Unit 1: Applying Algebra to Geometry

Dear Parents/Guardians,

Unit 1 integrates geometry and algebraic notation. In Lessons 1 and 2, students develop formulas for finding the volumes of cylinders, cones and spheres and use them to solve problems. In Lesson 3, students learn about angle relationships with triangles and parallel lines. They use these relationships to write and solve equations to find missing angle measures.

Volume

Students solve problems involving volume of 3-D figures.

Example: A basketball used by the NCAA can be no more than 30 inches in circumference. Calculate the maximum volume.

Step 1: Determine the maximum radius of the basketball.	**Step 2: Find the maximum volume of the basketball (sphere).**
Circumference = $2\pi r$ The basketball can be no more than 30 inches in circumference. $2\pi r \le 30$ Divide both sides by 2π. $\frac{2\pi r}{2\pi} \le \frac{30}{2\pi}$ $r \le 4.78$ in (approximately)	Volume = $\frac{4}{3}\pi r^3$ $V = \frac{4}{3}(3.14)(4.78)^3$ $V \approx 457.48$ in^3 The basketball can have a volume no more than 457.48 in^3.

Angle Measures

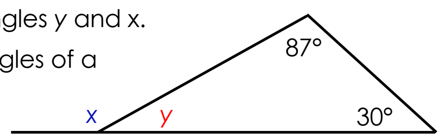
Students explore angle relationships to determine angle measures.

Example: Find the measures of angles *x* and *y*.

$|y|$ and $|x|$ represent the measures of angles *y* and *x*.

The sum of the measures of the interior angles of a triangle are 180°.

$87° + 30° + |\angle y| = 180°$; $|\angle y| = 63°$



Since *x* and *y* form a straight angle, they are supplementary.

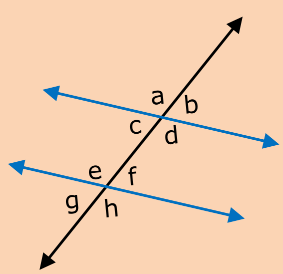
$|\angle x| + |\angle y| = 180°$

$|\angle x| + 63° = 180°$' $|\angle x| = 117°$

Parallel Lines

When parallel lines are intersected by a third line, the angles formed have the following relationships.

- Alternate interior angles have equal measures, such as $|\angle c|$ and $|\angle f|$.
- Corresponding angles have equal measures, such as $|\angle b|$ and $|\angle f|$.



Alternate exterior angles have equal measures, such as $|\angle b|$ and $|\angle g|$.

We can use these relationships to find angle measures.

Example: If $|\angle b| = 60°$, then

$|\angle a| = 120°$	supplementary angles	$|\angle g| = 60°$	alternate exterior angles
$|\angle f| = 60°$	corresponding angles	$|\angle c| = 60°$	alternate interior angle with $|\angle f|$

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By the end of the unit, your student should know…

- How to develop the formula for volume of cylinders and use it to solve problems [Lesson 1.1]
- How to develop the formulas for the volumes of cones and spheres and use them to solve problems [Lesson 1.2]
- How to use facts about angle relationships to find angle measures [Lesson 1.3]
- How to write and solve equations involving angle measures [Lesson 1.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- For more information about volume of a cylinder: https://youtu.be/fxTsG4qkz1U
- For more information about volume of a cone: https://youtu.be/hC6zx9WAiC4
- For more information about volume of a sphere: https://youtu.be/lelS2vg7JO8
- For more information about angle relationships: https://youtu.be/6RMN5Pf1fHU

Unit 2: Squares, Square Roots, Triangles and Real Numbers

Dear Parents/Guardians,

Unit 2 introduces square roots and different number sets within the real number system. In Lesson 1, students explore the inverse relationship between squares and square roots of numbers. In Lesson 2, they investigate the Pythagorean Theorem and its converse. In Lesson 3, students convert numbers into different forms (such as decimals to fractions) and determine whether numbers are rational or irrational.

