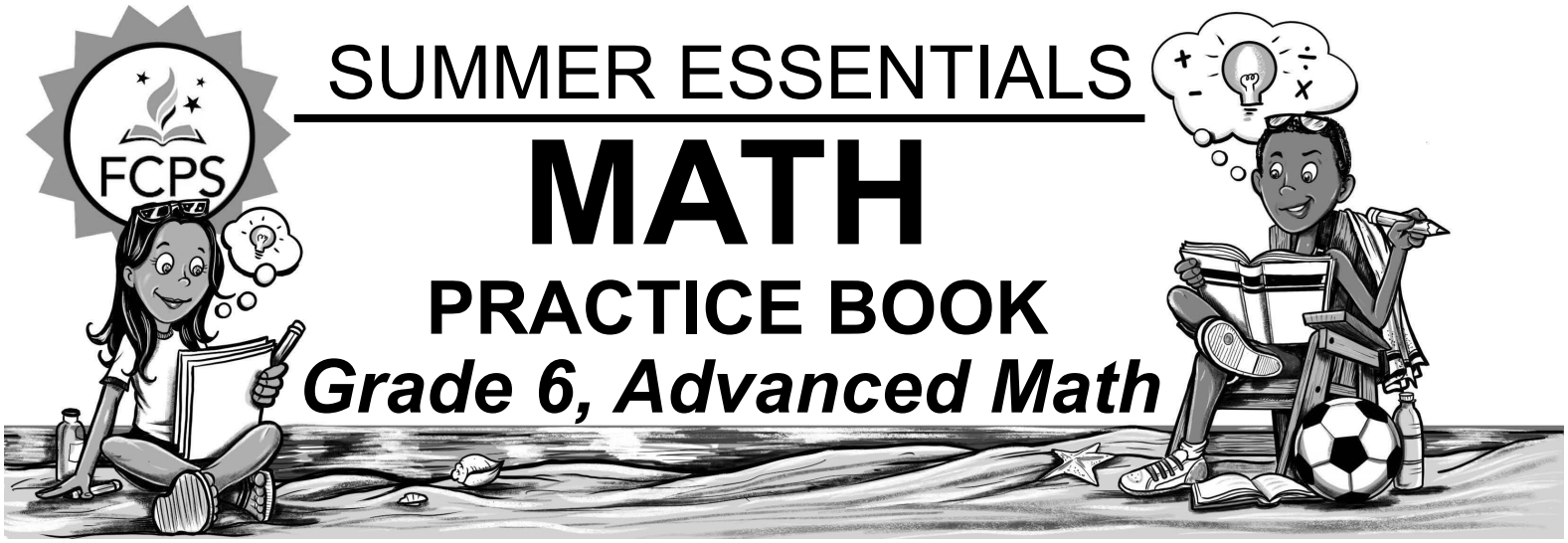

# SUMMER ESSENTIALS

# MATH

## PRACTICE BOOK

## *Grade 6, Advanced Math*

**Name:** _____

Welcome to your Summer Essentials Practice Book! This book is designed to support your learning this summer during the weeks of June 29 - July 31. In this book you will have opportunities to:

- Practice and apply mathematics skills from the past school year
- Engage in open-ended creative tasks through Learning Quests

This practice book provides suggested mathematics learning activities for you to complete each weekday over the next five weeks. Take a few moments to look at the calendar on page 3 and explore the book with your family. An answer key is provided at the end of each week so that you can check your answers. Learning Quests are included for you at the end of the book. You can complete the quests and share your learning with family and friends. As you use this book, keep in mind:

- Practice books reinforce the most important skills needed for your next math course. It is recommended that you engage in this review this summer; practice books will not be collected or graded.
- Practice books are posted to FCPS 24/7 Learning Blackboard for families.
- You have the opportunity to attend one virtual office hour each week with a teacher from your school. Office hours are optional and give you the chance to receive help with the content in this practice book. Please contact your school if you have questions about office hour details.

Usen este enlace para obtener la información en español.

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إستخدم هذا الرابط للوصول إلى المعلومات باللغة العربية.

请使用本链接获得中文信息。

از طریق این لینک برای دسترسی به این اطلاعات به زبان فارسی استفاده کنید.

이러한 정보를 한국어로 확인하려면 다음 링크를 이용하기 바랍니다.

اردو زبان میں معلومات حاصل کرنے کے لیئے، یہ لنک استعمال کریں

Hãy dùng liên kết này để truy cập thông tin này  bằng tiếng  Việt :

Message to families:  https://www.fcps.edu/node/41224

# Learning Opportunities

| Advanced Mathematics | | Pages |
|---|---|---|
| Week 1 | • Recognize similarities and differences between numbers written as fractions, decimals, and percents<br>• Solve practical problems involving rational numbers | 4-10 |
| Week 2 | • Write negative exponents as a fraction and decimal<br>• Compare and order numbers written in scientific notation<br>• Identify perfect squares<br>• Identify the absolute value of rational numbers | 11-17 |
| Week 3 | • Solve single step and multistep practical problems using proportions<br>• Solve problems involving the relationship between corresponding sides and angles of similar figures | 18-24 |
| Week 4 | • Solve two-step equations, including practical problems<br>• Solve one- and two-step inequalities, including practical problems | 25-29 |
| Week 5 | • Determine slope as rate of change in a proportional relationship<br>• Graph a line representing a proportional relationship given the slope and an ordered pair, or given the equation in y=mx-form<br>• Determine the y-intercept and write in the form of y=mx+b<br>• Graph a line representing an additive relationship given the y-intercept and an ordered pair, or given the equation in the form y=mx+b<br>• Make connections between and among representations of proportional or additive relationship between two quantities using verbal descriptions, tables, equations, or graphs | 30-36 |
| **Learning Quests** | | |
| Weeks 1-5 | • Create a paper airplane and revise to fly as far as possible<br>• Create unique characters from simple shapes | 37-39 |
| **COVID-19 Education** | | |
| Weeks 1-5 | • Understand COVID-19 can make you sick and how you may feel<br>• Identify that COVID-19 is spread from one person to another and how to help stop the spread | 40 |

# Weekly Calendar

This calendar suggests practice activities for students to do each day. Every student works at a different pace. Please customize to meet the needs of your child and consider participating in Office Hours provided by your school as an additional support.

| Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|
| **Week 1: Compare and Order Rational Numbers** | | | | |
| June 29<br>Comparing Rational Numbers<br>Pages 4-5 | June 30<br>Ordering Rational Numbers<br>Pages 6-8 | July 1<br>Application<br>Pages 8-9 | July 2<br>Application<br>Pages 9-10 | July 3<br>Weekly Reflection<br>Page 10 |
| **Week 2: Negative Exponents, Scientific Notation, Perfect Squares and Absolute Value** | | | | |
| July 6<br>Negative Exponents<br>Pages 11-12 | July 7<br>Scientific Notation<br>Pages 12-14 | July 8<br>Perfect Squares<br>Pages 14-15 | July 9<br>Absolute Value<br>Pages 16-17 | July 10<br>Weekly Reflection<br>Page 17 |
| **Week 3: Proportional Reasoning** | | | | |
| July 13<br>Proportions<br>Pages 18-19 | July 14<br>Tax, Tip, Discount<br>Pages 19-20 | July 15<br>Property of Similar Figures<br>Pages 21-22 | July 16<br>Solving Similar Figures<br>Pages 22-24 | July 17<br>Weekly Reflection<br>Page 24 |
| **Week 4: Equations and Inequalities** | | | | |
| July 20<br>Two-Step Equations Including Practical Problems<br>Page 25 | July 21<br>Two-Step Equations Including Practical Problems<br>Pages 26-27 | July 22<br>One- and Two-Step Inequalities<br>Pages 27-28 | July 23<br>One- and Two-Step Inequalities Including Practical Problems<br>Pages 28-29 | July 24<br>Weekly Reflection<br>Page 29 |
| **Week 5: Introduction to Functions** | | | | |
| July 27<br>Identifying Slope and y-intercept<br>Pages 30-31 | July 28<br>Multiplicative Linear Equations<br>Pages 32-33 | July 29<br>Additive Linear Equations<br>Pages 33-34 | July 30<br>Graphing Linear Equations<br>Page 35 | July 31<br>Weekly Reflection<br>Page 36 |

# Compare and Order Rational Numbers (Including Practical Problems)

**Weekly Learning Outcome:**

- **I can recognize similarities and differences between numbers written as fractions, decimals, and percents and can solve practical problems involving rational numbers.**

**Day 1**

**Number Sense Routine:** How are these numbers alike and different?

| $\frac{3}{4}$ | They are alike because | They are different because | $\frac{9}{12}$ |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

**Teaching**

Today we will review comparing rational numbers. One strategy to use is to convert fractions, decimals, and percents to the same form. Let's use example 1 to review. You can watch optional videos about this topic at **https://bit.ly/3gDl0t4** and **https://bit.ly/2M12Y5V**.

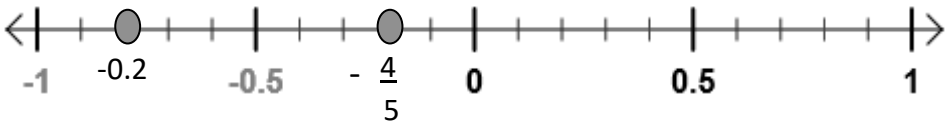
**Example 1: Compare the following rational numbers, fill in the circle using <, >, or =**

10% ◯ $\frac{1}{8}$

| Method 1 | Method 2 |
|---|---|
| Convert both percent and fraction to decimals.<br>$\frac{1}{8} = 8\overline{)1.000} = 0.125 = 12.5\%$<br>0.125<br>− 08<br>20<br>− 16<br>40<br>− 40<br>0<br>To convert percent to decimal, move the decimal 2 places left and drop the % sign<br>10% ⇨ 0.10<br>To convert fraction to decimal, divide the numerator by the denominator as seen in the image to the left.<br>$\frac{1}{8}$ = 0.125<br>0.100 < 0.125 | Convert fraction to percent.<br>Divide the numerator by the denominator and change the decimal to percent, by moving decimal 2 places right (as shown in method 1).<br>$\frac{1}{8}$= 12.5%  10% < 12.5% |
| **Answer:** 10% < $\frac{1}{8}$ | **Answer:** 10% < $\frac{1}{8}$ |

**Example 2: Graph –0.2 and $-\frac{4}{5}$, then compare using <, >, or = .**

-0.2 ◯ $-\frac{4}{5}$




*Remember $\frac{1}{5}$ = 0.20, so $\frac{4}{5}$ = 0.20(4) = 0.80. Therefore, $-\frac{4}{5} = -0.80$.

**Answer:** -0.2 > $-\frac{4}{5}$

**Practice:** Compare the following rational numbers. Fill in the circle using <, >, or =.

| | | | | |
|---|---|---|---|---|
| **1.** 0.5 ◯ $\frac{3}{5}$ | **2.** 1.7 ◯ 170% | **3.** $2\frac{3}{4}$ ◯ 2.75% | **4.** 15% ◯ $\frac{1}{5}$ | **5.** 50% ◯ 0.05 |

| **6.** Which of the following is true? | | **7.** Which of the following is false? | |
|---|---|---|---|
| a. $-\frac{3}{5} < -\frac{7}{10}$ | b. $-\frac{7}{10} > \frac{3}{5}$ | a. $-\frac{3}{5} < 0.5$ | b. –9 > 5 |
| c. 1.25 < 1.2 | d. $-\sqrt{49} < -\sqrt{36}$ | c. 3.8 > – 3.8 | d. 5.2 > $\sqrt{25}$ |

| **8.** Which of the following numbers has the greatest value? | | | |
|---|---|---|---|
| a. 0.004 | b. 2/5 | c. 3 | d. 250% |

**Check & Reflect: Use page 10 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

**Day 2**

**Number Sense Routine:** Which one doesn't belong?

| | |
|---|---|
| $\frac{2}{10}$ | $\frac{1}{5}$ |
| 0.2 | 2% |

**Teaching**

Today we are going to continue exploring rational numbers. Your task will involve putting rational numbers in different numerical orders. Let's review some vocabulary.

**Ascending Order = Least to Greatest Order = Smallest to Largest Order = Increasing Order**

**Descending Order = Greatest to Least Order = Largest to Smallest Order = Decreasing Order**

When ordering rational numbers, there are a few different strategies that may be helpful. You can also watch an optional video at **https://bit.ly/2X5aMtG**.

**The Stacking Method**

When using the stacking method, it is important to remember to fill in any empty spaces with place holders. Then, compare each rational number by place value, working from left to right.

**Example: Order the following decimals in Ascending Order**

**0.33, 0.5, 0.125, 0.25**

| | | tenths | hundredths | thousandths | |
|---|---|---|---|---|---|
| 0 | . | 3 | 3 | 0 | |
| 0 | . | 2 | 5 | 0 | |
| 0 | . | 1 | 2 | 5 | |
| 0 | . | 5 | 0 | 0 | |

Looking at our chart we want to find the smallest value first, in the tenths place we see a **1**, that will be our smallest decimal and the first in our answer.

**Answer:** 0.125, 0.25, 0.33, 0.5

## Graphic Organizer

Using the graphic organizer is very similar to the stacking method.

