# ALGEBRA I READINESS RESOURCES

PARENT OVERVIEW AND ANSWER KEY

**Summer 2020**

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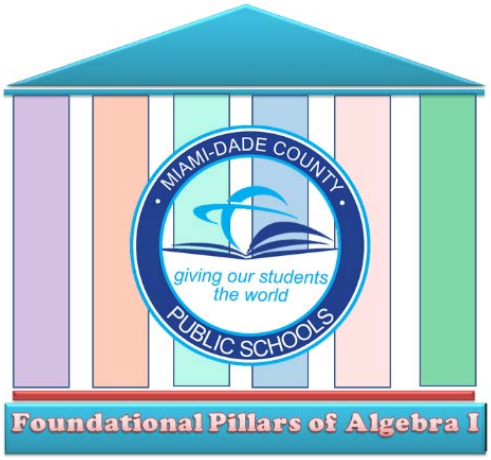
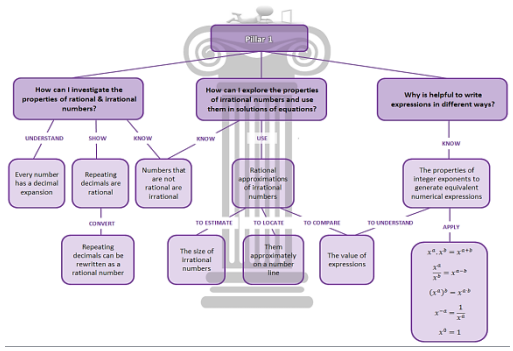
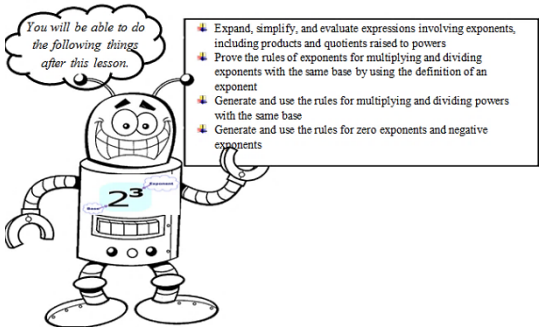
OVERVIEW

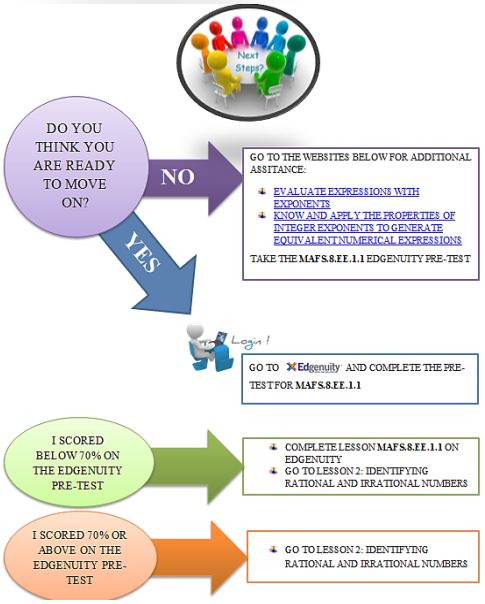



In order for students to be successful in Algebra I, they must have a clear understanding of the foundational math concepts that are taught in Pre-Algebra. These concepts are grouped in six pillars within this packet. Together they will assist in building a strong foundation for future mathematics.

The Algebra I Readiness Resources in this packet are designed to address and build the skills necessary to be successful in Algebra I. The packet is comprised of the following components that allow students to work independently towards academic success.

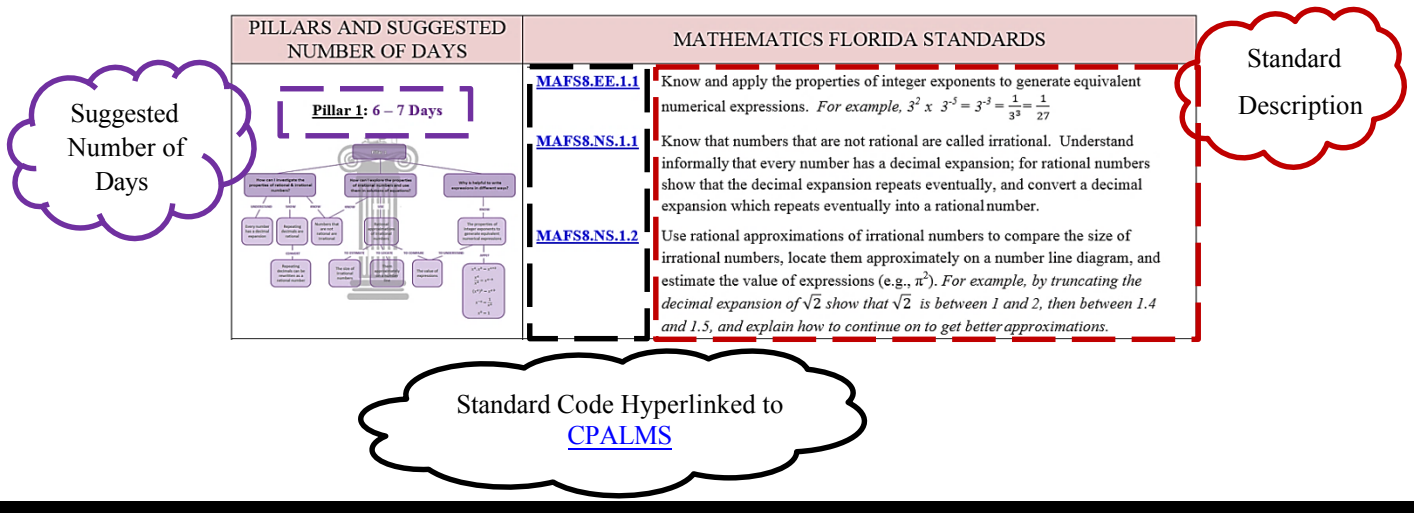
COMPONENTS

| | |
|---|---|
|   | **PILLAR ROADMAP**<br><br>The Pillar Roadmap organizes the connected foundational concepts that will be covered in the upcoming lesson. |
|   | **AL – The Robot Guide**<br><br>Al gives a quick overview of the concepts students will have the opportunity to learn and practice for each lesson. |

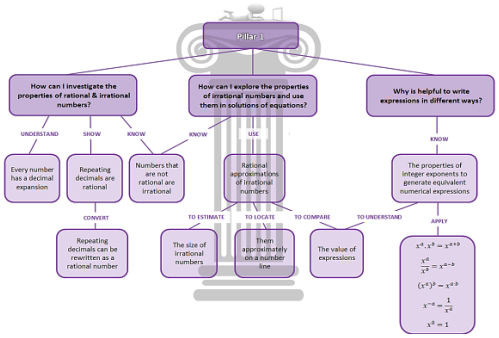
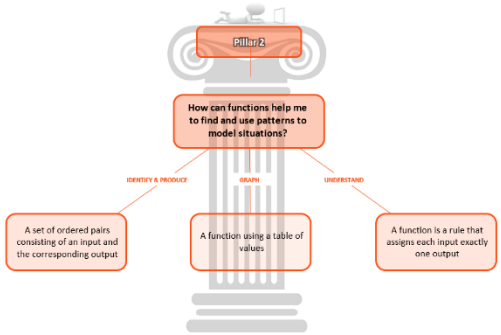
| | |
|---|---|
|  | **Vocabulary**<br><br>Students will be able to use the links provided to define vocabulary words for the respective lesson. |
|  | **Check Yourself**<br><br>Throughout the lesson, students will have the opportunity to do a quick check for understanding of the concept they just learned. |
|  | **Next Steps?**<br><br>Students have a choice of:<br>1. Watching the video resources related to the lesson prior to taking the test on Edgenuity.<br><br>2. Taking the Edgenuity assessment on the concepts they learned in the lesson. If they score 70% or above on the test they will continue to the next lesson. If they did not score 70% on the Edgenuity assessment, they will be prompted to complete the respective lesson in order to build the necessary skills before they move onto the next lesson in the packet. |

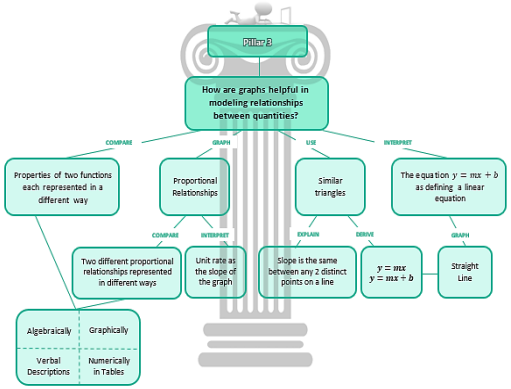
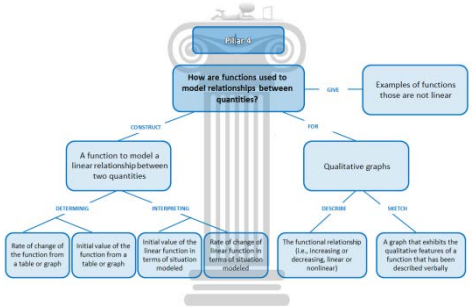
IMPLEMENTATION

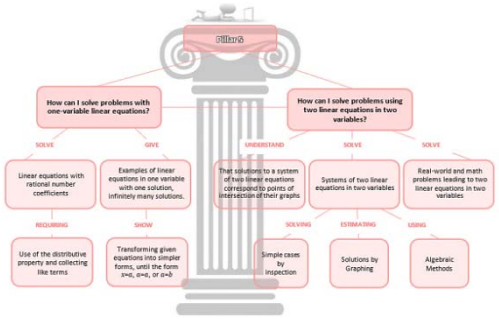
The implementation of the packet is designed to be done independently by students at their own pace. In order to better facilitate the completion of the packet a Standard Correlation Guide has been provided.

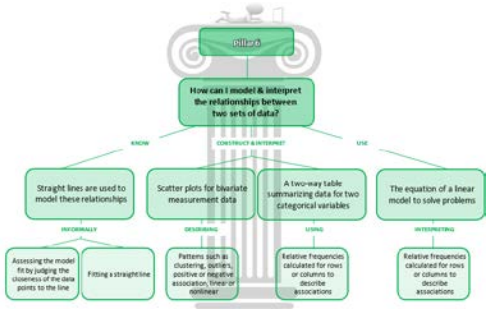


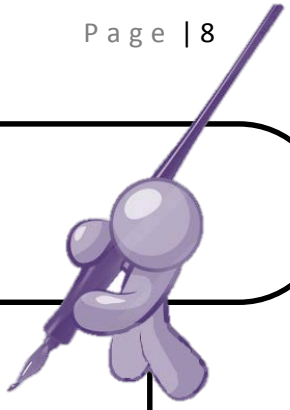
STANDARD CORRELATION GUIDE

| PILLARS AND SUGGESTED NUMBER OF DAYS | MATHEMATICS FLORIDA STANDARDS |
|---|---|
| **Pillar 1**: 6 – 7 Days<br>Approximately 2 hours a day<br>  | **MAFS8.EE.1.1** Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \cdot 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$<br><br>**MAFS8.NS.1.1** Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.<br><br>**MAFS8.NS.1.2** Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\pi^2$). *For example, by truncating the decimal expansion of the square root of 2 show that square root of 2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.* |
| **Pillar 2**: 2-3 Days<br>Approximately 2 hours a day<br>  | **MAFS8.F.1.1** Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. |

| PILLARS AND SUGGESTED NUMBER OF DAYS | MATHEMATICS FLORIDA STANDARDS |
|---|---|
| **Pillar 3**: 8-10 Days<br>Approximately 2 hours a day<br>  | **MAFS8.EE.2.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.<br>**MAFS8.EE.2.6** Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; 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 $b$.<br>**MAFS8.F.1.2** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.<br>**MAFS8.F.1.3** Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line. |
| **Pillar 4**: 4-5 Days<br>Approximately 2 hours a day<br>  | **MAFS8.F.2.4** Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(x, y)$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.<br>**MAFS8.F.2.5** Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line. |

| PILLARS AND SUGGESTED NUMBER OF DAYS | MATHEMATICS FLORIDA STANDARDS |
|---|---|
| **Pillar 5**: 4-5 Days<br>Approximately 2 hours a day<br>  | **MAFS8.EE.3.7a** Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show 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).<br>**MAFS8.EE.3.7b** Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.<br>**MAFS8.EE.3.8a** Understand 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.<br>**MAFS8.EE.3.8b** Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.<br>**MAFS8.EE.3.8c** Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair. |

| PILLARS AND SUGGESTED NUMBER OF DAYS | MATHEMATICS FLORIDA STANDARDS |
|---|---|
| **Pillar 6**: 8-10 Days   | **MAFS8.SP.1.1** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.<br>**MAFS8.SP.1.2** Know that straight lines are widely used to model relationships between two quantitative variables. 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.<br>**MAFS8.SP.1.3** Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.<br>**MAFS8.SP.1.4** Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?* |