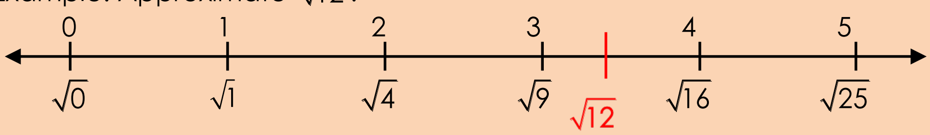
Squares and Square Roots

When a number is taken to the second power, we refer to it as 'squaring the number'. (Think of the area of a square. If it's side length is 5 units, then the area is 5^2 (or 5 squared).

4^2 is '4 to the second power' or '4 squared'. $4^2 = 16$	The square root of 16 is 4. $\sqrt{16} = 4$

Students will observe that most numbers do not have a whole number square root and will need to approximate the quantity.

Example: Approximate $\sqrt{12}$.



$\sqrt{12}$ is between 3 and 4.

To find a better approximation, subtract the closest perfect square that is less than the given number and the next perfect square.

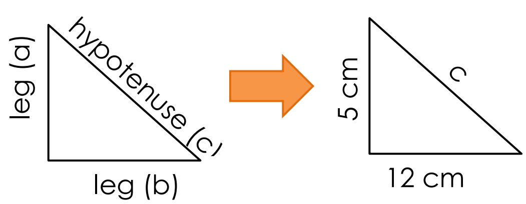
$\sqrt{12}$ lies between $\sqrt{9}$ and $\sqrt{16}$.

Estimate the fractional part of $\sqrt{12} \rightarrow \frac{12-9}{16-9} = \frac{3}{7}$. $\sqrt{12} \approx 3\frac{3}{7} \approx 3.43$.

Using a calculator, $\sqrt{12} \approx 3.46$, which is extremely close!

The Pythagorean Theorem

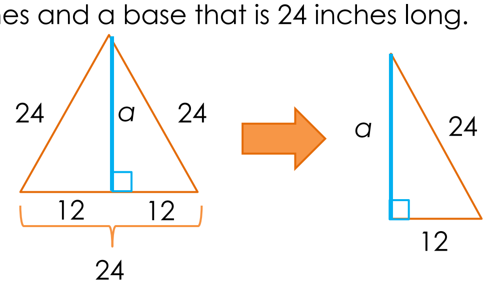
Students explore right triangles to prove the Pythagorean Theorem, which states for any right triangle, the sum of the squares of the lengths of the two legs is equal to the square of the length of the hypotenuse.



$$c^2 = a^2 + b^2$$
$$c^2 = 5^2 + 12^2$$
$$c^2 = 25 + 144$$
$$c^2 = 169$$
$$c = \sqrt{169} = 13\,cm$$

Students will use the Pythagorean Theorem to solve problems.

Example: Find the height of an isosceles triangle that each measure 24 inches and a base that is 24 inches long.



$$c^2 = a^2 + b^2$$
$$24^2 = a^2 + 12^2$$
$$576 = a^2 + 144$$
$$a^2 = 432$$
$$a = \sqrt{432} \approx 20.78\,in$$

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By the end of the unit, your student should know…

- How to find squares and square roots of whole numbers [Lesson 2.1]
- How to approximate square roots as fractions and decimals [Lesson 2.1]
- The meaning of the Pythagorean theorem, and how to use it and its converse [Lesson 2.2]
- That numbers that are not rational are called irrational numbers [Lesson 2.3]
- How to change repeating decimals to fractions [Lesson 2.3]
- How to locate irrational numbers on a number line [Lesson 2.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- For more on the Pythagorean Theorem: https://youtu.be/ibkR4PHpylg

Unit 3: The Algebra of Exponents and Roots

Dear Parents/Guardians,

Unit 3 introduces exponents and roots. In Lesson 1, students use patterns to develop an understanding of exponents and rules for exponentials. In Lesson 2, students explore ways to express very large and very small values, including scientific notation. In Lesson 3, students explore the inverse relationships between square numbers and square roots, and cube numbers and cube roots. They apply all that they have learned in the unit to simplify expressions and solve equations involving exponential numbers.