**Example: Order the following rational numbers in descending order.**

| | | | | |
|---|---|---|---|---|
| **1** | 0.75 | $\frac{1}{8}$ | $\frac{2}{3}$ | 0.8% |
| **2** | | | | |
| **3** | | | | |

Fill in the chart below. Follow these instructions:

- In line 2, write the numbers in decimal form
- In line 3, rank the numbers from greatest (1) to least (4).

| | | | | |
|---|---|---|---|---|
| **1** | 0.75 | $\frac{1}{8}$ | $\frac{2}{3}$ | 0.8% |
| **2** | 0.75 | 0.125 | $0.\underline{6}$ | 0.008 |
| **3** | 1 | 3 | 2 | 4 |

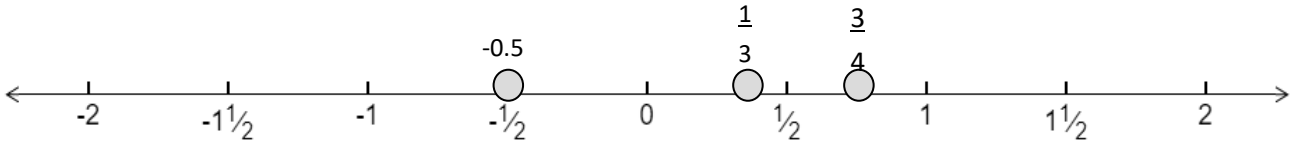
Now, write the original numbers from **Line 1** in descending order; use the rankings in Line 3 to help.

**Answer:** 0.75, $\frac{2}{3}$, $\frac{1}{8}$, 0.8%

## Using a Number Line

When using a number line, you can estimate the placement using benchmark fractions and Integers.

**Example: Order the following rational numbers in ascending order** $\boldsymbol{\frac{3}{4}, -0.5, \frac{1}{3}}$




**Answer:** $-0.5$, $\frac{1}{3}$, $\frac{3}{4}$

## Practice

**1) Order the following rational numbers in descending order.**

$\frac{4}{7}$ , 45% , $\frac{2}{3}$ , 0.8

_____, _____, _____, _____

**2) Which list of numbers is arranged in ascending order?**

A. 0.25, 17%, $\frac{2}{9}$

B. 0.25, $\frac{2}{9}$, 17%

C. 17%, 0.25, $\frac{2}{9}$

D. 17%, $\frac{2}{9}$, 0.25

**3. Which number would make the sentence true?**

$\frac{2}{9} < \square < 1.42$

A. 0.153

B. $1\frac{1}{3}$

C. 22%

**4. Circle all the numbers that are less than 0.18.**

| | |
|---|---|
| 20% | 0.102 |
| 0.2 | $\frac{1}{6}$ |
| $\frac{1}{10}$ | 2% |

**Check & Reflect: Use page 10 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

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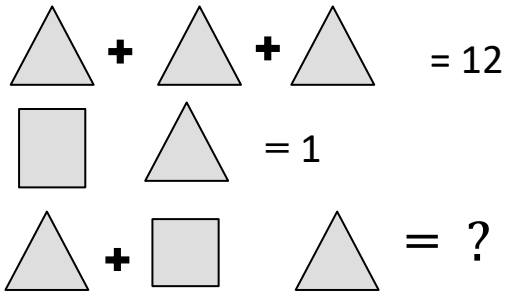
**Day 3**

**Number Sense Routine:** Each shape represents a number. Based on the given information, what number do you think each shape is? What does one triangle plus one square times one triangle equal?



## Application and Practice

**1.** Arrange the numbers shown in order from least to greatest. Explain your reasoning for how you put the numbers in the chart.

$-60\%$ $\quad -\frac{2}{5}$ $\quad 0.7$ $\quad -0.54$

| | | | |
|---|---|---|---|
| | | | |

Least Greatest

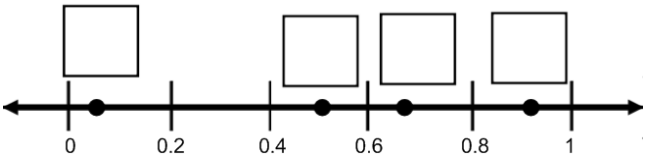
**2.** Select 2 numbers below that make the number sentence true.

-2.5 < _____< -3.4%

-1.63 -0.02 $-\frac{9}{4}$ $-3\frac{1}{4}$

**3.** Label each point on the number line with the correct value.

50% $\frac{93}{100}$ 6% $\frac{2}{3}$




**Check & Reflect: Use page 10 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

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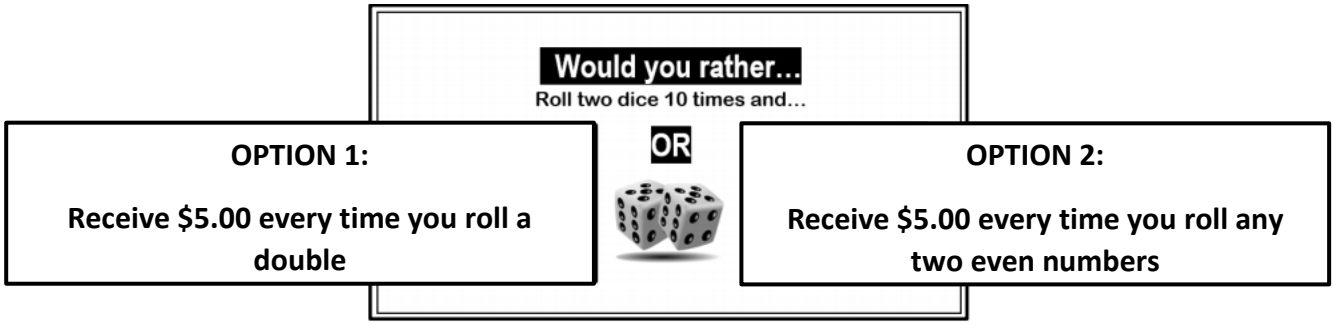
**Day 4**

**Number Sense Routine:** Choose one of the options. Explain your thinking.



**Practice:**

1. A baby's t-shirt requires $^4/_5$ yards of fabric. How many t-shirts can be made from 48 yards?

2. A recipe for banana oat muffins calls for 1 $^4/_5$ cups of oats. You are making 50% of the recipe. How much oats should you use?

3. Mrs. Rodgers ordered 3.5 lbs of fajita meat for Labor Day weekend. Each pound cost $5.96. What was Mrs. Rogers' change if she paid with a $50 bill?

4. Five friends went to the movies. After buying tickets, popcorn and drinks, the total came to $52.85. One friend had a $7.00 off coupon that the cashier needed to take off the bill. How much would each person have to pay if they split the bill equally after the discount?

