



Eighth Grade Mathematics

Here is a list of all of the Mathematics Skills students learn in Eighth Grade.

A. Number theory

1. Factors
2. Divisibility rules
3. Prime or composite
4. Prime factorization
5. Greatest common factor
6. Least common multiple
7. GCF and LCM: word problems
8. Sort factors of numerical expressions
9. Classify numbers

B. Integers

1. Integers on number lines
2. Graph integers on horizontal and vertical number lines
3. Absolute value and opposite integers
4. Compare and order integers
5. Integer inequalities with absolute values

C. Operations with integers

1. Integer addition and subtraction rules
2. Add and subtract integers using counters
3. Add and subtract integers
4. Add and subtract three or more integers
5. Add and subtract integers: word problems
6. Integer multiplication and division rules
7. Multiply and divide integers
8. Evaluate numerical expressions involving integers

D. Rational numbers

1. Write fractions in lowest terms
2. Least common denominator
3. Round decimals and mixed numbers
4. Convert between decimals and fractions or mixed numbers
5. Identify rational and irrational numbers
6. Absolute value of rational numbers
7. Compare rational numbers
8. Put rational numbers in order

E. Operations with rational numbers

1. Reciprocals and multiplicative inverses
2. Add and subtract rational numbers
3. Add and subtract rational numbers: word problems
4. Apply addition and subtraction rules
5. Multiply and divide rational numbers
6. Multiply and divide rational numbers: word problems
7. Apply multiplication and division rules
8. Apply addition, subtraction, multiplication, and division rules
9. Evaluate numerical expressions involving rational numbers

F. Exponents and roots

1. Understanding exponents
2. Evaluate exponents
3. Solve equations with variable exponents
4. Exponents with negative bases
5. Exponents with decimal and fractional bases
6. Understanding negative exponents
7. Evaluate negative exponents
8. Multiplication with exponents
9. Division with exponents
10. Multiplication and division with exponents

11. Power rule
12. Evaluate expressions using properties of exponents
13. Identify equivalent expressions involving exponents I
14. Identify equivalent expressions involving exponents II
15. Square roots of perfect squares
16. Positive and negative square roots
17. Estimate positive and negative square roots
18. Relationship between squares and square roots
19. Solve equations using square roots
20. Cube roots of perfect cubes
21. Solve equations using cube roots
22. Estimate cube roots

G. Scientific notation

1. Convert between standard and scientific notation
2. Compare numbers written in scientific notation
3. Multiply numbers written in scientific notation
4. Divide numbers written in scientific notation

H. Ratios, rates, and proportions

1. Understanding ratios
2. Identify equivalent ratios
3. Write an equivalent ratio
4. Equivalent ratios: word problems
5. Unit rates

6. Compare ratios: word problems
7. Solve proportions: word problems
8. Do the ratios form a proportion?
9. Do the ratios form a proportion: word problems
10. Solve proportions
11. Estimate population size using proportions
12. Scale drawings: word problems
13. Scale drawings: scale factor word problems

I. Proportional relationships

1. Find the constant of proportionality from a table
2. Write equations for proportional relationships from tables
3. Identify proportional relationships by graphing
4. Find the constant of proportionality from a graph
5. Write equations for proportional relationships from graphs
6. Identify proportional relationships from graphs and equations
7. Identify proportional relationships from tables
8. Graph proportional relationships
9. Interpret graphs of proportional relationships
10. Write and solve equations for proportional relationships

J. Percents

1. Convert between percents, fractions, and decimals
2. Compare percents to fractions and decimals
3. Find what percent one number is of another
4. Find what percent one number is of another: word problems
5. Estimate percents of numbers

6. Percents of numbers and money amounts
7. Percents of numbers: word problems
8. Compare percents of numbers
9. Solve percent equations
10. Percent of change
11. Percent of change: word problems
12. Percent of change: find the original amount word problems

K. Consumer math

1. Price lists
2. Unit prices
3. Unit prices with unit conversions
4. Unit prices: find the total price
5. Percent of a number: tax, discount, and more
6. Find the percent: tax, discount, and more
7. Sale prices: find the original price
8. Multi-step problems with percents
9. Estimate tips
10. Simple interest
11. Compound interest

L. Units of measurement

1. Convert rates and measurements: customary units
2. Convert rates and measurements: metric units
3. Mixed customary units
4. Convert between customary and metric systems
5. Precision
6. Convert between Celsius and Fahrenheit