*Dear Family,*

*In Grade 7, students learned to differentiate between terminating and repeating decimals. This pillar will build the skills students will need to learn that numbers that are not rational are called irrational. They will learn to use rational approximations of irrational numbers to represent the value of irrational numbers on the number line. Students will also use their knowledge of the properties of integer exponents to rewrite algebraic expressions.*

*How will my student apply what he/she learns in Algebra 1?*

*Students will be able to explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values. In Algebra 1 students will rewrite expressions involving radicals and rational exponents using the properties of exponents.*

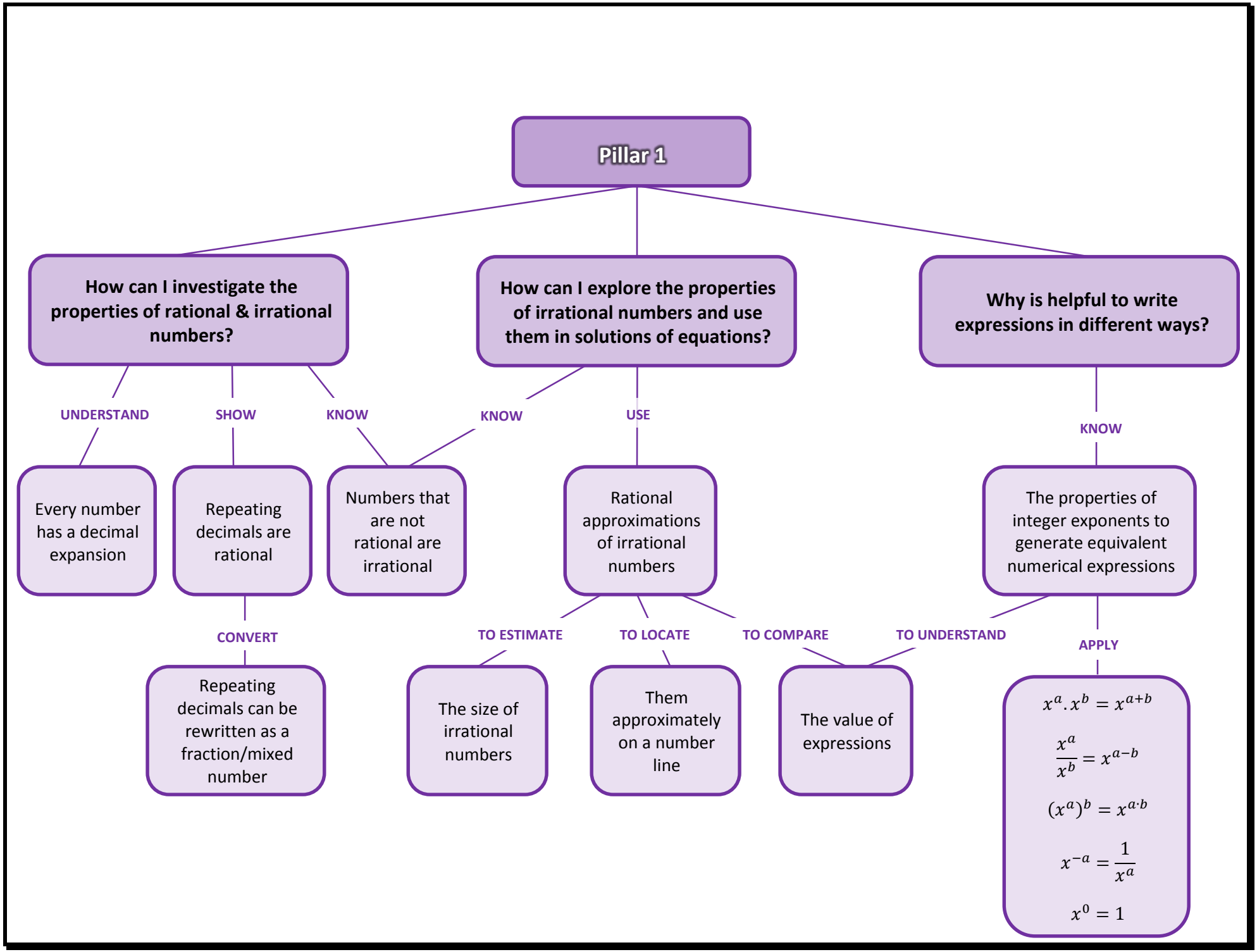
*How can you help your student at home?*

*One of the best things you can do during this unit is to ask your student to explain the difference between a rational and an irrational number. Ask them to give you examples of both. Ask them how they can write a repeating decimals as a fraction.*

*Happy Solving!*


How Parents Can Use Khan Academy

*Khan Academy Lessons: Numbers and operations*


Pillar 1
How can I investigate the properties of rational & irrational numbers?
How can I explore the properties of irrational numbers and use them in solutions of equations?
Why is helpful to write expressions in different ways?
UNDERSTAND
SHOW
KNOW
KNOW
USE
KNOW
Every number has a decimal expansion
Repeating decimals are rational
Numbers that are not rational are irrational
Rational approximations of irrational numbers
The properties of integer exponents to generate equivalent numerical expressions
CONVERT
TO ESTIMATE
TO LOCATE
TO COMPARE
TO UNDERSTAND
APPLY
Repeating decimals can be rewritten as a fraction/mixed number
The size of irrational numbers
Them approximately on a number line
The value of expressions
$x^a . x^b = x^{a+b}$
$\frac{x^a}{x^b} = x^{a-b}$
$(x^a)^b = x^{a \cdot b}$
$x^{-a} = \frac{1}{x^a}$
$x^0 = 1$

ANSWER KEY

**Check Yourself: Evaluate, leaving your answer as a number to a power.**

1. $5^3 \cdot 5^7 = \mathbf{5^{10}}$
2. $t^4 \cdot t^6 = \mathbf{t^{10}}$
3. $5^2 \cdot 5^8 = \mathbf{5^{10}}$
4. $b^{10} \cdot b^2 = \mathbf{5^{12}}$

**Check Yourself: Evaluate, leaving your answer as a number to a power.**

1. $\frac{f^5}{f^2} = \mathbf{f^3}$
2. $\frac{u^{11}}{u^4} = \mathbf{f^7}$
3. $\frac{5^8}{5} = \mathbf{5^7}$
4. $\frac{4^{12}}{4^7} = \mathbf{4^5}$

**Check Yourself: Evaluate, leaving your answer as a number to a power.**

1. $(5^4)^5 = \mathbf{5^{20}}$
2. $(a^3)^7 = \mathbf{a^{21}}$
3. $(r^6)^5 = \mathbf{r^{30}}$
4. $(3^2)^9 = \mathbf{3^{18}}$

**Check Yourself: Evaluate, leaving your answer as a number to a power.**

1. $a^{-6} = \mathbf{\frac{1}{a^6}}$
2. $2^{-3} = \mathbf{\frac{1}{8}}$
3. $6^{-2} = \mathbf{\frac{1}{36}}$
4. $b^{-7} = \mathbf{\frac{1}{b^7}}$

**Check Yourself: Evaluate, leaving your answer as a number to a power.**

1. $\frac{t^5}{t^{-4}} = t^9$
2. $(2^{-3})^{-5} = 2^{15}$
3. $\frac{6^{-2}}{6^{-3}} = 6$
4. $(3^{-7})^2 = 3^{-14} = \frac{1}{3^{14}}$

**Check Yourself: Convert the following fractions to repeating decimals.**

| 1. | 2. | 3. | 4. | 5. | 6. |
|---|---|---|---|---|---|
| $\frac{11}{12}$ | $\frac{1}{3}$ | $\frac{5}{6}$ | $\frac{5}{11}$ | $\frac{1}{6}$ | $\frac{7}{18}$ |
| $\mathbf{0.91\overline{6}}$ | $\mathbf{0.\overline{3}}$ | $\mathbf{0.8\overline{3}}$ | $\mathbf{0.\overline{45}}$ | $\mathbf{0.1\overline{6}}$ | $\mathbf{0.3\overline{8}}$ |

## Check Yourself: Convert the following decimals to fractions.

1. $0.\overline{2}$ → $\frac{2}{9}$

2. $0.\overline{15}$ → $\frac{15}{99}$

3. $0.\overline{36}$ → $\frac{36}{99}$

4. $0.\overline{215}$ → $\frac{215}{999}$

5. $1.2\overline{3}$ → $1\frac{21}{90}$

6. $3.\overline{25}$ → $3\frac{25}{99}$

## Check Yourself: Rational or Irrational?

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $\frac{2}{3}$ | 0.25 | $\sqrt{56}$ | $\sqrt{36}$ | 0.6 | -3 | $\sqrt{225}$ | $-0.\overline{4}$ | $\sqrt[3]{8}$ | $\sqrt{196}$ |
| $5\frac{3}{4}$ | $\frac{5}{3}$ | $\sqrt{15}$ | $2\sqrt{49}$ | 50% | $-2\frac{1}{4}$ | $3\pi$ | 0.576... | 0.378... | -45% |
| $3\sqrt{36}$ | 0 | $\pi$ | 0.123... | $\sqrt{65}$ | 0.284... | $-\sqrt{21}$ | $\sqrt{1}$ | $3\sqrt{75}$ | -78 |
| 0 + -4 | $\sqrt[3]{27}$ | 6.37 | $8\frac{5}{7}$ | $\sqrt{9}$ | $\frac{2}{5}$ | $8.\overline{5}$ | -3 | $6\sqrt{15}$ | $\sqrt{4}$ |
| $2\sqrt{16}$ | $\pi + 4$ | $\sqrt{95}$ | $-\sqrt{63}$ | 0.245... | $\sqrt{5}$ | 37% | $\sqrt{81}$ | $\frac{\pi}{2}$ | 0.702 |
| $-5 + \frac{1}{4}$ | 0.731... | $0.\overline{8}$ | $2+\sqrt{36}$ | 0.245 | $\sqrt{48}$ | $\pi^5$ | 0.598... | $\sqrt{35}$ | $\sqrt{100}$ |
| 75% | $\sqrt{10}$ | $3 - \pi$ | $\sqrt{99}$ | $\sqrt[3]{64}$ | $\frac{1}{3}$ | $\sqrt{121}$ | $-3\frac{2}{5}$ | $\frac{6}{7}$ | -45% |
| $\sqrt{400}$ | 1 - 0.6 | $7^3$ | $\sqrt{\pi}$ | 0.967... | $\sqrt{31}$ | $-\sqrt{80}$ | $6 + \frac{1}{8}$ | $\sqrt{49}$ | $\sqrt[3]{125}$ |
| $(-23)^5$ | $\frac{7}{9}$ | 56 ÷8 | $\sqrt{169}$ | $5\frac{3}{7}$ | 56% | $\pi - 5$ | $\sqrt{4\pi}$ | $\sqrt{37}$ | $0.3\overline{5}$ |
| -6.89 | 4 + -3 | 5 · -2 | -69 | $\frac{9}{10}$ | $2\sqrt{16}$ | 23% | 0.142 | 0.142... | $\sqrt{64}$ |