5. Your mom bought a multi pack of Hot Fries from Sam's Club last week. When you got home from school your brother and his friends had eaten ⅙ of the bags. By the end of the week your family had eaten 50% of what was left. There are 30 bags of Hot Fries left in the box.
   How many were in the box to begin with? Be sure to show and explain all of your reasoning.

---

**Day 5: Weekly Reflection**

Christina and Brett are debating the relationship between two rational numbers. Read their claims below, then write an explanation of who is correct. Use a number line model to support your answer.

**<u>Christina's Claim</u>:** "I know that 3 is greater than $2\frac{1}{2}$. So, $-3$ must be greater than $-2\frac{1}{2}$."

**<u>Brett's Claim:</u>** "Yes, 3 is greater than $2\frac{1}{2}$, but when you look at their opposites, their order will be opposite. So, that means $-2\frac{1}{2}$ is greater than $-3$.

---

**Answer Guide: Day1: NSR:** Alike: They are both fractions and equal to ¾. Different: They have different numbers in the numerator and denominator. **1.** < **2.** = **3.** = **4.** < **5.** > **6.**d **7.**b **8.**c

**Day 2: NSR:** Answers vary. Sample answers: 2/10 because it is not simplified, 1/5 because it has odd numbers, 0.2 because it is a decimal, 2% because it is a percent and is not equivalent to the other three **1.** 0.8, $\frac{2}{3}$, $\frac{4}{7}$, 45% **2.** D **3.** B **4.** 0.102, $\frac{1}{6}$, $\frac{1}{10}$, 2%

**Day 3: NSR:** 5 **1.** -60%, -0.54, $-\frac{2}{5}$, 0.7 **2.** -1.63, $-\frac{9}{4}$ **3.** 6%, 50%, $\frac{2}{3}$, $\frac{93}{100}$

**Day 4: NSR:** Sample answer: Option B because you have a better chance of rolling two even numbers (9/36 = 1/4) than a double (6/36 = 1/6) **1.** 60 **2.** $\frac{9}{10}$ cups **3.** $29.14 **4.** $9.17 **5.** 72

**Day 5:** Brett is correct because placing these numbers on the number line, you can see that $-2\frac{1}{2}$ is closer to 0 than -3.

## Negative Exponents, Scientific Notation, Perfect Squares and Absolute Value

**Weekly Learning Outcome/Essential Question:**

- I can write negative exponents as a fraction and decimal.
- I can compare and order numbers written in scientific notation.
- I can identify perfect squares.
- I can identify the absolute value of rational numbers

---

### Day 1: Negative Exponents

**Number Sense Routine:** How are these numbers alike and different?

| | |
|---|---|
| 30% | $\frac{3}{4}$ |
| 2.4 | $2\frac{5}{7}$ |

| These are alike because... | These are different because... |
|---|---|
| | |
| | |
| | |

### Teaching

- Negative exponents for powers of 10 are used to represent numbers between 0 and 1. (e.g.,$10^{-3} = \frac{1}{10^3} = 0.001$).

- Negative exponents for powers of 10 can be investigated through patterns such as:

$$10^2 = 100$$
$$10^1 = 10$$
$$10^0 = 1$$
$$10^{-1} = \frac{1}{10^1} = \frac{1}{10} = 0.1$$
$$10^{-2} = \frac{1}{10^2} = \frac{1}{100} = 0.01$$

**Examine the pattern below**

| Value | Exponential Form |
|---|---|
| $\mathbf{1000}$ | $\mathbf{10^3}$ |
| $\mathbf{100}$ | $\mathbf{10^2}$ |
| $\mathbf{10}$ | $\mathbf{10^1}$ |
| $\mathbf{1}$ | $\mathbf{10^0}$ |
| $\mathbf{\frac{1}{10}}$ | $\mathbf{10^{-1}}$ |
| $\mathbf{\frac{1}{100}}$ | $\mathbf{10^{-2}}$ |
| $\mathbf{\frac{1}{1,000}}$ | $\mathbf{10^{-3}}$ |

### Application

1. A base of ten raised to a negative exponent corresponds to a number:
   a. Between 0 and 1 b. Less than -1
   c. Greater than 1 d. Between -1 and 0

**2.** Which exponent will make this statement true?

$$10^{?} = 0.00001$$

**3.** Circle the errors in each row and correct them.

| | Exponential | Expanded Form | Standard Form | Fraction Form | Exponential Fraction |
|---|---|---|---|---|---|
| **Ex.** | $10^5$ | $5 \times 10$<br>$10 \times 10 \times 10 \times 10 \times 10$ | 50<br>100,000 | $\frac{50}{1}$<br>$\frac{100,000}{1}$ | $\frac{10^5}{1}$ |
| **a.** | $10^3$ | $10 \times 10 \times 10$ | 30 | $\frac{1000}{1}$ | $\frac{10^3}{1}$ |
| **b.** | $10^0$ | 0 | 1 | $\frac{1}{1}$ | $\frac{10^0}{1}$ |
| **c.** | $10^{-1}$ | $\frac{1}{10}$ | 0.1 | $\frac{1}{10}$ | $\frac{1}{10^1}$ |
| **d.** | $10^{-2}$ | $-10 \times -10$ | 0.01 | $\frac{1}{100}$ | $\frac{1}{10^2}$ |
| **e.** | $10^{-4}$ | $\frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10}$ | 0.0001 | $\frac{1}{100,000}$ | $\frac{1}{10^4}$ |

**Check & Reflect: Use page 17 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

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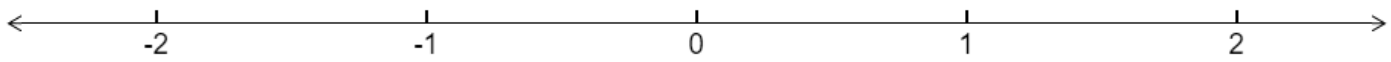
## Day 2: Scientific Notation

### Number Sense Routine

If the absolute value of a number is 0.9, how could you plot all the possible numbers?