Rules for Exponentials

Students explore exponential relationships to make conjectures and develop exponential rules to simplify expressions.

Rule	Expanded Form	Exponential Form
Product Rule $x^a \bullet x^b = x^{a+b}$	$(6^3)(6^2)$ $= (6 \bullet 6 \bullet 6) \bullet (6 \bullet 6)$ $= 6^5$	$(6^3)(6^2)$ $= 6^{3+2}$ $= 6^5$
Power Rule $(x^a)^b = x^{a \bullet b}$	$(6^3)^2$ $= (6 \bullet 6 \bullet 6) \bullet (6 \bullet 6 \bullet 6)$ (2 sets) $= 6^6$	$(6^3)^2$ $= 6^{3 \bullet 2}$ $= 6^6$
Quotient Rule $\frac{x^a}{x^b} = x^{a-b}$	$\frac{6^5}{6^2}$ $= \frac{6 \bullet 6 \bullet 6 \bullet 6 \bullet 6}{6 \bullet 6}$ $= 6^3$	$\frac{6^5}{6^2}$ $= 6^{5-2}$ $= 6^3$

Scientific Notation

Students convert very large and very small quantities into scientific notation. Note that very large values typically have a positive exponent and very small values typically have a negative exponent.

	5,910,000,000	0.0000302
Write each as the product of a number (between 1 and 10) and a power of 10.	5.91×10^9	3.02×10^{-5}

Exponents and Roots

Students will explore relationships between exponents and roots.

Exponent	Root (which is inverse of the exponent)
x squared $\rightarrow x^2$ $8^2 = 64$	*square root of x* $\rightarrow \sqrt{x}$ $\sqrt{64} = 8$ or -8 $8 \times 8 = 64$ and $(-8)(-8) = 64$
x cubed $\rightarrow x^3$ $5^3 = 125$	*cube root of x* $\rightarrow \sqrt[3]{x}$ $\sqrt[3]{125} = 5$ $5 \times 5 \times 5 = 125$, but $(-5)(-5)(-5) \neq 125$

Students will apply their knowledge of exponents and roots to solve equations.

$x^2 = 16$ $x = 4$ or $x = -4$	$x^2 = 165$ $x = \sqrt{15}$ or $x = -\sqrt{15}$ Since the solution is not an integer, we leave it in root form.	$x^3 = \frac{8}{27}$ $x = \frac{2}{3}$

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By the end of the unit, your student should know…

- The definitions of positive, negative, and zero exponents and their applications [Lesson 3.1]
- The product, power, and exponent rules and their applications [Lesson 3.1]
- Write large and small quantities in scientific notation and use them to solve problems [Lesson 3.2]
- Work with squares, square roots, cubes, and cube roots of rational numbers [Lesson 3.3]
- Solve equations involving expressions with exponents [Lesson 3.4]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- For more on exponent rules: https://tinyurl.com/mathtv-exponents
- For more on scientific notation: https://tinyurl.com/mathtv-scientific-notation

Unit 4: Functions

Dear Parents/Guardians,

Unit 4 introduces functions. In Lesson 1, students represent situations with words, pictures, tables, graphs, and equations. They determine when graphs are linear or non-linear. In Lesson 2, students formally define functions and determine if a representation is a function. In Lesson 3, students solve problems involving rates, using the representations from previous lessons.

Multiple Representations

Students interpret situations involving changes in area and money over time using a variety of representations.

Example: Nathan initially had $60 in his bank account. Every month he deposits another $20 into his account.
Represent Nathan's situation as a table, an equation, and in a graph.

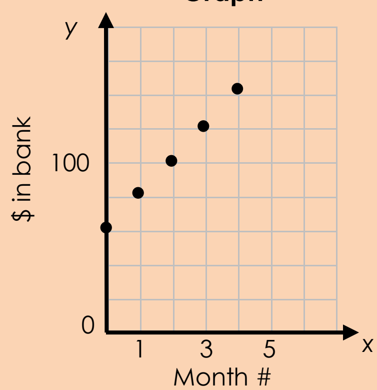
Table

month # (x)	$ in bank (y)
0	60
1	80
2	100
3	120
4	140

Equation

$y = 60 + 20x$

Graph



Functions and Non-Functions

A function is a rule that assigns each input value exactly one output value. Below are four representations commonly studied when determining if a given relationship among two quantities is a function. (The red highlights where the relationship is not a function.)