## Check Yourself: Square roots.

1. $\sqrt{144}$ = **12**
2. $-\sqrt{100}$ = **-10**
3. $\sqrt{64}$ = **8**
4. $\sqrt{225}$ = **15**

## Check Yourself: Cube roots.

1. $\sqrt[3]{-1} =$ **-1**
2. $\sqrt[3]{8} =$ **2**
3. $\sqrt[3]{27} =$ **3**
4. $\sqrt[3]{-64} =$ **-4**

## Check Yourself: Approximating irrational numbers to the nearest whole number.

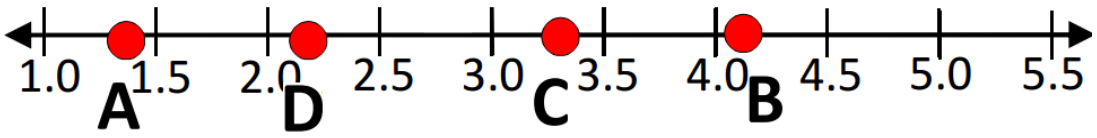
1. $\sqrt{2} \approx$ **1**
2. $\sqrt{41} \approx$ **6**
3. $\sqrt{77} \approx$ **9**
4. $\sqrt{120} \approx$ **11**

## Check Yourself: Compare the following numbers using < or >.

1. $\sqrt{51}$ **>** 5.1
2. $\sqrt{38}$ **<** $\sqrt{42}$
3. $\sqrt{17}$ **<** $\frac{9}{2}$
4. $\sqrt{49}$ **<** 7.1

## Check Yourself: Put a point on the line for each irrational number.

1. Point A: $\sqrt{2}$
2. Point B: $\sqrt{17}$
3. Point C: $\sqrt{11}$
4. Point D: $\sqrt{5}$




## Check Yourself: Estimate the expressions to the nearest whole number.

1. $\sqrt{8} + \sqrt{18} \approx$ **7**
2. $11 - \sqrt{80} \approx$ **2**
3. $4\sqrt{15} - 5 \approx$ **10**
4. $4\sqrt{24} - 3\sqrt{3} \approx$ **14**

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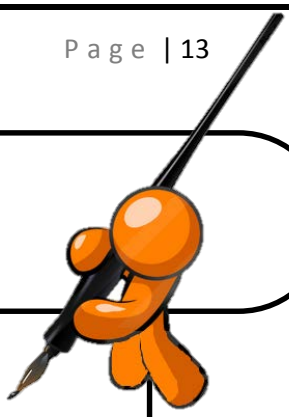


*Dear Family,*

*In this pillar students will understand that functions describe relationships. They will be introduced to the terms input and output and learn that a function assigns to each input exactly one output. Students will know that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output.*

*How will my student apply what he/she learns in Algebra 1?*

*Students in Algebra 1 begin to use formal notation and language for functions. Now the input/output relationship is a correspondence between two sets: the domain and the range. Students will extend their knowledge of functions to new families of functions, particularly, exponential and quadratic functions.*

*How can you help your student at home?*

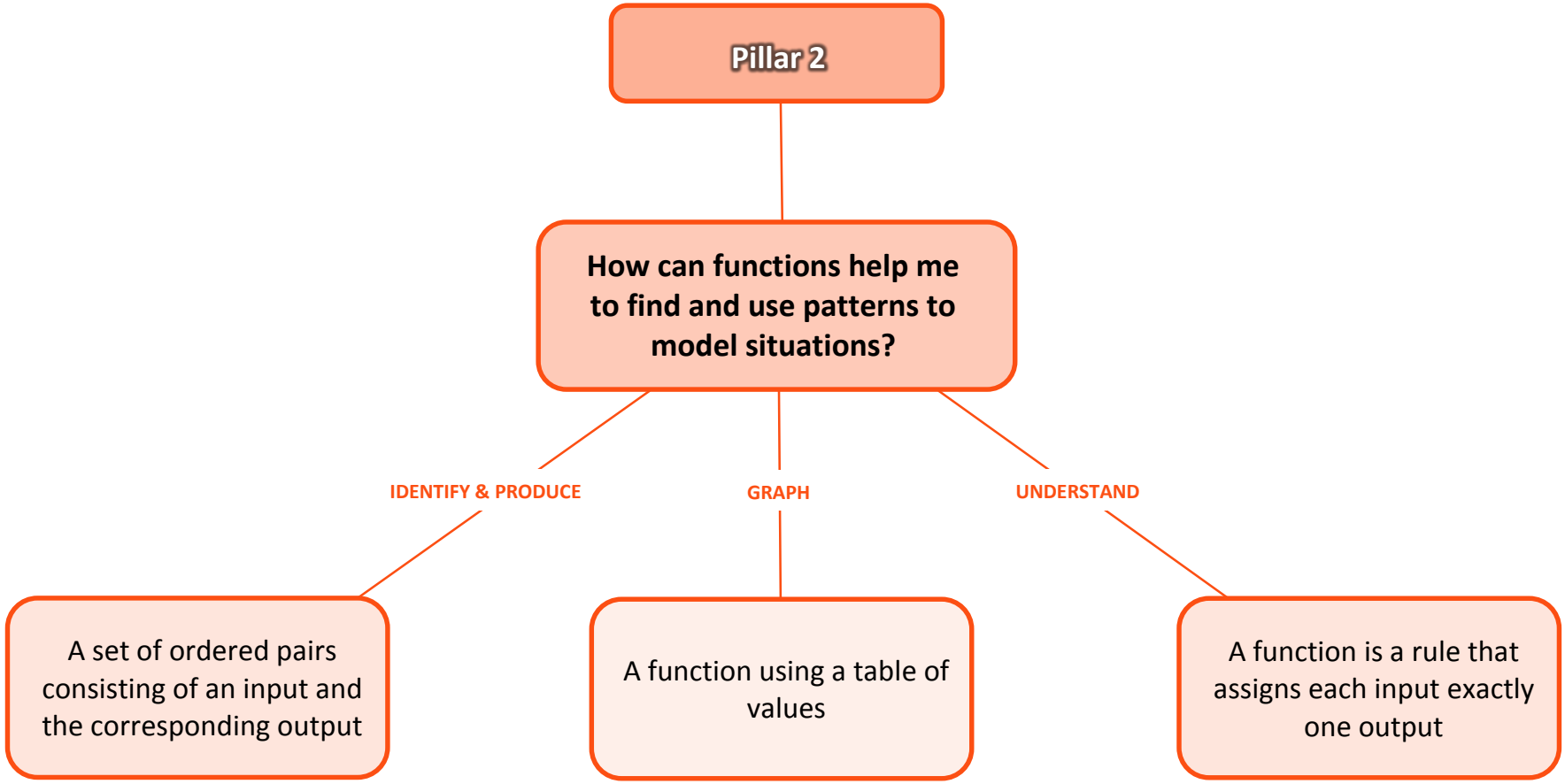
*Ask your student to explain uses of vocabulary terms from this unit: function, input, output, domain, range, independent variable, dependent variable, representations, and evaluate. Ask your student to generate a table, graph, and equation from a set of ordered pairs. Encourage your student to be persistent; make sure that he or she knows that mathematics requires patience, practice, and time to think and reflect.*

*Happy Solving!*


How Parents Can Use Khan Academy

*Khan Academy Lessons: Functions and function notation*

*Modeling with linear functions and equations*

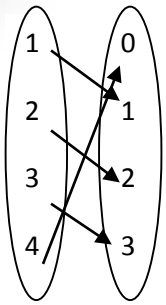

Pillar 2
How can functions help me to find and use patterns to model situations?
IDENTIFY & PRODUCE
GRAPH
UNDERSTAND
A set of ordered pairs consisting of an input and the corresponding output
A function using a table of values
A function is a rule that assigns each input exactly one output

ANSWER KEY

## Check Yourself: Functions.

1. Which relation is NOT a function?

**A.**

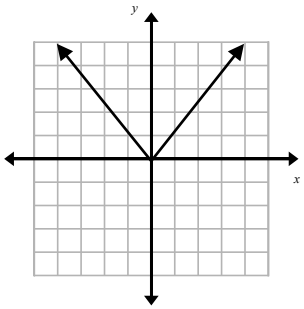



**B.**

| $x$ | 1 | 2 | 3 |
|---|---|---|---|
| $y$ | 6 | 6 | 6 |

**C.** $\{(1,\ 2),\ (1,\ 3),\ (1,\ 4)\}$

**D.**




**C. {(1,2), (1, 3), (1,4)}**

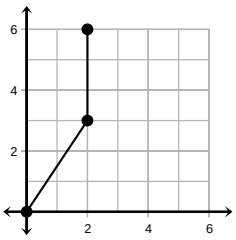
2. Select **all** relations that are functions.

**A.** $y=\frac{1}{2}x+\frac{1}{3}$

**B.**

| $x$ | $y$ |
|---|---|
| -3 | -7 |
| -1 | -1 |
| -1 | -4 |
| 0 | 2 |
| 4 | 10 |

**C.**




**D.** $\{(-1,\ 0)\ (0,\ 1)\ (1,\ 1)\ (2,\ 2)\}$

**A.** $y=\frac{1}{2}x+\frac{1}{3}$

**D. {(-1,0), (0,1), (1,1), (2,2)}**

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*Dear Family,*

*This pillar will assist students in building a firm understanding of slope, intercepts, the coordinate plane, and symbolic manipulation are the foundation of this unit. This will progress to the concepts in Pillar 5 where students will graph a system of two linear equations, recognizing that the ordered pair for the point of intersection is the $x$-value that will generate the given $y$-value for both equations. Students will recognize that graphed lines with one point of intersection (different slopes) will have one solution, parallel lines (same slope, different $y$-intercepts) have no solutions, and lines that are the same (same slope, same $y$-intercept) will have infinitely many solutions. Students will also learn that systems of linear equations can also be solved through symbolic representations.*

*How will my student apply what he/she learns in Algebra 1?*

*In Algebra 1, students will further explore systems of equations but will not be limited to linear functions. Later units will call on students' understanding of linear functions to develop models for data sets which show linear trends, and ultimately compare linear models to non-linear models. Students will also extend their notion of sequence to include geometric sequences.*