## Teaching

| Vocabulary | Examples |
|---|---|
| **Scientific notation** is a way of expressing a number that may be too big or small to write. Scientific notation is the product of a number between 1 and less than 10 & a power of 10. | $7.2 \times 10^4$ |
| **Standard form** is how we normally write numbers. | 1,000 |
| An **exponent** describes the number of times a base is multiplied (number times itself).<br><br>A negative exponent means the number is smaller, not negative (fraction or decimal).<br><br>Any non-zero number to the zero power is equal to 1.<br><br>Any number to the first power is itself. | $10^4 = 10 \times 10 \times 10 \times 10$<br><br>$10^{-3} = \frac{1}{10^3} = \frac{1}{10 \times 10 \times 10} = \frac{1}{1000} = 0.001$<br><br>$10^0 = 1$<br><br>$10^1 = 10$ |
| In scientific notation, if the exponent is negative, you are dividing by 10s, moving the decimal left. If the exponent is positive, you are multiplying by 10s, moving the decimal right | $4.5 \times 10^{-3} = 4.5 \cdot \frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10}$ |

## Application and Practice

1. The weight of an eyelash has **0.00000002** pounds of force. Write this number in scientific notation.

2. Which number is equivalent to **1.234 x $10^{-3}$** ?
   a. 1,234 b. 1,234,000 c. 0.0001234 d. 0.001234

3. How is **1,002,000** written in scientific notation?
   a. $1.2 \text{ x } 10^6$ b. $1.002 \text{ x } 10^6$ c. $1.00 \text{ x } 10^6$ d. $1.02 \text{ x } 10^6$

4. Place in ascending order: 4.32 x $10^{-2}$, 1.20 x $10^3$ , 4.32 x $10^{-4}$

   [ ] [ ] [ ]

5. Select the appropriate symbol: **<, >, or =**

   3.21 x $10^{-3}$ [ ] 3.20 x $10^{-3}$

**6.** Convert to scientific notation:

a. 0.004 _____ b. 107,000 _____

**7.** The capacity of a large petroleum super tanker is $1.33 \times 10^8$. What is this value in standard form?

**8.** Write six million in scientific notation. _____

**9.** Put these numbers in order from least to greatest.

$4.58 \times 10^6$ $4.58 \times 10^1$ $4.58 \times 10^3$ $4.58 \times 10^0$

_____, _____, _____, _____

**10.** Use >, <, or = to compare the numbers below.

a. $8.5 \times 10^{-2}$ ___ $8.5 \times 10^{-3}$ b. $6.04 \times 10^7$ ___ $6.4 \times 10^6$

c. $3.7 \times 10^5$ ___ $4.5 \times 10^5$ b. $9.03 \times 10^3$ ___ $3.4 \times 10^5$

**Check & Reflect: Use page 17 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

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**Day 3: Perfect Squares**

**Number Sense Routine:** What value could go in the box to make the numbers in ascending order?

$$1\frac{1}{4}, \boxed{\phantom{00}}, 130\%$$

**Teaching**

| **Perfect Square** | **Square Root** |
|---|---|
| A **perfect square** is a whole number whose square root is an integer. Zero (a whole number) is a perfect square.<br>**Example:** $\mathbf{36 = 6 \cdot 6 = 6^2}$ | A **square root** of a number is a number which, when multiplied by itself, produces the given number.<br>**Example:** $\sqrt{121}$ is 11 since $11 \cdot 11 = 121$ |

The square root of a specific number can be represented geometrically as the length of a side of a square with an area of that specific number.

| | |
|---|---|
| Example: $\boxed{\mathbf{144\ in^2}}$ | The square has an area of $144 in^2$; the length of the side of the square is 12. |
| $\sqrt{144} = 12$ | |

## Application and Practice

1. **Fill in the table with the perfect square.**

| Number | Perfect Square | | Number | Perfect Square | | Number | Perfect Square | | Number | Perfect Square |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | 6 | | | 11 | | | 16 | |
| 2 | | | 7 | | | 12 | | | 17 | |
| 3 | | | 8 | | | 13 | | | 18 | |
| 4 | | | 9 | | | 14 | | | 19 | |
| 5 | | | 10 | | | 15 | | | 20 | |

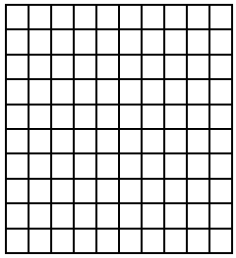
2. Circle all equations that are false.
$\sqrt{144} = 12$ $\sqrt{169} = 13$ $\sqrt{225} = 15$ $\sqrt{284} = 17$

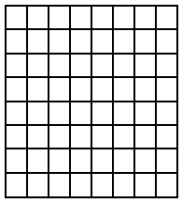
3. Mrs. Frizzle has a vegetable garden that is a perfect square. It has an area of 324 square feet. She wants to put a brick border around the entire garden. How many feet of border will she need to buy?

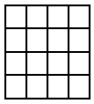
4. What is the square root of 1?
   a. 1 b. $\frac{1}{2}$ c. 2 d. $\frac{1}{4}$

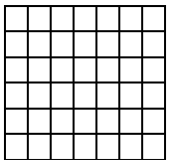
5. Tiffany has a square picture frame with an area of $400in^2$. She wants to decorate one side of the frame with ribbon. Which of the following represents the amount of ribbon she will need?
   a. 20 in. b. 80 in. c. 100 in. d. 200 in

6. Which of the following pictures **does not** represent a perfect square?

**a.**


**b.**


**c.**


**d.**


**Check & Reflect: Use page 17 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

## Day 4: Absolute Value

**Number Sense Routine:** Choose one of the options. Explain your thinking.

**Would you rather buy....**

| **Option A:** | **Option B:** |
|---|---|
| 8lb jug of ice cream for $24.56 | Two 3lb 11oz jugs of ice cream for $23.60 |

I would choose Option _____ because _____.

### Teaching

**Expressing distance using absolute value**

The distance between two numbers is the absolute value of their difference.

**Example: Which of the following represents the distance between points x and y on the number line?**


**a)** $|-4+2|$ **b)** $|2-4|$ **c)** $|-4-2|$ **d)** $|2+(-4)|$

*If you count from x to y you will find a distance of 6, so then you can look at each expression to find which one simplifies to 6.* ***Answer would be c; it correctly shows the distance between x and y.***

### Application and Practice

**1.** Circle ALL of the true statements.

$|-4| = |4|$ $33 = |33|$ $-17 = |-17|$ $|0| = 0$

$-2 = |2|$ $|2.4| = 2.4$ $\frac{1}{2} = |\frac{1}{2}|$ $|-5| = -5$

**2.** Fill in the blank with <, >, or = to make a true sentence.

**a.** $-3$___$|-6|$ **b.** $-\frac{1}{2}$___$|-6|$ **c.** $6$___$|-6|$ **d.** $-8$___$|-8|$ **e.** $|2.7|$___$|-2.7|$

**3.** Which absolute value has the greatest value?

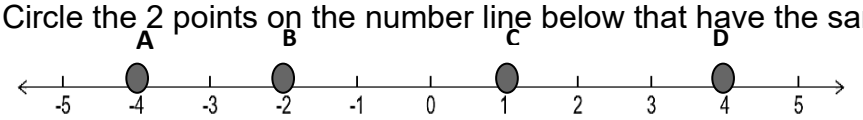
$|-5.7|$ $|\frac{1}{2}|$ $|10|$ $|-\frac{5}{9}|$ $|3.8|$

**4.** Which absolute value has the least value?

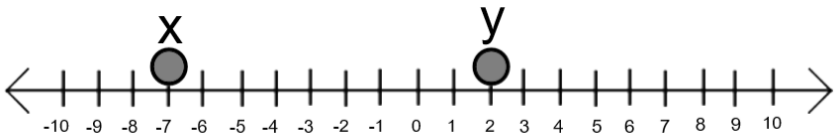
$|8.2|$ $|-4\frac{1}{2}|$ $|\frac{2}{3}|$ $|-7.9|$ $|-3|$

**5.** Circle the 2 points on the number line below that have the same absolute value.




**6.** Which of the following represents the distance between points x and y on the number line?




**a.** $|7-2|$ **b.** $|-7-2|$ **c.** $|-7+2|$ **d.** $|2-7|$

**Check & Reflect: See below to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

---

**Day 5: Weekly Reflection**

Read the word problem, then look at the student's work and solution. Identify and describe the error. Solve the problem correctly, then share a strategy this student could use to avoid making the same error in the future.