Table of Numbers

Function:

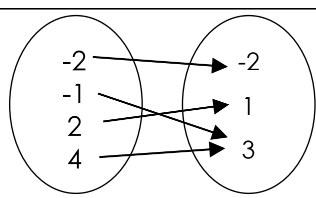
x (input)	2	-1	4	-2
y (output)	1	3	3	-2

Not a Function:

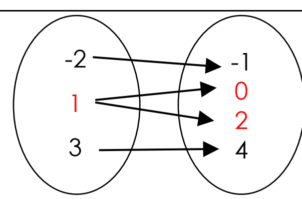
x (input)	1	1	3	-2
y (output)	2	0	4	-1

Mapping Diagram

Function:



Not a Function:



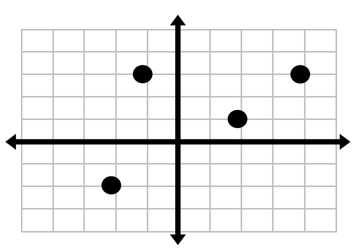
Ordered Pairs

Function: (2,1),(-1,3),(4,3),(-2,-2)

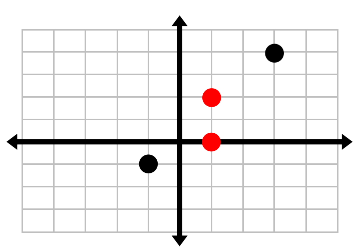
Not a Function: (1,2),(1,0),(3,4),(-2,-1)

Graph

Function:



Not a Function:



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By the end of the unit, your student should know…

- How to represent situations with words, pictures, tables, graphs and equations [Lesson 4.1]
- When a graph is linear or nonlinear, and when it is increasing or decreasing [Lesson 4.1]
- The definition of a function [Lesson 4.2]
- When a representation is a function [Lesson 4.2]
- How to solve and interpret rate situations with words, pictures, tables, graphs, and equations [Lesson 4.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.

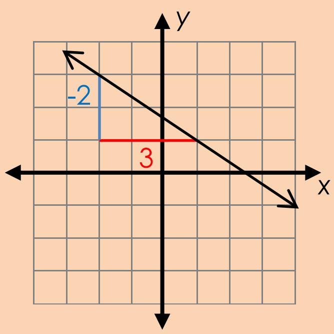
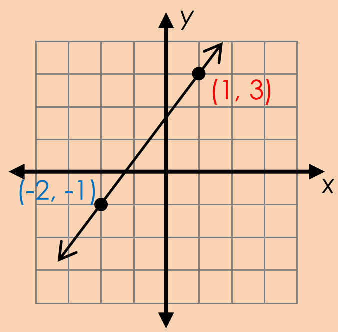
Unit 5: Linear Functions

Dear Parents/Guardians,

Students continue the work from Unit 4 to formally connect the slope of a line to its context in a graph. In Lesson 1 students visually determine the direction of a line and determine the slope of a line by counting on a graph. They connect their counting method to calculating the slope using the slope formula. In Lesson 2 students revisit determining the y-intercept and write equations of linear functions in slope-intercept form. In Lesson 3 students derive the equation of a line. They interpret the slope and y-intercept in tables, graphs and equations. They apply their knowledge of slope to help solve non-routine problems.

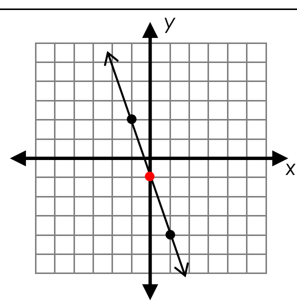
Slope of a Line

Roughly speaking, the slope of a line (*m*) is the slant of a line.
There are two ways students will find the slope of a line.