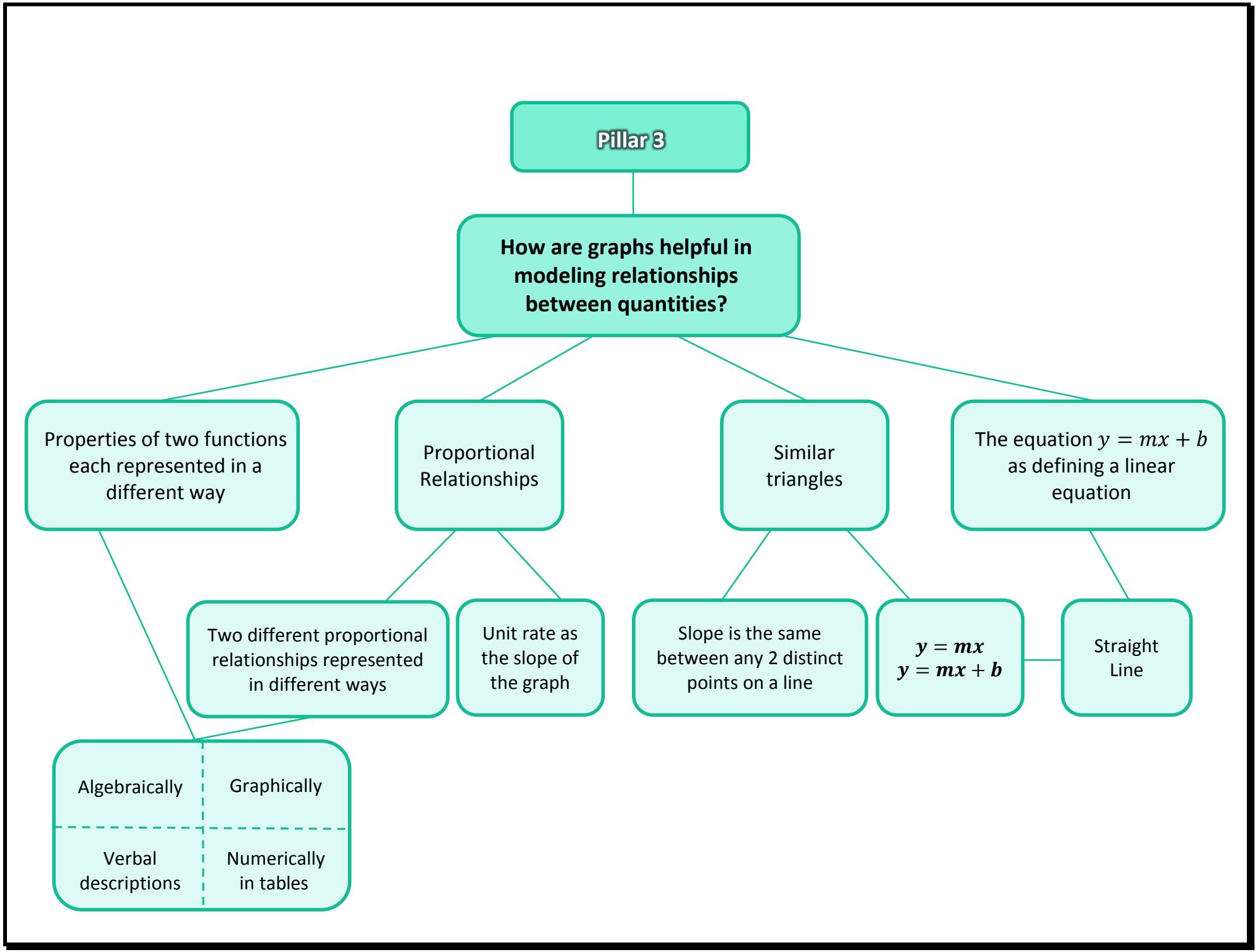
*How can you help your student at home?*

*Ask your student to describe a linear relationship that we might encounter in our real-world experiences and explain how to recognize that it is linear.*

*Happy Solving!*


How Parents Can Use Khan Academy

*Khan Academy Lessons:* *Graphing and analyzing proportional relationships*
*Slope*
*Slope-intercept form*
*Modeling with linear functions and equations*
*Systems of equations*


Pillar 3
How are graphs helpful in modeling relationships between quantities?
Properties of two functions each represented in a different way
Proportional Relationships
Similar triangles
The equation $y = mx + b$ as defining a linear equation
Two different proportional relationships represented in different ways
Unit rate as the slope of the graph
Slope is the same between any 2 distinct points on a line
$y = mx$
$y = mx + b$
Straight Line
Algebraically
Graphically
Verbal descriptions
Numerically in tables

ANSWER KEY

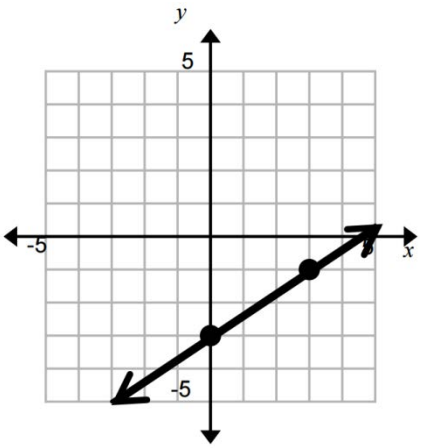
## Check Yourself: Find the slope of the line through the given points.

1. (5,4), (2,0) $m = \frac{4}{3}$

2. (-3,6), (4,6) $m = \frac{0}{7}$ **(Zero Slope)**

3. (3,-1), (3,2) $m = \frac{3}{0}$ **(Undefined Slope)**

4.




$m = \frac{2}{3}$


## Check Yourself: Determine the unit rates.

1. Bamboo that grows 5 inches in 2.5 hours.

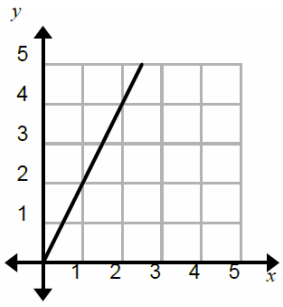
$\frac{\text{2 inches}}{\text{1 hour}}$

2.

| Cyclist Ride | |
|---|---|
| Hours | Miles |
| 3 | 24 |
| 6 | 48 |

$\frac{\text{8 miles}}{\text{1 hour}}$

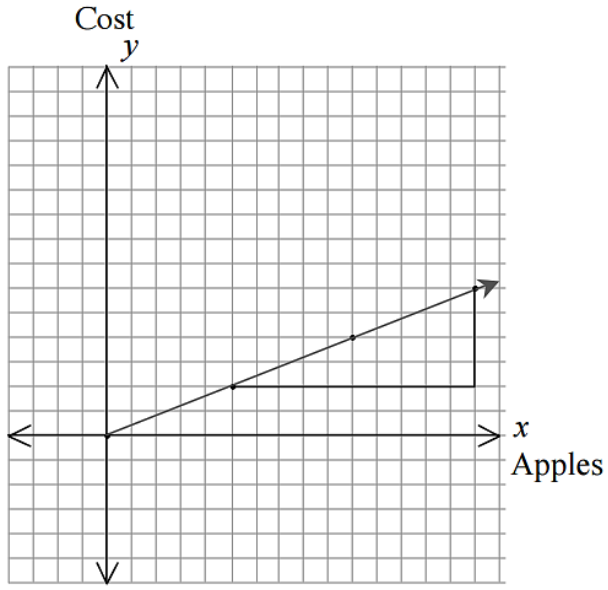
3.




$\frac{2}{1}$


**Check Yourself: Graph the proportional relationship between the two quantities, write the equation representing the relationship, and describe how the unit rate or s lope is represented on the graph.**

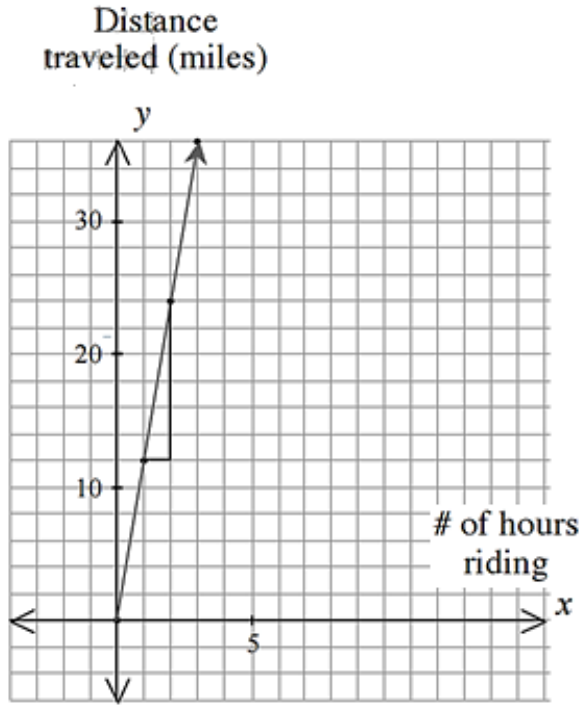
1. Jane went to the store and noticed that five apples cost $2.00.




$y = \frac{2}{5}x$

**If five apples cost $2.00, then one apple costs $\frac{2}{5} = 0.40$, or $0.40 for each apple. This is also represented on the graph: for each apple, the graph rises only 0.40.**

2. Jasmine rides her bike 12 miles per hour.




$y = 12x$

**If the number of hours is doubled or tripled, the distance Tess travels is also doubled or tripled. Here, the equation representing this data is y = 12x where x is the number of hours of riding, and y is the number of miles she has traveled. This is also represented on the graph: for every hour Jasmine traveled the graph rises 12.**

## Check Yourself: Compare proportional relationships.

**1.** Jim's earnings for 3 weeks from a part time job are shown in the table.

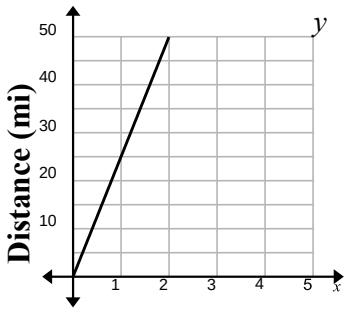
| Time Worked (h) | 11 | 21 | 8 |
|---|---|---|---|
| Total Pay ($) | 78.65 | 150.15 | 57.20 |

He is offered a job that will pay $7.25 per hour. Which job pays better? Explain your reasoning.

**The new job pays better. Jim's earnings for 3 weeks from a part time job was $7.15 per hour. The new job offered will pay $7.25 per hour. Jim would earn $0.10 more per hour if he accepted the job offer.**

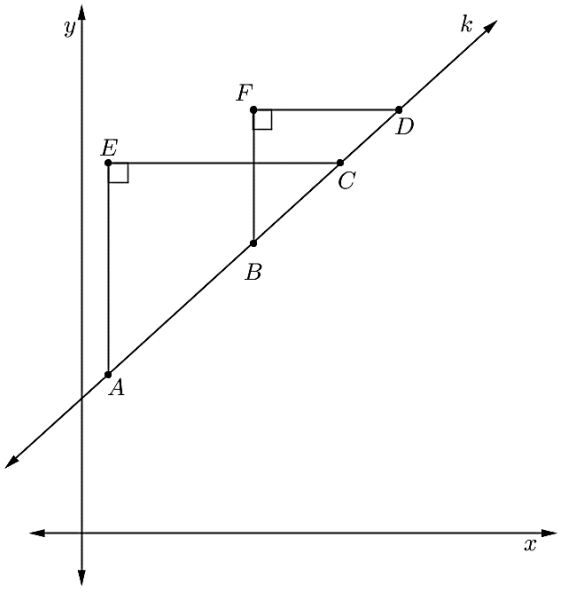
**2.** The distance $d$ in miles that can be covered by a rabbit in $t$ hours is given in the equation $d = 30t$.

The distance covered by a bear is shown on the graph. Which animal is faster? Explain your reasoning.




**The rabbit is faster. In one hour the bear ($d = 25t$) would have only traveled 25 miles, whereas the rabbit ($d = 30t$) would have traveled 30 miles.**

## Check Yourself: Show another way to show that the slope of a line is constant by using similar triangles.




Use similar triangles to explain why the slope of line $k$ is the same whether the slope is calculated using points $A$ and $C$ or points $B$ and $D$.

**$< E$ and $< F$ are both right angles that form similar triangles. Since the triangles are similar, corresponding sides are proportional so that $\frac{EA}{EC} = \frac{FB}{FD}$. Both $\frac{EA}{EC}$ and $\frac{FB}{FD}$ represent the slope of the line $k$, therefore, the slope can be calculated using either one.**

***Please note, that this is a similar task to the one presented on the Student packet. Use this activity to assess your child's understanding of slope of similar triangles.***

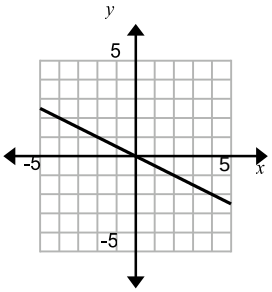
## Check Yourself: Which functions show a proportional relationship? How do you know?

1.

| | | | |
|---|---|---|---|
| ***x*** | 0 | 1 | 2 |
| ***y*** | 0 | 4 | 8 |

**Yes, passes through (0,0)**

2.

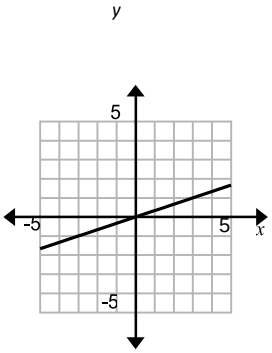



**Yes, passes through (0,0)**

3. $y = x$

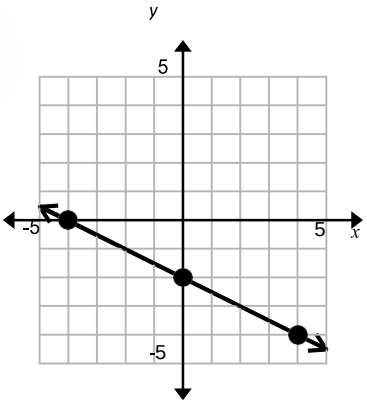
**Yes, y=mx**

4.