**An album receives an award when it sells 10,000,000 copies. An album has sold 7,680,000 copies. How many more copies does it need to sell to receive the award? Write your answer in scientific notation.**

| Incorrect Work/Solution | Identify and Explain the Error |
|---|---|
| 10,000,000 - 7,680,000 = 2,320,000<br>2,320,000 ← 4 zero<br>$2.32 \times 10^4$<br>The album must sell $2.32 \times 10^4$ more copies to receive the award. | |
| Correct Work/Solution: | Share a Strategy: The student could have … |

---

**Answer Guide: Day 1: NSR:** Sample answers: Alike: They are all rational numbers, two numbers are fractions, two numbers are less than 1, two numbers are between 2 and 4. Different: None are equal, they are in different forms (fractions, decimals, percents) **1.** a **2.**-5 **3a.** standard form 1,000 **3b.** expanded form 1 **3c.** no error **3d.** expanded form $\frac{1}{10}$x $\frac{1}{10}$ **3e.** fraction form $\frac{1}{10{,}000}$ **Day 2: NSR:** You could plot .9 and -.9 **1.** $2\text{x}10^{-8}$ **2.** d **3.** b **4.** $4.32\text{x}10^{-4}$, $4.32\text{x}10^{-2}$, $1.20\text{x}10^{3}$ **5.** > **6a.** $4\text{x}10^{-3}$ **6b**.$1.07\text{x}10^{5}$ **7.** 133,000,000 **8.** $6\text{x}10^{8}$ **9.** $4.58\text{x}10^{0}$,$4.58\text{x}10^{1}$,$4.58\text{x}10^{3}$,$4.58\text{x}10^{6}$ **10a.** > **10b**.> **10 c.** < **10d.** < **Day3: NSR:** Sample answers: 1.26, 1.27, 1.28, 1.29, 1.251, 1.29999 **1.**4,9,16,25,36,49,64,81,100,121,144,169,196,225,256,289,324,361,400 **2.** $\sqrt{284}$=17 **3.** 72ft **4.**a **5.**a **6.**d **Day 4**: **NSR:** Option A because it is cheaper per ounce (cheaper per unit price) \$0.192 versus \$0.20 **1.**$|-4|=|4|$ 33=$|33||0|$=0 $|2.4|$= 2.4 $\frac{1}{2}=\left|\frac{1}{2}\right|$ **2a.** < **2b.**< **2c**.= **2d**.< **2e**.= **3.**10 **4.**$\frac{2}{3}$ **5.** 4 & -4 **5.**d **6.**b **Day 5:** Scientific notation is not about the number of zeros; its in a format that has one digit in front of the decimal point and two digits after the decimal point. The correct answer would be $2.32\text{x}10^{5}$

# Proportional Reasoning

**Weekly Learning Outcome:**

- **I can solve single step and multistep practical problems, using proportions.**
- **I can solve problems involving the relationship between corresponding sides and angles of similar figures.**

---

**Day 1: Proportions**

**Number Sense Routine:** How are these numbers alike and different?

| | | | |
|---|---|---|---|
| **9** | **25** | **16** | **43** |

These numbers are alike because _____.

These numbers are different because_____.

**Teaching: Vocabulary**

**Proportion -** A proportion is a statement of equality between two ratios.

$$\frac{a}{b} = \frac{c}{d},\ a:b = c:d,$$

**Ratio Table -** is a table of values representing a proportional relationship that includes pairs of values that represents equivalent rates or ratios.

| **Cups** | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **Ounces** | 8 | 16 | 24 | 32 |

**Example: If it takes 6 gallons of gasoline for a 96-mile trip, how many gallons of gasoline would be needed for a 128 mile trip?**

**Method 1**

$$\frac{96\ miles}{6\ gallons} = \frac{128\ miles}{x\ gallons}$$

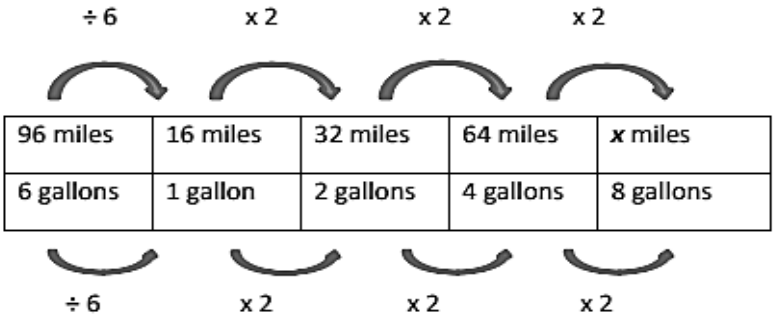
Cross multiply to get

$$96x = 6 \cdot 128$$

$$\frac{96x}{96} = \frac{768}{96} \quad x = 8$$

*It would take **8 gallons** for a 128-mile trip*

**Method 2**




Identify the unit rate by dividing by 6 (to get 1 gallon), once you have the unit rate you can multiply to find the units needed.

**Application**

1. Marcie can mow 9 lawns every 14 hours. How many lawns can she mow in 49 hours? _____ = _____

Solve:

2. Max ran 5 miles on Thursday. One mile equals 5,280 feet. Which proportion can be used to determine how many feet, x, Max ran on Thursday?

a. $\frac{1}{5,280} = \frac{x}{5}$ b. $\frac{1}{5,280} = \frac{5}{x}$

c. $\frac{1}{x} = \frac{5,280}{5}$ d. $\frac{1}{5} = \frac{x}{5,280}$

3. A granola recipe requires you to use 5 cups of oats for every 3 cups of almonds. Create a ratio table to help determine how many cups of oats would be needed if you used 12 cups of almonds.

| | | | | |
|---|---|---|---|---|
| **Cups of Oats** | 5 | | | x |
| **Cups of almonds** | 3 | | | 12 |

4. A blueprint of an office building is created using a scale of 1cm:6 feet. What is the actual length of a wall that is 10 cm long on the blueprint?

