorsOfGroup, *R 684*
- Standard Generators of Groups, *R 682*
- Standardization of coset tables, *R 452*
- StandardizeTable, *R 453*
- StarCyc, *R 160*
- Starting and Leaving GAP, *T 18*
- starting GAP, *T 18*
- Statements, *R 49*
- StateRandom, *R 265*
- Stirling1, *R 144*
- Stirling2, *R 144*
- Stirling number of the first kind, *R 144*
- Stirling number of the second kind, *R 145*
- StoreFusion, *R 775*
- Storing Normal Subgroup Information, *R 732*
- StraightLineProgElm, *R 331*
- StraightLineProgGens, *R 331*
- StraightLineProgram, *R 327*
- Straight Line Program Elements, *R 330*
- StraightLineProgramNC, *R 327*
- Straight Line Programs, *R 327*
- StraightLineProgramsTom, *R 686*
- StratMeetPartition, *E 61*
- StreamsFamily, *R 97*
- StretchImportantSLPElement, *R 331*
- strictly sorted list, *R 189*
- String, *R 245*  
for cyclotomics, *R 154*
- StringDate, *R 249*
- StringOfResultOfStraightLineProgram, *R 329*
- StringPP, *R 245*
- strings, *T 28*  
equality of, *R 244*  
inequality of, *R 244*  
lexicographic ordering of, *R 244*
- String Streams, *R 103*
- StringTime, *R 249*
- StrongGeneratorsStabChain, *R 409*
- StrongGens, *N 21*
- StronglyConnectedComponents, *R 305*
- Struct, *R 276*
- StructByGenerators, *R 277*
- StructuralCopy, *R 113, T 80*  
for lists, *R 176*
- structure constant, *R 712*
- StructureConstantsTable, *R 579*
- StructWithGenerators, *R 277*
- SU, *R 496*
- Subalgebra, *R 594*
- SubAlgebraModule, *R 609*
- SubalgebraNC, *R 594*
- Subalgebras, *R 594*
- SubalgebraWithOne, *R 594*
- SubalgebraWithOneNC, *R 595*
- SubdirectProduct, *R 489*
- Subdirect Products, *R 489*
- Subdomains, *T 70*
- subdomains, *R 280*
- Subfield, *R 560*
- SubfieldNC, *R 560*
- Subfields, *R 561*
- Subfields of Fields, *R 560*
- Subgroup, *R 337*
- SubgroupByPcgs, *R 426*
- subgroup fusions, *R 773*
- subgroup generators tree, *R 482*
- Subgroup Lattice, *R 358*
- SubgroupNC, *R 337*
- SubgroupOfWholeGroupByCosetTable, *R 454*
- SubgroupOfWholeGroupByQuotientSubgroup, *R 459*
- Subgroup Presentations, *R 466*
- SubgroupProperty, *R 411*
- Subgroups, Subgroups, as Stabilizers, *T 50*
- Subgroups, *R 336*
- subgroups, polyhedral, *R 711*
- Subgroups characterized by prime powers, *R 349*
- Subgroup Series, *R 352*
- Subgroups of Polycyclic Groups - Canonical Pcgs, *R 426*
- Subgroups of Polycyclic Groups - Induced Pcgs, *R 424*