**Yes, passes through (0,0)**

## Check Yourself: Write an equation in the slope-intercept form for the graph shown.




$$y = -\frac{1}{2}x - 2$$

## Check Yourself: Answer the following questions comparing function equations, graphs, tables and descriptions.

Your family is deciding which activity to participate in while on your vacation in San Diego. Here is the information about the cost ($c$) for admission for all of your family members ($f$). Included in the cost is the parking fee for each.

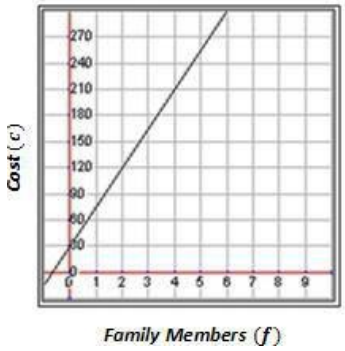
**City Tour**

Charges $40 per family member plus a $20 parking fee

**San Diego Zoo**

Cost is modeled by the equation $c = \frac{85}{2}f + 10$

**SeaWorld**




**Kayaking**

| $f$ | 2 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|---|
| $c$ | 75 | 125 | 175 | 225 | 275 |

1. Which activity is the cheapest per family member, and how do you know?

   City Tour -$40 /family member; Zoo - $42.50/family member; SeaWorld -$45 /family member;

   **Kayaking - $25/family member**

2. Which activity is the most expensive per family member, and how do you know?

   City Tour -$40 /family member; Zoo - $42.50/family member; SeaWorld **-$45 /family member;**

   Kayaking - $25/family member

3. Which activity has the cheapest parking fee, and how do you know?

   City Tour - $20 ; **Zoo - $10** ; SeaWorld - $30 ; Kayaking - $25

4. Which activity has the most expensive parking fee, and how do you know?

   City Tour - $20 ; Zoo - $10 ; **SeaWorld - $30** ; Kayaking - $25

5. How many of your family members could you bring to each activity if you budgeted $200?

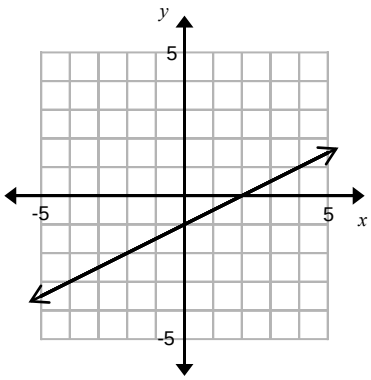
   **City Tour – 4 family members; Zoo – 4 family members; SeaWorld – 3 family members;**

   **Kayaking -7 family members**

6. Which activity allows you to bring the most people for that amount of money?

   **Kayaking**


## Check Yourself: Select the equation represented by the graph.




**A.** $y = \frac{1}{2}x - 1$

B. $y = -\frac{1}{2}x - 1$

C. $y = 2x - 1$

D. $y = -2x - 1$

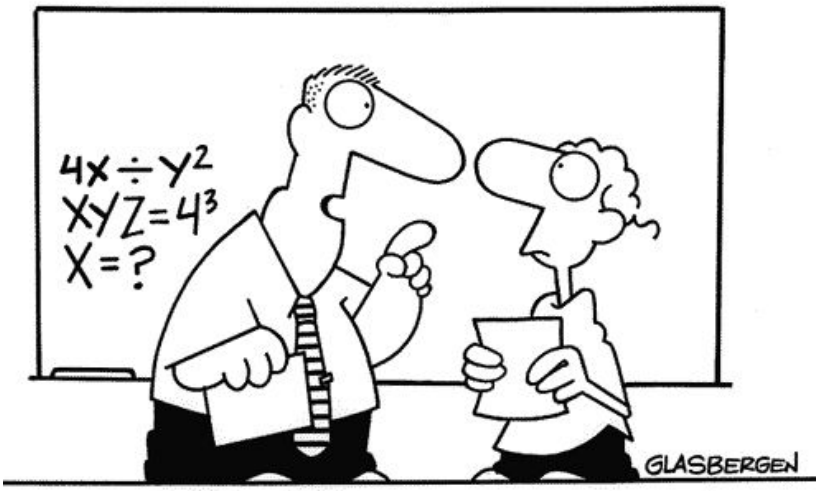
***Just as with reading, the math knowledge children bring to school at an early age is linked with their performance in later grades.***

**—U.S. Secretary of Education Margaret Spellings**

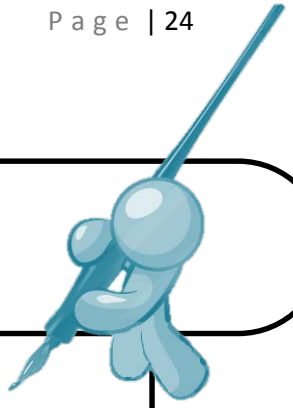
**Take this opportunity to shift the perspective of the importance of Algebra.**

https://www.youtube.com/watch?v=Cq832vvq9PE

https://www.youtube.com/watch?v=c4cMPNd0JJ4




**"Algebra class will be important to you later in life because there's going to be a test six weeks from now."**



*Dear Family,*

*In this pillar students will continue to build on the skills gained in Pillar 2, where they explored that functions describe relationships. They were introduced to the terms input and output and learn that a function assigns to each input exactly one output. Students will know that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output.*

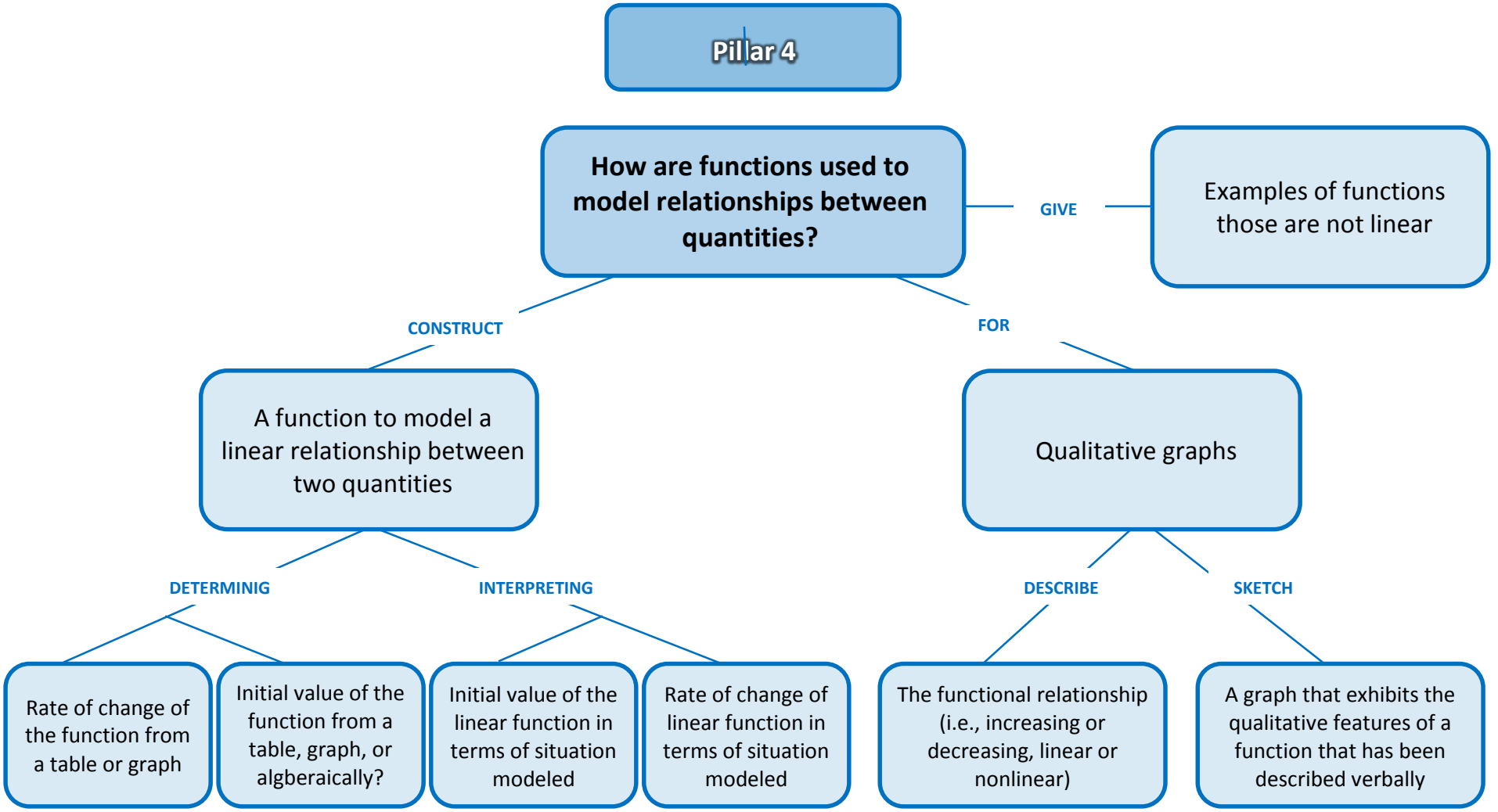
*How will my student apply what he/she learns in Algebra 1?*

*Students in Algebra 1 begin to use formal notation and language for functions. Now the input/output relationship is a correspondence between two sets: the domain and the range. Students will extend their knowledge of functions to new families of functions, particularly, exponential and quadratic functions.*

*How can you help your student at home?*

*Ask your student to explain uses of vocabulary terms from this unit: function, input, output, domain, range, independent variable, dependent variable, representations, and evaluate. Ask your student to generate a table, graph, and equation from a set of ordered pairs. Encourage your student to be persistent; make sure that he or she knows that mathematics requires patience, practice, and time to think and reflect.*

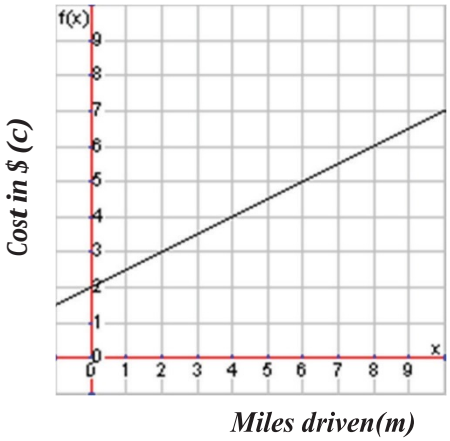
*Happy Solving!*


Pillar 4
How are functions used to model relationships between quantities?
GIVE
Examples of functions those are not linear
CONSTRUCT
FOR
A function to model a linear relationship between two quantities
Qualitative graphs
DETERMINIG
INTERPRETING
DESCRIBE
SKETCH
Rate of change of the function from a table or graph
Initial value of the function from a table, graph, or algberaically?
Initial value of the linear function in terms of situation modeled
Rate of change of linear function in terms of situation modeled
The functional relationship (i.e., increasing or decreasing, linear or nonlinear)
A graph that exhibits the qualitative features of a function that has been described verbally

ANSWER KEY


**Practice: Identify the rate of change, initial value, independent variable, and dependent variable. Then describe what the rate of change and initial value mean in the context of each situation. Finally, write the equation of the linear function.**

The cost for *6* people to travel in a taxi in New York *(c)* based on the number of miles driven *(m)* is shown by the following graph:




| Contextual Description of Rate of Change | Contextual Description of Initial Value |
|---|---|
| **The taxi charges one dollar per two miles traveled.** | **A passenger is charged $2 when 0 miles are traveled.** |

1. What is the rate of change?

   $\mathbf{\frac{1}{2}}$

2. What is the initial value?

   **2**

3. What is the independent variable?

   **m**

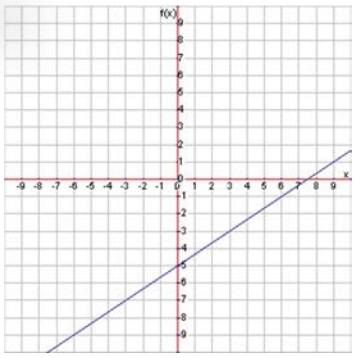
4. What is the dependent variable?