The Counting Method	Slope Formula
Students will count (from one point to another point on the line) the vertical and horizontal change to find the slope.	Students will find the coordinates of two points on the line and use this data in the slope formula to calculate the slope.
 Slope (m) = $\frac{-2}{3}$	 Slope (m) = $\frac{3-(-1)}{1-(-2)} = \frac{4}{3}$

Write Equations in Slope-Intercept Form

Students will represent the graph of a line as an equation in slope-intercept form.

Slope-Intercept Form $y = mx + b$ slope		slope (m): $\frac{6}{2} = 3$ y-intercept (b): -1 Equation of the line: $y = 3x - 1$

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By the end of the unit, your student should know…

- Whether a line has a positive or negative slope [Lesson 5.1]
- How to find the slope of a line by counting and by using the slope formula [Lesson 5.1]
- When line segments lie on the same line or on parallel lines [Lesson 5.1]
- The slope-intercept form (equation) of a line [Lesson 5.2]
- How to identify and interpret the slope and y-intercept of a line in tables, graphs, and equations [Lesson 5.3]
- How to apply slope concepts to nonroutine problems [Lesson 5.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.

Unit 6: Bivariate Data

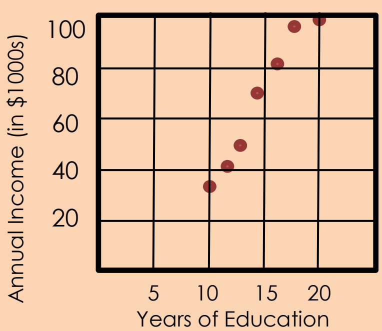
Dear Parents/Guardians,

In Unit 6, students will explore bivariate statistics. In Lesson 1, students plot data points to make scatter plots, describe associations, and draw conclusions. In Lesson 2, students connect what they learned about linear functions to statistics and draw and interpret lines of best fit. In Lesson 3, they organize and display data in tables, visual organizers, and graphs, as well as interpret the data.

Numerical Data

Students graph their data and interpret the results.

Level of Education	Average Years of Education	Annual Income (in $1000s)
Not a High School Graduate	10	32
High School Graduate	12	40
Some College, No Degree	13	49
Associate Degree	14	68
Bachelor Degree	16	80
Master Degree	17	98
Doctorate Degree	20	99



The graph is non-linear (not a line) but indicates a positive association.
Based on the data, more education is associated with making more money. Students might estimate a line that roughly fits this data and use it as a predictive tool.

https://tinyurl.com/averagesalarybyeducationlevel

Frequency Table

A frequency table is a table that lists items and the number of times they occur in a data set. Students use their categorical data to complete two-way frequency tables for two variables.

	Students with a Job	Students without a Job	Total
Students with Chores	6	4	10
Students with No Chores	2	10	12
Total	8	14	**22**

Students separate the data to explore relative frequency tables.

Example: We can construct a frequency table relative to students who did/did not do chores to determine that approximately 27.3% of students who have chores also have a job.

n = 22	Job	No Job	Total
Chores	$\frac{6}{22} \approx 27.3\%$	$\frac{4}{22} \approx 18.2\%$	45.5%
No Chores	$\frac{2}{22} \approx 9.1\%$	$\frac{10}{22} \approx 45.4\%$	54.5%
Total	8	12	**100%**

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By the end of the unit, your student should know…

- How to construct and interpret scatter plots [Lesson 6-1]
- How to recognize associations between variables and notice the difference between linear and non-linear associations [Lessons 6-1 and 6-2]
- How to draw lines of best fit and estimate their equations [Lesson 6-2]
- How to interpret the slope and y-intercept of linear models [Lesson 6-2]
- How to construct and interpret two-way frequency tables and relative frequency tables [Lesson 6-3]

Additional Resources

- For definitions and additional notes, please refer to Student Resources at the end of this unit.
- For information on how to read and interpret two-way frequency tables: https://youtu.be/k8xFH6fCIWs