5. Mr. Ford spent $2 on one big bag of hot fries; how many bags can he buy for $10? (Set up proportion)

| | | |
|---|---|---|
| **cost** | $2 | |
| **# bags of hot fries** | 1 | |

**Check & Reflect: Use page 24 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

---

**Day 2: Tax, Tip, Discount**

**Number Sense Routine:** Plot $\frac{2}{5}$, 2.5%, and 0.25 on the number line.

**Teaching**

| Vocabulary | Examples |
|---|---|
| **Tax and tip:** an amount **added** to your total | • *In Virginia, we pay 6% sales tax on items we purchase.*<br>• *When you go out to eat at a restaurant, you leave a tip for your server.*<br>**Total = Original Price + Tax or Tip** |
| **Discount:** an amount **subtracted** from your total | *Sale Price, Savings, Coupons, or On Sale are all ways the price of an item is discounted.*<br>• **Sale Price = Original Price - Discount** |

| **Calculating Tax, Tip and Discount Amount** | |
|---|---|
| **Method 1**<br>Using a proportion | **Method 2**<br>Changing the percent to a decimal and multiply |
| $\frac{Part}{Whole} = \frac{\%}{100}$ | 1. Convert the percent to a decimal by moving the decimal 2 places left<br>2. Multiply the now decimal with the original cost.<br>3. The answer will be the tax, tip or discount amount. |

**Example:** Sarah wants to buy a pair of jeans that cost $85.00.
How much tax will she pay, if the tax is 7.5%?

**Method 1**

$$\frac{x}{\$85.00} = \frac{7.5}{100}$$

$$7.5 \times \$85.00 = 100x$$

$$\frac{\$637.50}{100} = \frac{100x}{100}$$

$$x = \$6.375 = \$6.38$$

**Method 2**

1. $7.5\% = 0.075$
2. $0.075 \times \$85.00$
3. **Tax**$= \$6.375 = \$6.38$

**Example:** How much money does Sarah need **total** including tax to buy the $85.00 pair of jeans?
**Original Price + Tax = Total**
$85.00 + $6.38 = $91.38

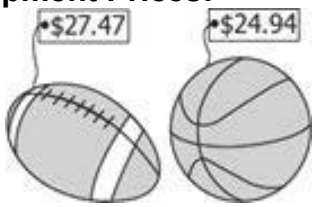
## Application

1. Mr. Porter's grocery bill is $143.74. If 5.3% sales tax is **added** to the bill, what is the total Mr. Porter owes?

2. Kim and Steve went to dinner. Kim has a coupon for a 25% discount off all meals not including tax and tip. If the original price of the meal was $75, how much money will they **save**?

3. Darrell's restaurant bill is $89.75. If Darrell leaves a 20% tip, how much **tip** does the server receive?

4. **Sports Zone Equipment Prices:**




This weekend, the store is running a special. You get 20% off of your total purchase. Which is the closest to the total sale price of buying both a football and a basketball (**before tax**)

| | | | |
|---|---|---|---|
| A: $62.89 | B: $52.41 | C: $41.93 | D: $32.41 |

5. Alene wants to buy a pencil pouch that costs $16.00. She must also pay 5% sales tax. If she pays with a $20 bill, how much **change** will she receive **back**?

**Check & Reflect: Use page 24 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

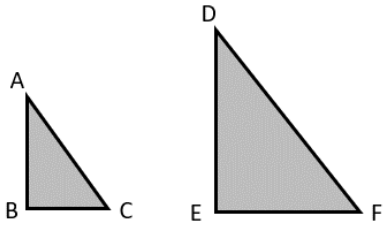
**Day 3: Property of Similar Figures**
**Number Sense Routine:** How are these numbers alike and different?

| | |
|---|---|
| $\frac{1}{4}$ of 80 | 20 |
| 25% of 80 | $\frac{80}{4}$ |

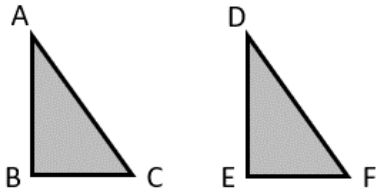
| These are alike because... | These are different because... |
|---|---|
| | |
| | |
| | |

## Teaching - Vocabulary

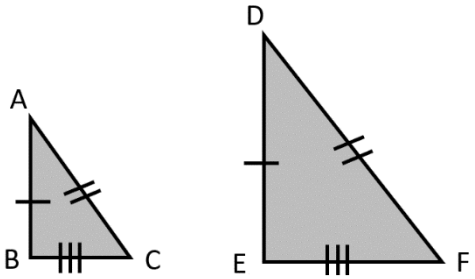
**Similar (~) -** figures that are the same shape but different sizes. Corresponding angles are equal and corresponding sides are proportional.



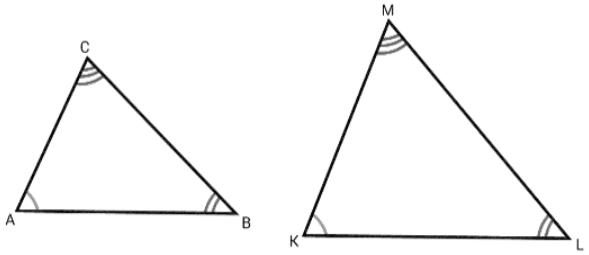

**Congruent (≅)-** figures that are the same shape and same size. Corresponding angles and corresponding sides are the same size and length.




**Corresponding Sides -** sides that are in the same position on two different shapes.

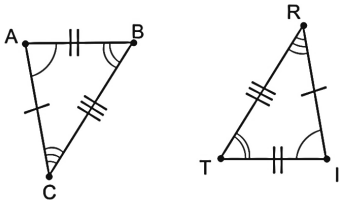



**Corresponding Angles -** angles that are in the same position on two different shapes.




**Similarity Statement -** a math sentence that shows the relationship between similar figures.

$$\triangle ABC \sim \triangle ITR$$



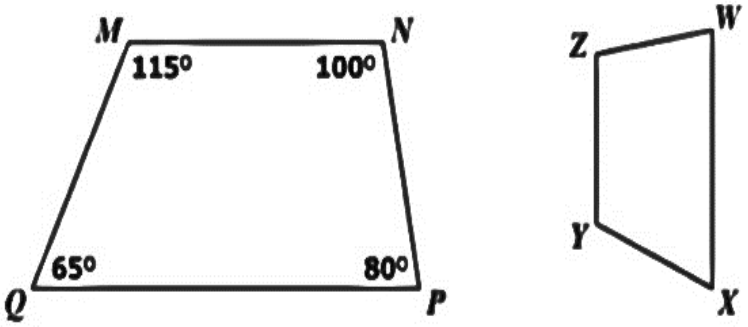

## Application

**1. GHIJ ~ KLMN**


| | |
|---|---|
| 1. ∠*G* corresponds to | 5. $\overline{GH}$ corresponds to |
| 2. ∠*H* corresponds to | 6. $\overline{GI}$ corresponds to |
| 3. ∠*I* corresponds to | 7. $\overline{IJ}$ corresponds to |
| 4. ∠*J* corresponds to | 8. $\overline{HI}$ corresponds to |