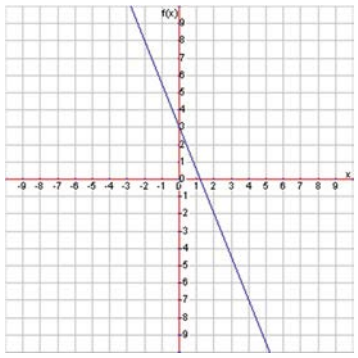
   **c**

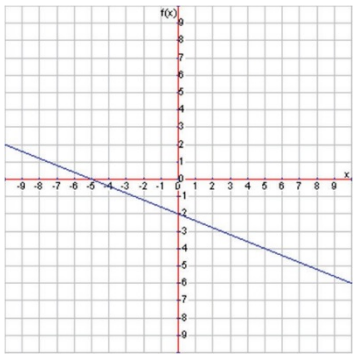
5. What is the equation of the line?

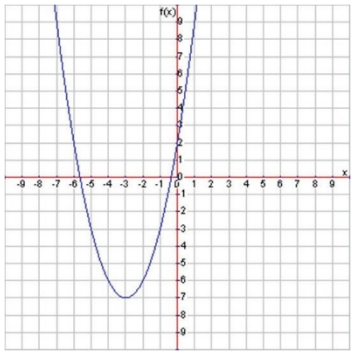
   $\mathbf{c = \frac{1}{2}m + 2}$

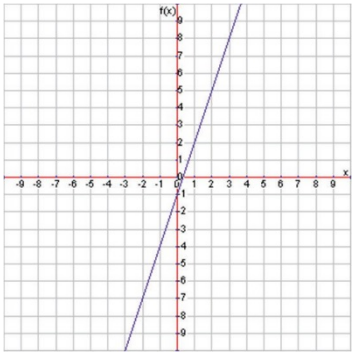

**Practice: Which graph represents a linear function increasing at a constant rate? Select all that apply by filling in the appropriate box.**

☐ 

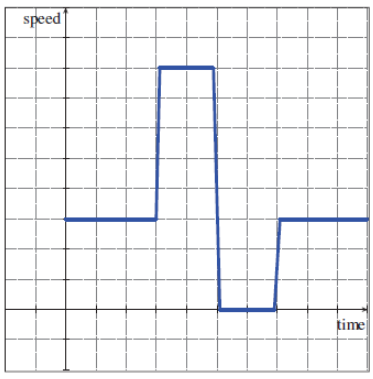
☐ 

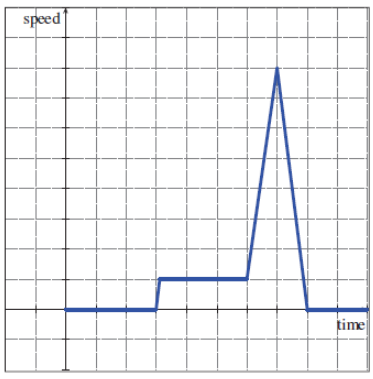
☐ 

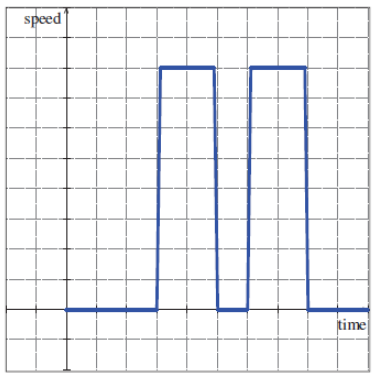
☐ 

☐ 


**Practice: Match each description with its function graph showing speed in terms of time.**

A. 

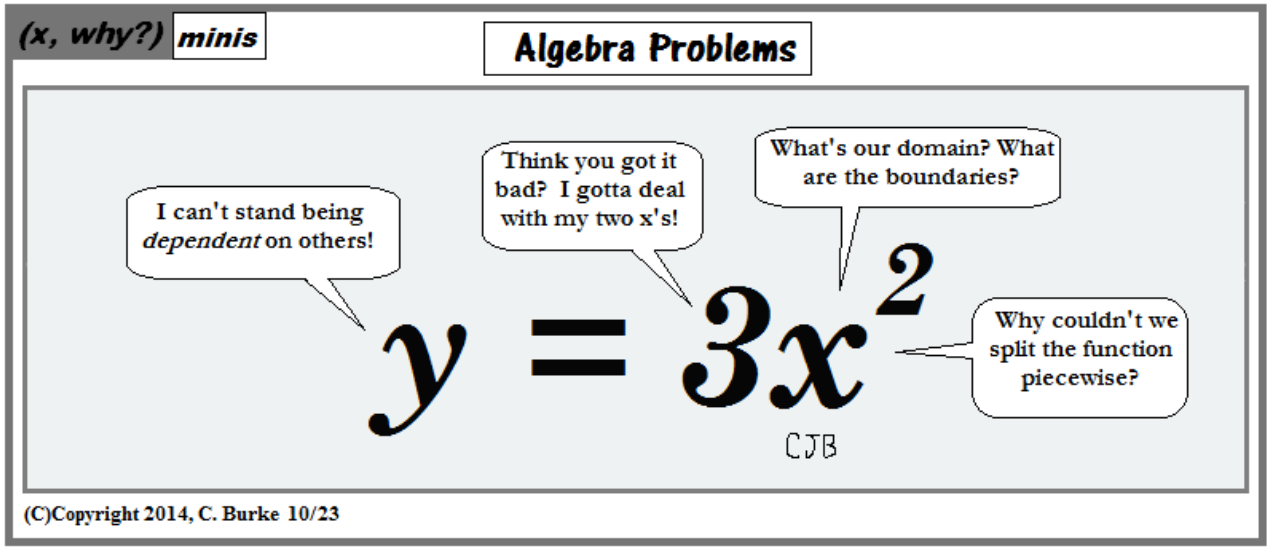

B. 


C. 

1. A squirrel chews on an acorn for a little while before hearing a car coming down the street. It then runs quickly to the base of a nearby tree where it sits for a second listening again for the car. Still hearing the car, the squirrel climbs up the tree quickly and sits very still on a high branch. **Graph C**

2. A possum is slowly walking through a backyard when a noise scares it causing it to hurry to a hiding place. It waits at the hiding place for a little while to make sure it's safe and then continues its slow walk through the backyard. **Graph A**

3. A frog is waiting quietly in a pond for a fly. Noticing a dragonfly landing on the water nearby, the frog slowly creeps its way to within striking distance. Once the frog is in range, it explodes into action quickly jumping towards the dragonfly and latching onto with its tongue. The frog then settles down to enjoy its meal. **Graph B**



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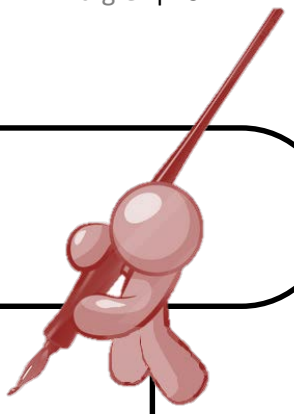


*Dear Family,*

*In Grade 7, students learned to add, subtract, factor and expand linear expressions. In this module, students will expand on this knowledge and solve equations, with linear expressions on one or both sides of the equation. They may need to combine like terms and apply the distributive property. Students will learn that there may be a single solution, infinite solutions or no solution.*

*How will my student apply what he/she learns in Algebra 1?*

*Solving equations will be used in all future high school math courses. This is an important skill to not only be successful in the Algebra 1 class, but to pass the FSA Algebra 1 EOC.*

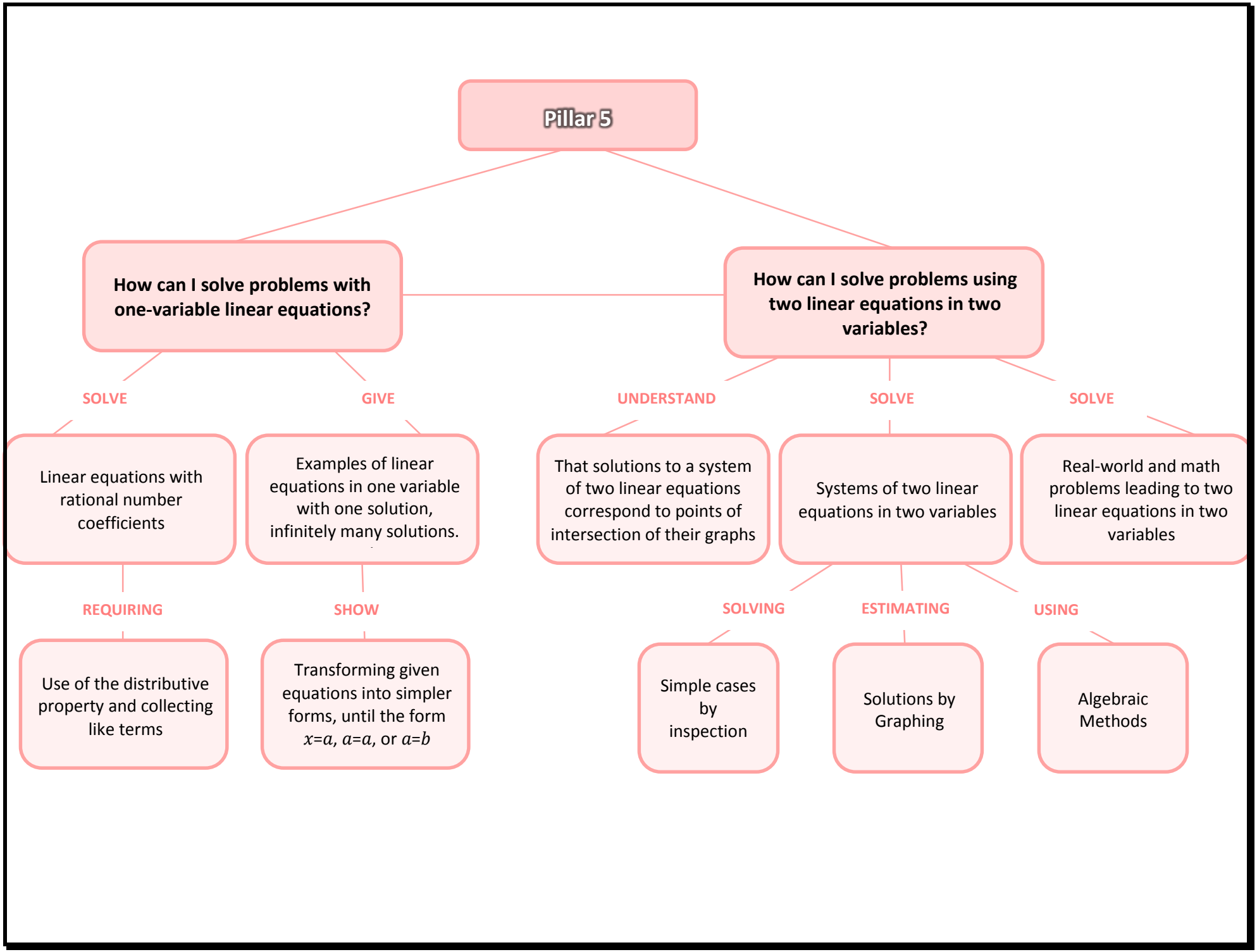
*How can you help your student at home?*

*One of the best things you can do during this unit is to ask your student to explain to you how to use the distributive property and how to simplify like terms. Ask your child to show you a problem that can be represented by more than one algebraic expression. Also, talk to your child about the tasks that they are working on in school.*

*Happy Solving!*


How Parents Can Use Khan Academy

*Khan Academy Lessons: Systems of equations*


Pillar 5
How can I solve problems with one-variable linear equations?
How can I solve problems using two linear equations in two variables?
SOLVE
GIVE
UNDERSTAND
SOLVE
SOLVE
Linear equations with rational number coefficients
Examples of linear equations in one variable with one solution, infinitely many solutions.
That solutions to a system of two linear equations correspond to points of intersection of their graphs
Systems of two linear equations in two variables
Real-world and math problems leading to two linear equations in two variables
REQUIRING
SHOW
SOLVING
ESTIMATING
USING
Use of the distributive property and collecting like terms
Transforming given equations into simpler forms, until the form $x=a$, $a=a$, or $a=b$
Simple cases by inspection
Solutions by Graphing
Algebraic Methods

ANSWER KEY

## Check Yourself: Solve equations with variables on both sides.

1. $8x - 14 = 6x + 16$ **x=15**

2. $12x - 14 = 6x + 10$ **x =4**

3. $5z - z + 3 = z + 3 + 1$ **$z = \frac{1}{3}$**

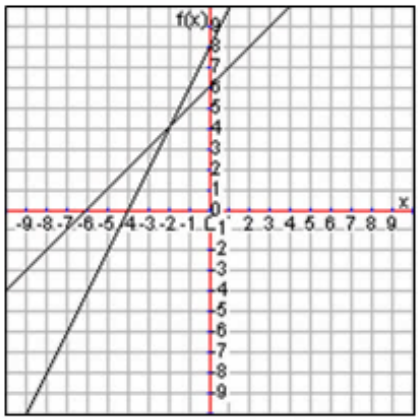
4. $6x - 3x + 26 = 5(x + 8)$ **$x = -7$**

## Check Yourself: Determine Whether the Equation has No Solution, One Solution, or Infinite Many Solution by Placing a Check in the Appropriate Column.