M. Problem solving

1. Multi-step word problems
2. Guess-and-check word problems
3. Use Venn diagrams to solve problems
4. Elapsed time word problems

N. Coordinate plane

1. Coordinate plane review
2. Quadrants and axes
3. Follow directions on a coordinate plane
4. Find the distance between two points

O. Two-dimensional figures

1. Identify and classify polygons
2. Classify triangles
3. Identify trapezoids
4. Classify quadrilaterals I
5. Classify quadrilaterals II
6. Graph triangles and quadrilaterals
7. Find missing angles in triangles
8. Find missing angles in triangles using ratios
9. Find missing angles in quadrilaterals I
10. Find missing angles in quadrilaterals II

11. Exterior Angle Theorem
12. Interior angles of polygons
13. Identify complementary, supplementary, vertical, adjacent, and congruent angles
14. Find measures of complementary, supplementary, vertical, and adjacent angles
15. Identify alternate interior and alternate exterior angles
16. Transversals of parallel lines: name angle pairs
17. Transversals of parallel lines: find angle measures
18. Find lengths and measures of bisected line segments and angles
19. Parts of a circle

P. Transformations and congruence

1. Line symmetry
2. Rotational symmetry
3. Rotational symmetry: amount of rotation
4. Identify reflections, rotations, and translations
5. Describe a sequence of transformations
6. Translations: graph the image
7. Translations: find the coordinates
8. Reflections over the x- and y-axes: graph the image
9. Reflections over the x- and y-axes: find the coordinates
10. Reflections: graph the image
11. Reflections: find the coordinates
12. Rotations: graph the image
13. Rotations: find the coordinates
14. Congruence statements and corresponding parts
15. Side lengths and angle measures of congruent figures
16. Congruent triangles: SSS, SAS, and ASA

Q. Transformations and similarity

1. Similar and congruent figures
2. Dilations: graph the image
3. Dilations: find the coordinates
4. Dilations: scale factor and classification
5. Side lengths and angle measures of similar figures

R. Pythagorean theorem

1. Pythagorean theorem: find the length of the hypotenuse
2. Pythagorean theorem: find the missing leg length
3. Pythagorean theorem: find the perimeter
4. Pythagorean theorem: word problems
5. Converse of the Pythagorean theorem: is it a right triangle?

S. Three-dimensional figures

1. Parts of three-dimensional figures
2. Nets of three-dimensional figures
3. Front, side, and top view
4. Base plans
5. Similar solids

T. Geometric measurement

1. Perimeter
2. Area
3. Area and perimeter: word problems
4. Area between two shapes
5. Area and circumference of circles

6. Circles: word problems
7. Area and perimeter of semicircles and quarter circles
8. Volume of cubes, prisms, and pyramids
9. Surface area of cubes, prisms, and pyramids
10. Volume of cylinders
11. Volume of cones
12. Surface area of cylinders
13. Surface area of cones
14. Volume of spheres
15. Surface area of spheres
16. Volume and surface area of similar solids
17. Perimeter and area: changes in scale

U. Number sequences

1. Identify arithmetic and geometric sequences
2. Arithmetic sequences
3. Geometric sequences
4. Number sequences: mixed review
5. Number sequences: word problems
6. Evaluate variable expressions for number sequences
7. Write variable expressions for arithmetic sequences

V. Expressions and properties

1. Write variable expressions: one operation
2. Write variable expressions: two or three operations
3. Write variable expressions from diagrams
4. Write variable expressions: word problems
5. Evaluate one-variable expressions
6. Evaluate multi-variable expressions
7. Evaluate absolute value expressions
8. Evaluate radical expressions
9. Evaluate rational expressions
10. Identify terms and coefficients
11. Sort factors of variable expressions
12. Properties of addition and multiplication
13. Multiply using the distributive property
14. Write equivalent expressions using properties
15. Add and subtract like terms
16. Add and subtract linear expressions
17. Factors of linear expressions
18. Identify equivalent linear expressions I
19. Identify equivalent linear expressions II
20. Identify equivalent linear expressions: word problems