- SubgroupsSolvableGroup, R 361
- sublist, R 170
  - access, R 170
  - assignment, R 172
  - operation, R 171
- sublist assignment, operation, R 173
- Submagma, R 309
- SubmagmaNC, R 309
- SubmagmaWithInverses, R 309
- SubmagmaWithInversesNC, R 309
- SubmagmaWithOne, R 309
- SubmagmaWithOneNC, R 309
- Submodule, R 556
- SubmoduleNC, R 556
- Submodules, *R 556*
- Submonoid, R 527
- SubmonoidNC, R 527
- SubnearAdditiveGroup, R 541
- SubnearAdditiveGroupNC, R 541
- SubnearAdditiveMagma, R 540
- SubnearAdditiveMagmaNC, R 540
- SubnearAdditiveMagmaWithZero, R 540
- SubnearAdditiveMagmaWithZeroNC, R 540
- SubnormalSeries, R 353
- Subring, R 544
- SubringNC, R 544
- SubringWithOne, R 548
- SubringWithOneNC, R 548
- Subroutines for the Construction of Class Fusions, *R 787*
- Subroutines for the Construction of Power Maps, *R 785*
- subsection mark-up, E 17
- Subsemigroup, R 520
- SubsemigroupNC, R 520
- subsets, R 145
- subset test, for collections, R 263
- Subsomething, T 70
- SubsomethingNC, T 70
- Subspace, R 573
- SubspaceNC, R 573
- Subspaces, R 574
- SubstitutedWord, R 324
- SubsTom, R 675
- Substruct, R 280
- SubstructNC, R 280
- SubSyllables, R 325
- subtract, a set from another, R 192
- SubtractBlist, R 206
- subtraction, R 48
  - matrices, R 216
  - matrix and scalar, R 216
  - rational functions, R 644
  - scalar and matrix, R 216
  - scalar and matrix list, R 217
  - scalar and vector, R 209
  - vector and scalar, R 209
  - vectors, R 209
- SubtractSet, R 192
- Subword, R 323
- Successors, R 304
- Suitability for Compilation, *R 36*
- Sum, R 199
- Sum and Intersection of Pcgs, *R 430*
- SumFactorizationFunctionPcgs, R 430
- SumIntersectionMat, R 225
- SumX, R 200
- SupersolvableResiduum, R 347
- superuser, R 820
- SupportedCharacterTableInfo, R 694
- Suppressing Indexing and Labelling of a Section and Resolving Label Clashes, *E 16*
- SurjectiveActionHomomorphismAttr, R 394
- SuzukiGroup, R 494
- SylowComplement, R 348
- SylowSubgroup, R 347
- Sylow Subgroups and Hall Subgroups, *R 347*
- SylowSystem, R 348
- Symbols, *R 40*
- Symmetric and Alternating Groups, *R 401*
- SymmetricClosureBinaryRelation, R 305
- SymmetricGroup, R 494
- symmetric group, powermap, R 151
- SymmetricParentGroup, R 402
- SymmetricParts, R 757
- SymmetricPowerOfAlgebraModule, R 634
- symmetric relation, R 303
- Symmetrizations, R 756
- symmetrizations, orthogonal, R 757
  - symplectic, R 758
- Symmetrizations of Class Functions, *R 756*
- SymplecticComponents, R 758
- SymplecticGroup, R 496
- syntax errors, R 64
- system getter, R 120
- system setter, R 120