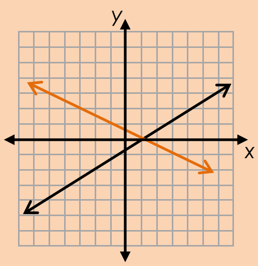
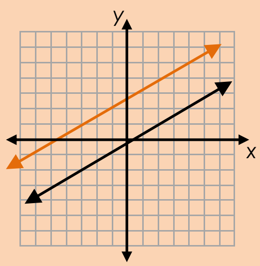
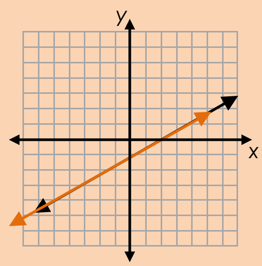
Unit 7: Linear Equations and Systems I

Dear Parents/Guardians,

Unit 7 is the first of two units to investigate linear equations in one variable and systems of linear equations in two variables. In Lesson 1, students graph systems of equations and interpret the solutions. Students use substitution to rewrite a system of equations as one equation. In Lesson 2, students revisit cups and counters as a model to solve equations in one variable with the variables on both sides by building and drawing. In Lesson 3, they transition to solving equations algebraically.

What is a System of Linear Equations?

A system of linear equations is a set of two or more linear equations with the same variables. The solution set is the set of values that, when substituted in for the variables, makes all the equations in the system true. Students graph systems of linear equations to determine its solutions.

One Solution When the lines intersect at only one point.	**No Solution** When the lines are parallel (never intersect).	**Infinitely Many Solutions** When equations are equivalent their lines coincide.
 	 	

Solving Equations

In Lesson 2, students continue to use the cups and counters to model solving equations. Students use properties of arithmetic and properties of equality to solve equations using "legal moves". In Lesson 3 students transition to solving equations without the model.

Equation/ Algebraic Steps	Drawing
$-2(x-3)=3x+1$ $-2x+6=3x+1$	Λ + + + | V V V + Λ + + +
$-2x+6=3x+1$ $-1 \quad -1$	Λ Λ | V V V + + + + + + + − −
$-2x+5=3x$ $+2x \quad +2x$	Λ Λ | V V V V V | V V + + + + +
$\frac{5}{5}=\frac{5x}{5}$ $x=1$	+ + + + + | V V V V V

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By the end of the unit, your student should know…

- How to solve systems of equations by graphing [Lesson 7.1]
- That systems of linear equations that have one, zero, or infinitely many solutions [Lesson 7.1]
- How to use substitution to rewrite systems of equations as a single equation [Lesson 7.1]
- How to solve equations using a model [Lesson 7.2]
- That equations in one variable have one, zero, or infinitely many solutions [Lesson 7.3]
- How to solve equations algebraically [Lesson 7.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- Solutions to linear equations: https://youtu.be/qsL_5Y8uWPU
- Graphing solutions for systems of linear equations: https://youtu.be/5a6zpfI50go

Unit 8: Equations and Systems 2

Dear Parents/Guardians,

Unit 8 is a continuation of the topics in Unit 7. Students continue to solve linear equations algebraically, including those involving fractions and decimals. Students learn how to solve systems of equations using algebra. Students use algebra to solve various problems involving linear equations.

Solving Equations Algebraically

Students learn to solve linear equations with non-integer rational numbers in at least two ways.

Example: $\frac{1}{8}(8x-3)=2x+\frac{3}{4}$

Method 1: Solve with Fractions	Method 2: "Remove" the Fraction
Students use properties of arithmetic and properties of equality to solve equations. For equations with fractions, this may include renaming fractions with a common denominator.	Students may find the lowest common multiple of the denominators and use the multiplication property of equality to simplify each side of the equation. They will use a similar strategy for solving equations with decimals.
$\frac{1}{8}(8x-3)=2x+\frac{3}{4}$ $x-\frac{3}{8}=2x+\frac{3}{4}$ $-x=\frac{3}{4}+\frac{3}{8}$ $-x=\frac{6}{8}+\frac{3}{8}$ $x=-\frac{9}{8}$	$\frac{1}{8}(8x-3)=2x+\frac{3}{4}$ $8\left[\frac{1}{8}(8x-3)\right]=\left(2x+\frac{3}{4}\right)8$ $8x-3=16x+6$ $-8x=9$ $x=-\frac{9}{8}$

Solving Systems of Equations with Substitution

Substitution is a good strategy to use when there is an isolated variable, or it is easy to isolate a variable.