W. One-variable equations

1. Which x satisfies an equation?
2. Write an equation from words
3. Model and solve equations using algebra tiles
4. Write and solve equations that represent diagrams
5. Properties of equality
6. Identify equivalent equations
7. Solve one-step equations
8. Solve two-step equations
9. Solve multi-step equations
10. Solve equations involving like terms
11. Solve equations with variables on both sides
12. Solve equations: mixed review
13. Solve equations: complete the solution
14. Solve equations: word problems
15. Find the number of solutions
16. Create equations with no solutions or infinitely many solutions

X. One-variable inequalities

1. Solutions to inequalities
2. Graph inequalities on number lines
3. Write inequalities from number lines
4. Solve one-step inequalities
5. Graph solutions to one-step inequalities

6. Solve two-step inequalities
7. Graph solutions to two-step inequalities
8. Solve multi-step inequalities
9. Graph solutions to multi-step inequalities

Y. Linear equations

1. Find the slope of a graph
2. Find the slope from two points
3. Find a missing coordinate using slope
4. Find the slope of a linear equation
5. Graph a line using slope
6. Graph a line from an equation in slope-intercept form
7. Write a linear equation from a slope and y-intercept
8. Write a linear equation from a graph
9. Write a linear equation from a slope and a point
10. Write a linear equation from two points
11. Convert a linear equation in standard form to slope-intercept form
12. Graph a line from an equation in standard form
13. Slopes of parallel and perpendicular lines

Z. Functions

1. Identify functions
2. Does (x, y) satisfy the linear function?
3. Identify independent and dependent variables
4. Rate of change: tables
5. Rate of change: graphs

6. Constant rate of change
7. Evaluate a linear function
8. Complete a table for a linear function
9. Complete a table and graph a linear function
10. Interpret the graph of a linear function: word problems
11. Write a linear function from a table
12. Compare linear functions: graphs and equations
13. Compare linear functions: tables, graphs, and equations
14. Write linear functions: word problems
15. Interpret linear functions
16. Identify linear and nonlinear functions: graphs and equations
17. Identify linear and nonlinear functions: tables
18. Does (x, y) satisfy the nonlinear function?
19. Evaluate a nonlinear function
20. Find values using function graphs
21. Complete a table for a function graph
22. Domain and range of functions

AA. Systems of linear equations

1. Is (x, y) a solution to the system of equations?
2. Solve a system of equations by graphing
3. Solve a system of equations by graphing: word problems
4. Find the number of solutions to a system of equations by graphing
5. Find the number of solutions to a system of equations

6. Classify a system of equations by graphing
7. Classify a system of equations
8. Solve a system of equations using substitution
9. Solve a system of equations using substitution: word problems
10. Solve a system of equations using elimination
11. Solve a system of equations using elimination: word problems

BB. Monomials and polynomials

1. Identify monomials
2. Model polynomials with algebra tiles
3. Add and subtract polynomials using algebra tiles
4. Add and subtract polynomials
5. Add polynomials to find perimeter
6. Multiply monomials
7. Divide monomials
8. Multiply and divide monomials
9. Powers of monomials
10. Square and cube roots of monomials
11. Multiply polynomials using algebra tiles
12. Multiply polynomials
13. Multiply polynomials to find area

CC.Data and graphs

1. Interpret tables
2. Interpret bar graphs
3. Create bar graphs
4. Interpret line graphs
5. Create line graphs
6. Interpret line plots
7. Create line plots
8. Create and interpret line plots with fractions
9. Interpret stem-and-leaf plots
10. Create stem-and-leaf plots
11. Interpret histograms
12. Create histograms
13. Create frequency charts
14. Interpret box-and-whisker plots
15. Identify trends with scatter plots
16. Make predictions with scatter plots
17. Interpret circle graphs
18. Circle graphs and central angles
19. Choose the best type of graph

DD. Statistics

1. Calculate mean, median, mode, and range
2. Interpret charts and graphs to find mean, median, mode, and range
3. Mean, median, mode, and range: find the missing number
4. Changes in mean, median, mode, and range
5. Quartiles
6. Identify an outlier
7. Identify an outlier and describe the effect of removing it
8. Outliers in scatter plots
9. Scatter plots: line of best fit
10. Identify representative, random, and biased samples

EE. Probability

1. Probability of simple events
2. Probability of opposite, mutually exclusive, and overlapping events
3. Experimental probability
4. Make predictions
5. Compound events: find the number of outcomes
6. Compound events: find the number of sums
7. Identify independent and dependent events
8. Probability of independent and dependent events
9. Factorials
10. Permutations
11. Counting principle
12. Combination and permutation notation