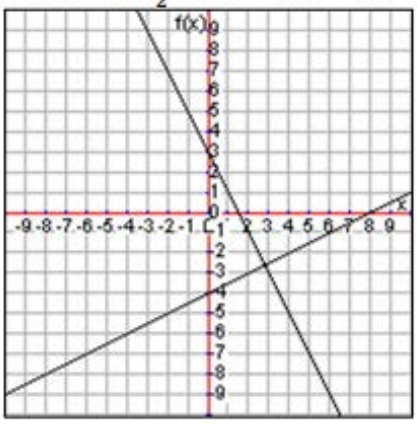
| Equation | No Solution | One Solution | Infinite Solutions |
|---|---|---|---|
| $2(3x + 4) = 6x + 8$ | | | ■ |
| $2x - 5 = 5$ | | ■ | |
| $3x - 1 = -3x - 1$ | | ■ | |
| $-2x + 11 = -2x - 11$ | ■ | | |

## Check Yourself: Graph the following systems of equations and estimate the solution from the graph.

1. $y = 2x + 8$, $y = x + 6$ **$(-2, 4)$**



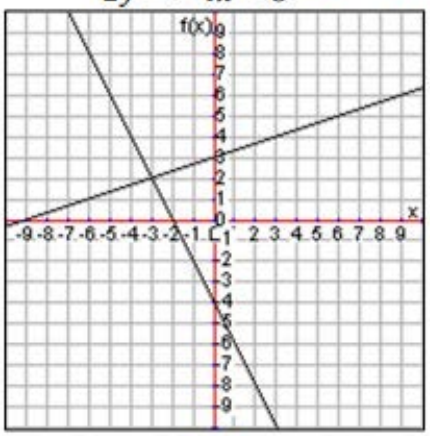
2. $y = -2x + 3$, $y = \frac{1}{2}x - 4$ **$(2.8, -2.6)$**



3.

$3y = x + 9$
$2y = -4x - 8$

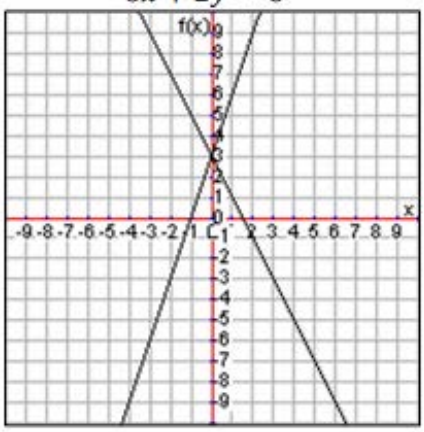
**(−3, 2)**




4.

$4x + 2y = 6$
$-6x + 2y = 6$

**(0, 3)**





## Check Yourself: Solve the following systems using the substitution method.

1. $2x + 8y = 12$
   $x - 2y = 0$

   **(2 , 1)**

2. $x + y = 7$
   $2x + y = 5$

   **(-2 , 9)**

3. $y = -\frac{1}{2}x + 1$
   $2x + 3y = 6$

   **(6 , -2)**

4. $2x - \frac{1}{3}y = -9$
   $-3x + y = 15$

   **(-4 , 3)**


## Check Yourself: Solve the following systems using the elimination method.

1. $x + y = 1$
   $x - y = 5$

   **(3 , -2)**

2. $\frac{1}{2}x + 2y = -10$
   $2x + 2y = -10$

   **(0 , -5)**

3. $3x + y = 2$
   $6x + 3y = 5$

   **( $\frac{1}{3}$ , 1)**


## Check Yourself: Decide if the following systems of equations have a single solution, no solutions, or infinite solutions. If it has a solution, solve the system.

1. $2x + y = 4$
   $y - 5 = -2x$

   **No Solution**

2. $x + \frac{1}{3}y = -10$
   $3x + y = 30$

   **No Solution**

3. $\frac{2}{3}x - y = 0$
   $2x = 3y$

   **Infinite Solutions**

4. $x + 4y = 2$
   $2(x + 4y) = 10$

   **No Solution**

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*Dear Family,*

*In this pillar students "apply their experience with the coordinate plane and linear functions in the study of association between two variables related to a question of interest. As in the univariate case, analysis of bivariate measurement data graphed on a scatterplot proceeds by describing shape, center, and spread. But now "shape" refers to a cloud of points on a plane, "center" refers to a line drawn through the cloud that captures the essence of its shape, and "spread" refers to how far the data points stray from this central line. Students extend their understanding of "cluster" and "outlier" from univariate data to bivariate data. They summarize bivariate categorical data using two-way tables of counts and/or proportions, and examine these for patterns of association."( From the 6-8, Statistics and Probability Progression Document, p. 3)*

*How will my student apply what he/she learns in Algebra 1?*

*In Algebra 1, students will Students will use statistics to compare two or more different data sets, including the use of scatter plots, histograms, box plots, and standard deviation. Students will interpret outliers and recognize relationships and trends in the data. They will use technology to examine data sets and potential models, as well as support the appropriate choice of model.*

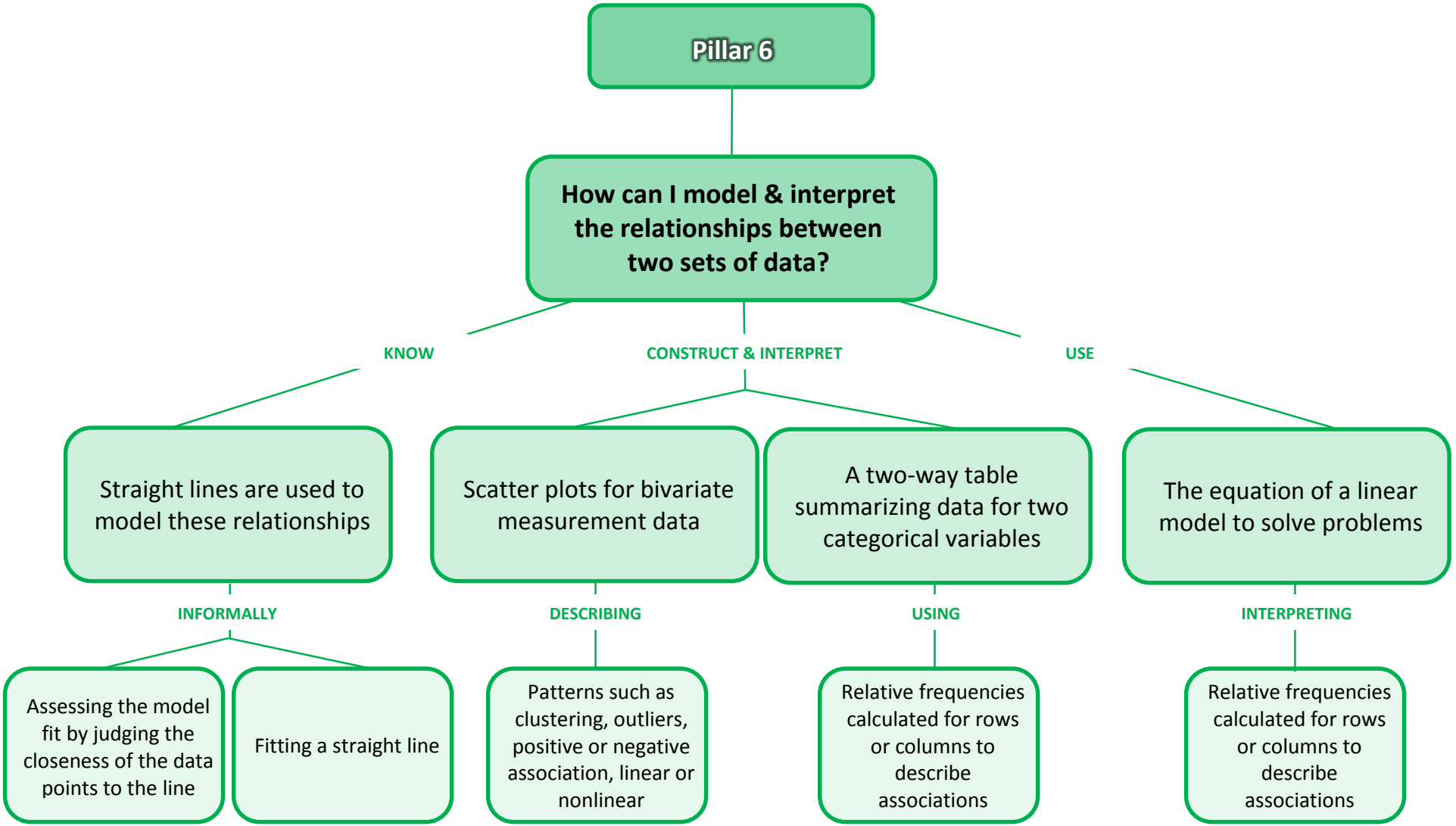
*How can you help your student at home?*

*Ask your student to explain uses of vocabulary terms from this module. Encourage your student to be persistent; make sure that he or she knows that mathematics requires patience, practice, and time to think and reflect.*

*Happy Solving!*


How Parents Can Use Khan Academy

*Khan Academy Lessons: Data and modeling*

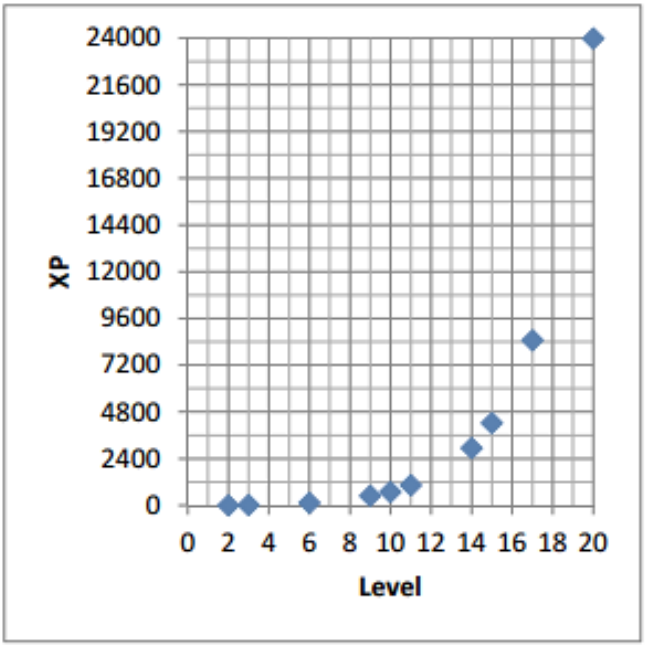

Pillar 6
How can I model & interpret the relationships between two sets of data?
KNOW
CONSTRUCT & INTERPRET
USE
Straight lines are used to model these relationships
Scatter plots for bivariate measurement data
A two-way table summarizing data for two categorical variables
The equation of a linear model to solve problems
INFORMALLY
DESCRIBING
USING
INTERPRETING
Assessing the model fit by judging the closeness of the data points to the line
Fitting a straight line
Patterns such as clustering, outliers, positive or negative association, linear or nonlinear
Relative frequencies calculated for rows or columns to describe associations
Relative frequencies calculated for rows or columns to describe associations