System V, R 800

SysV, R 800

Sz, R 494

## T

$t_N$ , R 158

TableAutomorphisms, R 727

table automorphisms, R 788

TableHasIntKeyFun, N 12

table of chapters for help books, R 24

TableOfMarks, R 671

TableOfMarksByLattice, R 672

TableOfMarksComponents, R 675

TableOfMarksCyclic, R 689

TableOfMarksDihedral, R 689

TableOfMarksFamily, R 675

TableOfMarksFrobenius, R 689

Table of Marks Objects in GAP, R 670

table of sections for help books, R 24

tables, E 24, R 692

Tables, Displayed Mathematics and Mathematics Alignments, E 24

tabulator, R 40

Tau, R 138

Technical Details about Tables of Marks, R 675

Technical Details about the Implementation of Magma Rings, R 640

Technical Matters Concerning General Mappings, R 301

TemporaryGlobalVarName, R 45

Tensored, R 748

TensorProductOfAlgebraModules, R 633

Tensor Products and Exterior and Symmetric Powers, R 633

test, for a primitive root, R 136

for a rational, R 141

for records, R 251

for set equality, R 191

TestConsistencyMaps, R 782

Tester, R 120

tester, R 120

of an attribute, T 72

Test Files, R 84

Test for the Existence of GAP Package Binaries, E 39

TestHomogeneous, R 791

TestInducedFromNormalSubgroup, R 793

Testing Finiteness of Finitely Presented Groups, R 462

Testing for a GAP Package, E 41

Testing for the System Architecture, R 814

Testing Monomiality, R 793

Testing the Examples, E 24

TestJacobi, R 591

TestMonomial, R 793

TestMonomialQuick, R 794

TestMonomialUseLattice, R 794

TestPackageAvailability, R 823

TestPerm1, R 764

TestPerm2, R 764

TestPerm3, R 764

TestPerm4, R 764

TestPerm5, R 764

TestQuasiPrimitive, R 792

TestRelativelySM, R 795

Tests for Actions, R 389

Tests for the Availability of Methods, R 366

TestSubnormallyMonomial, R 795

TeX Macros, E 17

TeX Macros for Domains, E 21

The .gaprc file, R 34

The Adjoint Representation, R 624

The Compiler, R 35

The Defining Attributes of Rational Functions, R 656

The Dixon-Schneider Algorithm, R 717

The Documentation, R 815

The External Representation for Associative Words, R 326

The family pcgs, R 436

The GAP System, T 11

The GASMAN Interface for Weak Pointer Objects, E 55

The General Backtrack Algorithm with Ordered Partitions, E 57

The Help Book Handler, E 45

The Info Mechanism, T 85

The Init File of a GAP Package, E 36

The Interface between Character Tables and Groups, R 696

The Interface between Tables of Marks and Character Tables, R 688

The Library of Tables of Marks, R 690

The Main File, E 12

The manual.six File, E 44



- then, R 51
- The Natural Action, R 400
- The Pager Command, R 26
- The Permutation Image of an Action, R 386
- The Representations of Rational Functions, R 655
- The Smash MeatAxe, R 668
- The Structure of a GAP Package, E 36
- The Syntax in BNF, R 58
- ThreeGroup library, R 501
- Tietze Options, R 485
- Tietze Transformations, R 472
- Tietze Transformations that introduce new Generators, R 476
- TietzeWordAbstractWord, R 470
- time, R 81
- Timing, R 81
- Todd-Coxeter Procedure, R 535
- Trace, R 218
  - for field elements, R 562
  - of a matrix, R 218
- TracedCosetFpGroup, R 450
- TraceImmediateMethods, R 79
- TraceMat, R 218
- TraceMethods, R 79, T 75
- TracePolynomial, R 562
- Tracing generator images through Tietze transformations, R 480
- Tracing Methods, R 79
- TransferDiagram, R 781
- Transformation, R 536
- TransformationData, R 536
- TransformationFamily, R 536
- TransformationNC, R 536
- TransformationRelation, R 538
- TransformationType, R 536
- TransformingPermutations, R 727
- TransformingPermutationsCharacterTables, R 727
- transitive, R 389
- TransitiveClosureBinaryRelation, R 305
- TransitiveGroup, R 500
- TransitiveIdentification, R 500
- Transitive Permutation Groups, R 500
- transitive relation, R 303
- Transitivity, for characters, R 747
  - for class functions, R 747
  - for group actions, R 389
- transporter, R 385
- TransposedMat, R 220
- TransposedMatAttr, R 220
- TransposedMatDestructive, R 220
- TransposedMatImmutable, R 220
- TransposedMatMutable, R 220
- TransposedMatOp, R 220
- TransposedMatrixGroup, R 414
- Transversal, N 20
- TransversalBySiftFunction, N 19
- TransversalByTrivial, N 19
- TransversalElt, N 17
- TransversalOfChainSubgroup, N 21
- Transversals, R 341
- Transversals by direct products, N 19
- Transversals by homomorphic images, N 18
- Transversals by Schreier tree, N 17
- Transversals by sift functions, N 19
- Transversals by Trivial subgroups, N 19
- Triangular Matrices, R 226
- TriangulizedIntegerMat, R 234
- TriangulizedIntegerMatInverseTransform, R 234
- TriangulizedIntegerMatTransform, R 234
- TriangulizedNullspaceMat, R 222
- TriangulizedNullspaceMatDestructive, R 222
- TriangulizeIntegerMat, R 233
- TriangulizeMat, R 222
- Trivial chain subgroups and sift function chain subgroups, N 22
- TrivialCharacter, R 743
- TrivialGroup, R 492
- TrivialIterator, R 267
- TrivialSubalgebra, R 595
- TrivialSubgroup, R 345
- TrivialSubmagmaWithOne, R 312
- TrivialSubmodule, R 556
- TrivialSubmonoid, R 527
- TrivialSubnearAdditiveMagmaWithZero, R 541
- TrivialSubspace, R 574
- TryConwayPolynomialForFrobeniusCharacterValue, R 767
- TryCosetTableInWholeGroup, R 453
- TryGcdCancelExtRepPolynomials, R 658
- TryNextMethod, P 13, T 74
- Tuples, R 147
- tuple stabilizer, R 384
- TwoClosure, R 411
- TwoCoboundaries, R 441