Example: $\begin{cases} y+3x=1 \\ 2x-y=4 \end{cases}$

Isolate one of the variables. For this system, we can isolate y in the first equation by subtracting 3x from both sides.	$y+3x=1$ $y=-3x+1$
Replace (substitute) the y in the second equation with -3x + 1.	$2x-y=4$ $2x-(-3x+1)=4$ $2x+3x-1=4$
Solve for x.	$2x+3x-1=4$ $5x=5$ $x=1$
Replace (substitute) the x in the first equation with 1 and solve for y.	$y+3x=1$ $y+3(1)=1$ $y=-2$
The solution for the system of equations is (1, -2) because this ordered pair is a solution for both equations.	

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By the end of the unit, your student should know…

- How to solve equations with rational numbers algebraically [Lesson 8-1]
- How to use algebraic methods to solve linear systems of equations [Lessons 8.2 and 8.3]
- How to set up equations and solve problems [Lesson 8.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- Solving linear equations with decimals algebraically: https://youtu.be/QJoGTMzoFNA
- Substitution: https://youtu.be/uzyd_mlJaoc

Unit 9: Congruence

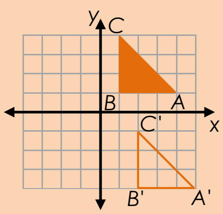
Dear Parents/Guardians,

Unit 9 introduces students to transformations in geometry. Using patty paper, students will explore translations, rotations, and reflections, noting how the transformation moves the plane and the location change of a given figure. Students will perform rigid motion transformations on coordinate planes, recording their moves in pictures, words, coordinates and symbolic notation. Students will determine that figures are congruent if one can be obtained from the other by a sequence of (one or more) translations, rotations and/or reflections.

Translations

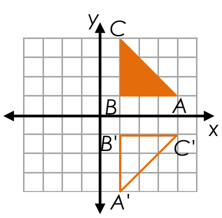
An original figure is referred to as a "pre-image" and is always shaded in the lessons. A figure that results after a transformation is called an "image" figure.

A translation, or "slide", of the plane shifts all the points in the same distance and in the same direction.

Picture	Words	Coordinates	Symbolic
	The pre-image is translated 1 unit to the right and 5 units down to create the image.	A (4,1) maps to A' (5, -4). B (1,1) maps to B' (2, -4). C (1,4) maps to C' (2, -1).	$(x,y)\rightarrow(x+1,y-5)$

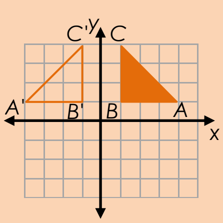
Rotations

A rotation, or "turn", of a plane rotates the plane through a given angle about a given point.

Picture	Words	Coordinates	Symbolic
	The pre-image is rotated about the origin clockwise 90° to create the image.	A (4,1) maps to A' (1, -4). B (1,1) maps to B' (1, -1). C (1, 4) maps to C' (4, -1).	$(x,y)\rightarrow(y,-x)$

Reflections

A reflection, or "flip", of a plane flips the plane over a given line.

Picture	Words	Coordinates	Symbolic
	The pre-image is reflected over the y-axis to create the image.	A (4,1) maps to A' (-4,1). B (1,1) maps to B' (-1,1). C (1,4) maps to C' (-1,4).	$(x,y)\rightarrow(-x,y)$

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By the end of the unit, your student should know…

- How to perform translations using patty paper and on coordinate planes [Lesson 9.1]
- How to perform rotations using patty paper and on coordinate planes [Lesson 9.2]
- How to perform reflections using patty paper and on coordinate planes [Lesson 9.3]
- The definition of congruence and apply the definition to show that two figures are congruent [Lesson 9.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- Transformations: https:/youtu.be/7h46hKwyahQ https://youtu.be/KbNFTUgNJw4