ANSWER KEY


## Practice: Use the given data to answer the questions and construct the scatter plots.

Use the given data to answer the questions and construct the scatter plots. Pathfinder Character Level vs. Total Experience Points

| Level | 2 | 3 | 6 | 9 | 10 | 11 | 14 | 15 | 17 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|
| XP | 15 | 35 | 150 | 500 | 710 | 1050 | 2950 | 4250 | 8500 | 24000 |




1. Which variable should be the independent variable (x- axis) and which should be the dependent variable (y-axis)?
   **Level should be *x*-axis, XP should be *y*-axis.**

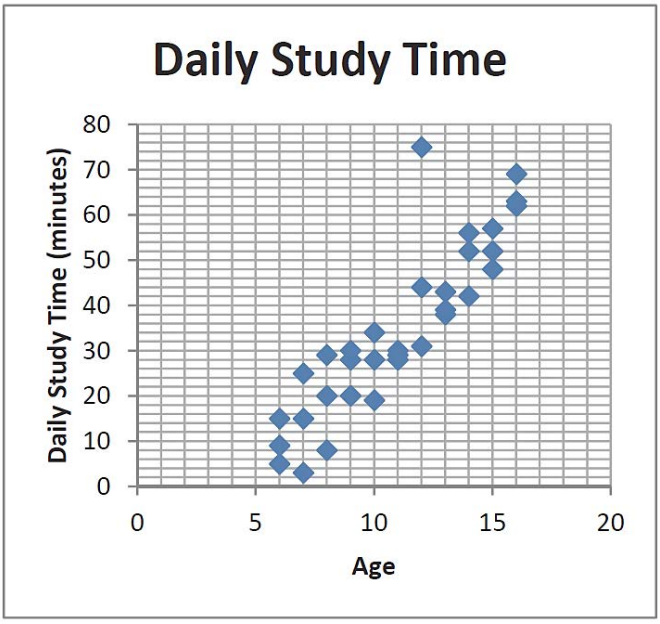
2. Should you use a broken axis? Why or why not?
   **No broken axis, uses all space in range**

3. What scale and interval should you use for the x-axis?
   **0 to 20 by ones**

4. What scale and interval should you use for the y-axis?
   **0 to 24,000 by 1,200**

5. Construct the scatter plot on the grid above.

## Check Yourself: Use the given scatter plots to answer the questions.




1. Does this scatter plot show a positive association, negative association, or no association? Explain why.

**Positive, going up from left to right**

2. Is there an outlier in this data set? If so, approximately how old is the outlier and about how many minutes does he or she study per day?

**12 years old and 75 minutes**

3. Is this association linear or non-linear? Explain why.

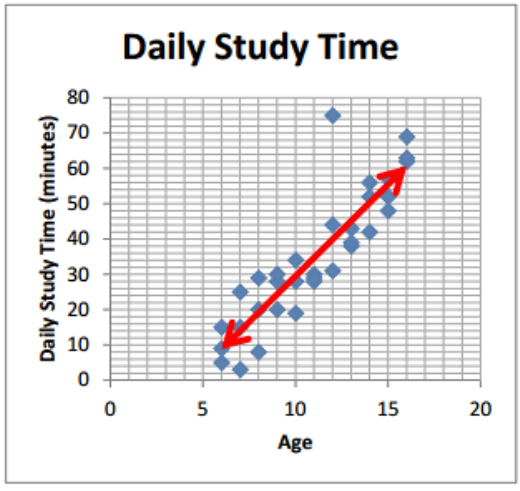
**Linear, increases by about the same amount each year**

4. What can you say about the relationship between your age and the amount that you study?

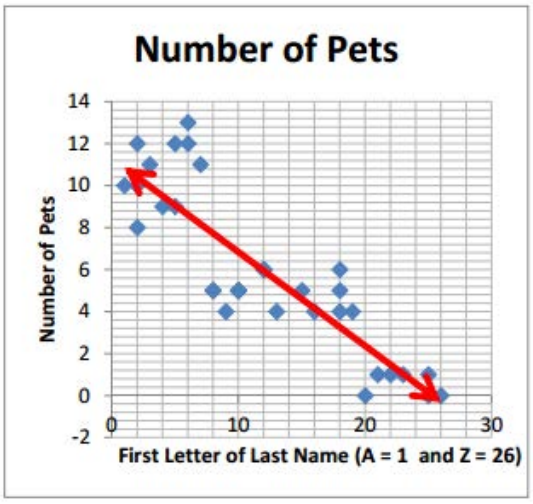
**The older you are, the more you study**

## Check Yourself: Draw a line of best fit on the given scatter plot.

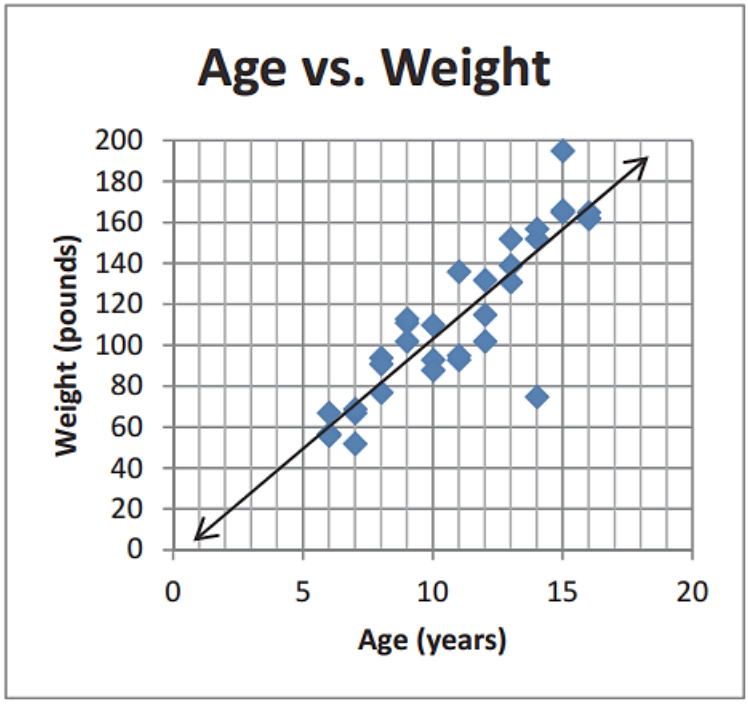
1.




2.




**Check Yourself: Use the given line of best fit or equation of the line of best fit to answer the following questions.**




1. Using the graph only, about how much would you expect an 18 year old to weigh?
   **190 lbs**

2. Using the graph only, about how much would you expect a 4 year old to weigh?

   **40 lbs**

3. Using the graph only, if a person weighed 120 pounds, how old would you expect them to be?
   **11.5 years old**

4. The line of best fit for the scatter plot showing age (x-value) compared to weight (y-value) is approximately: $y = \frac{21}{2}x - \frac{7}{2}$. Using the line of best fit equation (show your work), about how much would you expect an 18 year old to weigh? How does this answer compare to the answer for problem 1?
   **185.5 lbs**


**Check Yourself: Use the data set to answer the following questions. For this data set a class of middle school students was asked what they thought was most important in school: good grades or popularity.**

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boy or Girl | B | B | G | G | G | B | G | B | B | G | G | B | G | B | G | B | B | G | G | B |
| Grades or Popularity | P | G | G | P | G | P | G | G | P | G | G | P | G | P | P | P | G | G | G | P |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boy or Girl | B | B | G | G | G | B | G | B | B | G | G | B | G | B | G | B | B | G | G | B |
| Grades or Popularity | P | G | P | G | G | P | G | P | P | G | G | G | G | P | P | P | G | P | G | G |

1. Construct a two-way table of the data.

| | Grades | Popularity | Total |
|---|---|---|---|
| Boys | 7 | 13 | 20 |
| Girls | 15 | 5 | 20 |
| Total | 22 | 18 | 40 |

2. How many students believe grades are important?

**22**

3. How many girls believe grades are important?

**15**

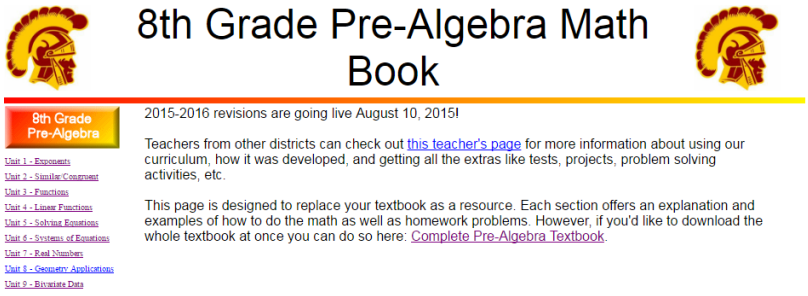
4. How many more boys than girls believe popularity is more important than grades?

**8**

The majority of the resources compiled in the Algebra I Readiness Packet were compiled and modified from:

Regional Professional Development Program


Mr. Bright's Team Website




**Non-Discrimination Policy**

The School Board of Miami-Dade County, Florida adheres to a policy of nondiscrimination in employment and educational programs/activities and strives affirmatively to provide equal opportunity for all as required by:

**Title VI of the Civil Rights Act of 1964** - prohibits discrimination on the basis of race, color, religion, or national origin.

**Title VII of the Civil Rights Act of 1964 as amended** - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

**Title IX of the Education Amendments of 1972** - prohibits discrimination on the basis of gender.

**Age Discrimination in Employment Act of 1967 (ADEA) as amended -** prohibits discrimination on the basis of age with respect to individuals who are at least 40.

**The Equal Pay Act of 1963 as amended** - prohibits gender discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

**Section 504 of the Rehabilitation Act of 1973** - prohibits discrimination against the disabled.

**Americans with Disabilities Act of 1990 (ADA)** - prohibits discrimination against individuals with disabilities in employment, public service, public accommodations and telecommunications.

**The Family and Medical Leave Act of 1993 (FMLA)** - requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to "eligible" employees for certain family and medical reasons.

**The Pregnancy Discrimination Act of 1978** - prohibits discrimination in employment on the basis of pregnancy, childbirth, or related medical conditions.

**Florida Educational Equity Act (FEEA)** - prohibits discrimination on the basis of race, gender, national origin, marital status, or handicap against a student or employee.

**Florida Civil Rights Act of 1992** - secures for all individuals within the state freedom from discrimination because of race, color, religion, sex, national origin, age, handicap, or marital status.

**Title II of the Genetic Information Nondiscrimination Act of 2008 (GINA)** - Prohibits discrimination against employees or applicants because of genetic information.

*Veterans are provided re-employment rights in accordance with P.L. 93-508 (Federal Law) and Section 295.07 (Florida Statutes), which stipulate categorical preferences for employment.*

In Addition:
**School Board Policies 1362, 3362, 4362, and 5517** - Prohibit harassment and/or discrimination against students, employees, or applicants on the basis of sex, race, color, ethnic or national origin, religion, marital status, disability, genetic information, age, political beliefs, sexual orientation, gender, gender identification, social and family background, linguistic preference, pregnancy, and any other legally prohibited basis. Retaliation for engaging in a protected activity is also prohibited.

Revised: (05-12)