TwoCocycles, R 441  
 TwoCohomology, R 441  
 TwoGroup library, R 501  
 TwoSidedIdeal, R 545  
 TwoSidedIdealByGenerators, R 546  
 TwoSidedIdealNC, R 546  
 TwoSquares, R 139  
 type, boolean, R 165  
   cyclotomic, R 153  
   records, R 251  
   strings, R 240  
 TypeObj, R 124  
 TypeOfDefaultGeneralMapping, R 302  
 Types, *R 124*  
 TzEliminate, R 475  
 TzFindCyclicJoins, R 476  
 TzGo, R 472  
 TzGoGo, R 474  
 TzImagesOldGens, R 480  
 TzInitGeneratorImages, R 480  
 TzNewGenerator, R 472  
 TzOptions, R 485  
 TzPreImagesNewGens, R 481  
 TzPrint, R 471  
 TzPrintGeneratorImages, R 481  
 TzPrintGenerators, R 470  
 TzPrintLengths, R 471  
 TzPrintOptions, R 486  
 TzPrintPairs, R 471  
 TzPrintPresentation, R 471  
 TzPrintRelators, R 470  
 TzPrintStatus, R 471  
 TzSearch, R 475  
 TzSearchEqual, R 476  
 TzSort, R 464  
 TzSubstitute, R 477  
 TzSubstituteCyclicJoins, R 480

## U

$u_N$ , R 158  
 UglyVector, R 586  
 ULTRIX, R 800  
 Umlauts, *E 27*  
 Unbind, R 43  
   for lists, R 174  
 UnbindElmWPObj, *E 54*  
 UnbindGlobal, R 45  
 UnderlyingCharacteristic, R 702

UnderlyingCharacterTable, R 737  
 UnderlyingElement, fp group elements, R 448  
   fp semigroup elements, R 532  
 UnderlyingElementOfReesMatrixSemigroup-  
   Element, R 526  
 UnderlyingElementOfReesZeroMatrixSemigroup-  
   Element, R 526  
 UnderlyingExternalSet, R 394  
 UnderlyingFamily, R 614  
 UnderlyingGeneralMapping, R 295  
 UnderlyingGroup, for character tables, R 696  
   for tables of marks, R 677  
 UnderlyingLeftModule, R 577  
 UnderlyingLieAlgebra, R 620  
 UnderlyingMagma, R 637  
 UnderlyingRelation, R 295  
 Undocumented Variables, *E 34*  
 UnInstallCharReadHookFunc, R 105  
 Union, R 263  
   union, of collections, R 264  
     of sets, R 192  
 Union2, R 263  
 UnionBlist, R 205  
 Unique, R 193  
 UniteBlist, R 206  
 UniteBlistList, R 206  
 UniteSet, R 192  
 Units, R 549  
 Units and Factorizations, *R 549*  
 UnivariatenessTestRationalFunction, R 648  
 UnivariatePolynomial, R 647  
 UnivariatePolynomialByCoefficients, R 647  
 UnivariatePolynomialRing, R 654  
 Univariate Polynomial Rings, *R 654*  
 Univariate Polynomials, *R 647*  
 UnivariateRationalFunctionByCoefficients,  
   R 652  
 Univariate Rational Functions, *R 652*  
 UniversalEnvelopingAlgebra, R 626  
 Universal Enveloping Algebras, *R 626*  
 UNIX, features, R 28  
   installation, R 800  
   options, R 28  
 UNIXSelect, R 97  
 Unknown, R 163  
 UnloadSmallGroupsData, R 502  
 UnorderedTuples, R 146  
 UnprofileFunctions, R 82

