Montana Math

Grade 8

The Number System MT.8.NS

1. **Know real numbers are made up of rational and irrational numbers, understand informally that every number has a decimal expansion, and convert a decimal expansion which repeats eventually into a rational number.** MT.8.NS.1
2. **Use rational approximations of irrational numbers to compare the value of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions.** MT.8.NS.2

Expressions and Equations MT.8.EE

1. **Know and apply the properties of integer exponents to generate equivalent numerical expressions.** MT.8.EE.1
2. **Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number and evaluate square roots of small perfect squares and cube roots of small perfect cubes.** MT.8.EE.2
3. **Represent very large or very small quantities using scientific notation, limited to a single digit times an integer power of ten.** MT.8.EE.3
4. **Perform operations with numbers expressed in scientific notation.** MT.8.EE.4
5. **Graph proportional relationships, interpreting the unit rate as the slope of the graph, and compare two different proportional relationships as tables, graphs, and equations.** MT.8.EE.5
6. **Use similar triangles to explain why the slope m is the same between any two distinct points on a nonvertical line in the coordinate plane and derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.** MT.8.EE.6
7. **Solve linear equations in one variable by:** MT.8.EE.7
   a. *Solve linear equations in one variable by* giving examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions and showing which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). MT.8.EE.7.A
   b. *Solve linear equations in one variable by* solving linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. MT.8.EE.7.B

Skip to main content

8 **Analyze and solve pairs of simultaneous linear equations by:** MT.8.EE.8

- a *Analyze and solve pairs of simultaneous linear equations by* understanding that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. MT.8.EE.8.A
- b *Analyze and solve pairs of simultaneous linear equations by* solving systems of two linear equations in two variables algebraically, estimating solutions by graphing the equations, and solving simple cases by inspection. MT.8.EE.8.B
- c *Analyze and solve pairs of simultaneous linear equations by* solving problems in context that lead to two linear equations in two variables. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities. MT.8.EE.8.C

Functions MT.8.F

1 **Understand that a function is a rule that assigns to each input exactly one output and the graph of a function is the set of ordered pairs (x,y) each consisting of an input, x, and the corresponding output, y.** MT.8.F.1

2 **Compare properties of two functions using tables, graphs, and equations.** MT.8.F.2

3 **Interpret the equation y = mx + b as defining a linear function whose graph is a straight line with slope m passing through the point (0, b).** MT.8.F.3

4 **Given linear data relating two quantities, construct a linear function that models the data and interpret the rate of change and initial value of a linear function in terms of the situation it models.** MT.8.F.4

5 **Given the graph of a function, describe qualitatively the functional relationship between quantities, and, given a verbal description of a functional relationship, sketch a graph that exhibits the qualitative features of a function.** MT.8.F.5

Geometry MT.8.G

1 **Verify experimentally the properties of rotations, reflections, and translations and understand that these are rigid transformations, lines are taken to lines, line segments to line segments of the same length, angles are taken to angles of the same measure, and parallel lines are taken to parallel lines. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.** MT.8.G.1

2 **Understand that a two-dimensional figure is congruent to another if the second can be obtained by a sequence of rigid transformations, and, given two congruent figures, describe a sequence that exhibits the congruence between them.** MT.8.G.2

3 **Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.** MT.8.G.3

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4 **Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations, and, given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.** MT.8.G.4

5 **Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.** MT.8.G.5

6 **Explain a proof of the Pythagorean Theorem and its converse.** MT.8.G.6

7 **Apply the Pythagorean Theorem to determine unknown side lengths in right triangle problems, including problems in context in two and three dimensions. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.** MT.8.G.7

8 **Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.** MT.8.G.8

9 **Know, use, and apply the formulas for the volumes of cones, cylinders, and spheres to solve problems, including problems in context.** MT.8.G.9

Statistics and Probability MT.8.SP

1 **Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities and describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.** MT.8.SP.1

2 **Know that straight lines are widely used to model relationships between two quantitative variables and for scatter plots that suggest a linear association, informally fit a straight line and informally assess the model fit by judging the closeness of the data points to the line.** MT.8.SP.2

3 **Use the equation of a linear model to solve problems in the context of bivariate measurement data, and interpret the slope and intercept.** MT.8.SP.3

4 **Construct and interpret frequencies and relative frequencies for bivariate categorical data in a two-way table to investigate patterns of association. This standard should incorporate cultural context relating to Montana Indigenous Peoples and local communities.** MT.8.SP.4