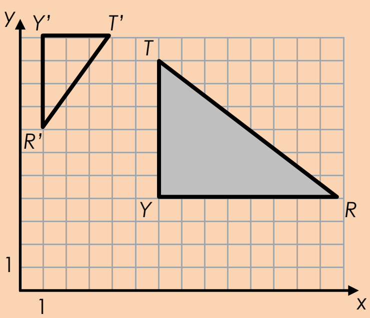
Unit 10: Similarity

Dear Parents/Guardians,

Unit 10 builds on the geometric concepts from Unit 9. In Lesson 1, students explore a fourth transformation, dilations. In Lesson 2, students see how dilations lead to a definition of similarity and compare this with the definition of congruence. In Lesson 3, students determine whether two triangles are similar using the Angle-Angle Criterion for Similarity of Triangles. They connect similar triangles to the slope of a line and solve triangle problems to find missing measures.

Dilations and Similarity

A dilation is a transformation where the image is not congruent to the original figure (unless the scale factor is 1).



Two figures are similar if one can be obtained from another by a sequence of (one or more) translations, rotations, reflections, and **dilations.**

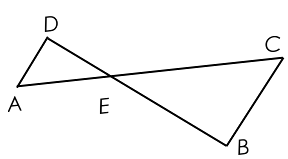
$\triangle R'Y'T'$ can be obtained from $\triangle RYT$ by:

- **Rotating** $\triangle RYT$ 90° clockwise around Y
- **Translating** $\triangle RYT$ up 7 and to the left 5
- **Dilating** $\triangle RYT$ with a scale factor of $\frac{1}{2}$

Similar Triangles

Another way to determine if two triangles are similar is the Angle-Angle Criterion for Similarity of Triangles. If two angles in one triangle are equal in measure to two angles in another triangle, then the triangles are similar.

Given: $\overline{AD} \parallel \overline{BC}$

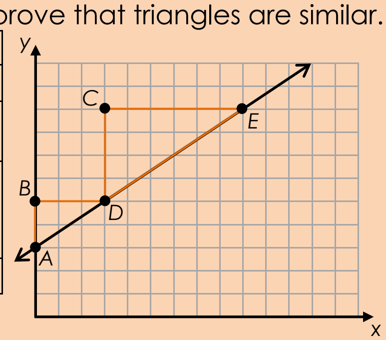


Statement	Reason
$\angle AED \cong \angle CEB$	Vertical angles are congruent.
$\angle DAE \cong \angle BCE$	Alternate interior angles are congruent.
$\Delta ADE \sim \Delta CBE$	Angle-Angle Criterion.

Similarity and Slope

Applying the Angle-Angle Criterion, students will determine that the slope of a line is always the same as the ratio of lengths of similar right triangle legs and use these properties to prove that triangles are similar.

Statement	Reason
$\angle ABD \cong \angle DCE$	Both are right angles.
$\overline{BD} \parallel \overline{CE}$	Both line segments are horizontal.
$\angle BDA \cong \angle CDE$	Line $\overleftrightarrow{AE}$ is the transversal. Corresponding angles are congruent.
$\triangle ABD \sim \triangle DCE$	AA Criterion



The lengths of corresponding sides of similar triangles are proportional.

$\frac{|AB|}{|BD|} = \frac{2}{3} \quad \frac{|CD|}{|CE|} = \frac{4}{6} = \frac{2}{3}$. The slope of line $\overleftrightarrow{AE}$ is $\frac{2}{3}$.

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By the end of the unit, your student should know…

- How perform and understand properties of dilations [Lesson 10.1]
- How to apply the Pythagorean theorem to explore properties of dilations and similarity [Lessons 10.1, 10.2]
- How do define similarity [Lesson 10.2]
- How similarity and congruence are the same and how they are different [Lessons 10.2, 10.3]
- How to define the angle-angle criterion for similarity of triangles and use it to solve problems [Lesson 10.3]
- How to use the connection between parallel lines and similar triangles to slopes of lines to solve for missing triangle measures [Lesson 10.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- For more information on dilations: https://youtu.be/BCllaARDOWI