- UnprofileMethods, R 82
- until, R 52
- UntraceMethods, R 79
- unzoo, R 797
- UpdateMap, R 779
- UpEnv, R 71
- UpperCentralSeriesOfGroup, R 354
- UpperSubdiagonal, R 226
- Usage of the Percent Symbol, *E 25*
- UseBasis, R 557
- UseFactorRelation, R 286
- Useful Categories for all Elements of a Family, *R 289*
- Useful Categories of Elements, *R 287*
- UseIsomorphismRelation, R 286
- User Streams, *R 103*
- UseSubsetRelation, R 285
- Using buildman.pe, *E 28*
- utilities for editing GAP files, R 75
- V**
- V, (global) Variable mark-up, E 17
- $v_N$ , R 158
- Valuation, R 662
- Value, R 649
- ValueCochain, R 629
- ValueGlobal, R 44
- ValueMolienSeries, R 760
- ValuePol, R 213
- ValuesOfClassFunction, R 737
- Variable Access in a Break Loop, *R 71*
- Variables, *R 42*
- variables, T 22
- vectors, row, T 36
- Vectors and Matrices, *T 36*
- Vectors as coefficients of polynomials, *R 212*
- VectorSpace, R 573
- VectorSpaceByPcgsOfElementaryAbelianGroup, R 432
- Vector Space Homomorphisms, *R 584*
- Vector Spaces, *T 59*
- Vector Spaces Handled By Nice Bases, *R 586*
- verbatim environments, E 23
- VERSION, E 41
- Version Numbers, *E 41*
- vi, R 75
- View, R 65
- View and Print, *R 65*
- ViewObj, R 66
- for character tables, R 712
- for class functions, R 741
- for tables of marks, R 672
- vim, R 75
- VirtualCharacter, R 742
- virtual character, R 744
- virtual characters, R 735
- W**
- $w_N$ , R 158
- WeakPointerObj, E 53
- WeakPointerObj, *E 53*
- Weak Pointer Objects, *E 53*
- web sites, for GAP, T 16
- WeekDay, R 249
- WeightLexOrdering, R 272
- WeightOfGenerators, R 273
- WeightsTom, R 678
- WeightVecFFE, R 212
- WeylGroup, R 621
- WeylOrbitIterator, R 623
- Where, R 70, T 85
- While, *R 51*
- while loop, R 51
- whitespace, T 19
- Whitespaces, *R 40*
- Why Class Functions?, *R 735*
- Why Proceed in a Different Way?, *P 43*
- Windows, R 806
  - installation, R 807
- WordAlp, R 245
- words, in generators, R 339
- Working with large degree permutation groups, *R 412*
- Wrapping Up a GAP Package, *E 42*
- WreathProduct, R 490
- wreath product embedding, R 491
- WreathProductImprimitiveAction, R 490
- WreathProductOrdering, R 274
- WreathProductProductAction, R 491
- Wreath Products, *R 490*
- WriteAll, R 100
- WriteByte, R 100
- WriteLine, R 100
- Writing Documentation, *E 42*
- Writing Functions, *T 40*
- www, R 798
- X**

**x**, T 78

$x_N$ , R 158

## **Y**

$y_N$ , R 158

## **Z**

**Z**, R 565

ZClassRepsQClass, R 418

Zero, R 282

ZeroAttr, R 282

ZeroCoefficient, R 638

ZeroCoefficientRatFun, R 657

ZeroImmutable, R 282

ZeroMapping, R 293

ZeroMutable, R 282

ZeroOp, R 282

ZeroSameMutability, R 282

ZeroSM, R 282

ZippedProduct, R 658

ZippedSum, R 658

ZmodnZ, R 132

ZmodnZObj, R 132

ZmodpZ, R 132

ZmodpZNC, R 132

zoo, E 42

ZumbroichBase, R 570

Zuppos, R 360