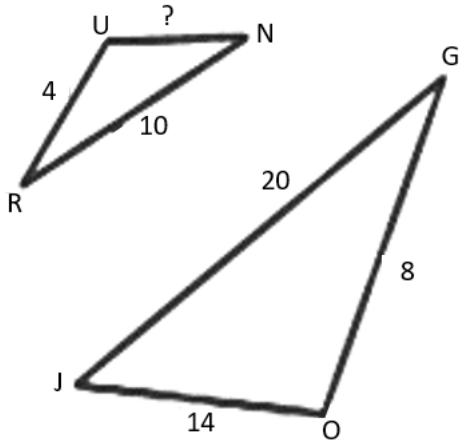
2. Quadrilateral MNPQ is similar to quadrilateral YZWX.



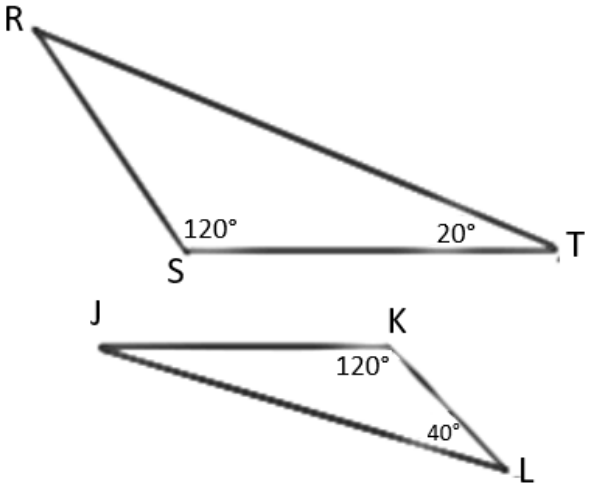

**What is the measure of angle *W*? _____**

3. Complete the following similarity statement based on the image below:

△ RUN ~ △_____




4. Given $\triangle RST \sim \triangle LKJ$.




**What is the measure of angle J?_____**

**Check & Reflect: Use page 24 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

**Day 4: Solving Similar Figures**

**Number Sense Routine:** Would you rather …?

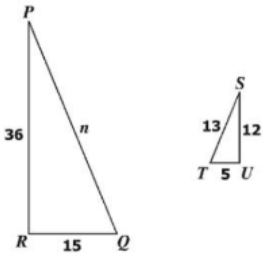
| | |
|---|---|
| **Option A:** Sell a batch of 30 cookies for 50 cents each with the cost to make them of $8.00. | **Option B:** Sell a batch of 30 cookies altogether for $15.00 with the cost to make them of $6.00. |

**I would rather choose option ___ because _____**

**Teaching - Today's focus will be to find missing sides and/or angles of similar figures and proving that 2 figures are similar.**

## Solving for a missing side

Triangle *PQR is similar to triangle STU.*




The given information tells us that the triangles **are** similar. Using corresponding sides we can set up a proportion to solve for the missing side ***n.***

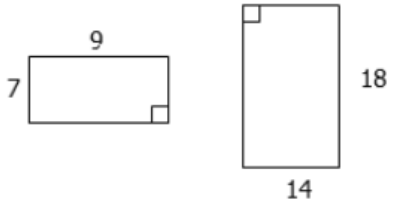
$$\frac{\boldsymbol{n}}{\mathbf{13}} = \frac{\mathbf{36}}{\mathbf{12}} \quad \text{or} \quad \frac{n}{13} = \frac{15}{5}$$

$$n = 39$$

You can use either proportion to solve for this missing side, refer to **Day 1** if you need a reminder on solving proportions.

## Proving two figures are similar

Is this pair of polygons similar?



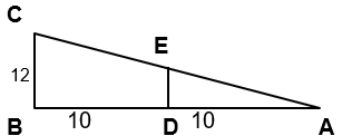

This time, we are being asked to prove **IF** these polygons are similar. We will set up a proportion for the corresponding sides in order to check the **cross products** to see if they are equal. If the cross products are equal, the sides are proportionate and therefore the figures would be similar.

**Proportional Setup**

$$\frac{7}{14} = \frac{9}{18}$$

The figures are similar because $7 \cdot 18 = 9 \cdot 14$

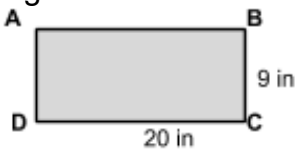
## Application



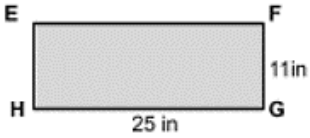

1. The two triangles shown are similar. Which three proportions can be used to prove similarity?

| a. | b. | c. | d. | e. |
|---|---|---|---|---|
| $\frac{10}{12} = \frac{6}{10}$ | $\frac{10}{6} = \frac{20}{12}$ | $\frac{12}{6} = \frac{20}{10}$ | $\frac{12}{20} = \frac{6}{10}$ | $\frac{10}{6} = \frac{10}{12}$ |

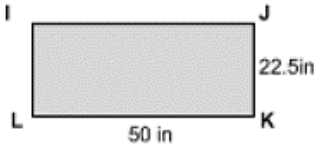
2. Which rectangle is similar to rectangle ABCD?




**Option A**



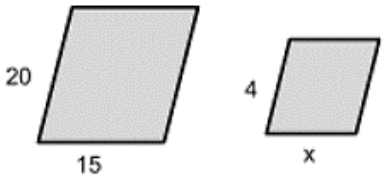

**Option B**




**Explain your answer:**

3. Jillian claims that two isosceles triangles will always be similar. Is her claim true or false? Explain

4. Find the missing side (x) of the similar figure




*Set up the proportion _____ = _____

**Check & Reflect: See below to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

---

**Day 5: Weekly Reflection**

1. The Fosters traveled the first 100 miles of their trip in 80 minutes. They traveled the final 198,000 feet in 30 minutes. Is this an example of a proportional relationship? Explain your reasoning.

2. Explain how you know two figures are similar. How do corresponding sides affect similar figures?

3. Based on the content you reviewed this week; how might this information be useful in real life?

---

**Answer Guide**

**Day 1: NSR:** Sample answers: Alike: They are all integers; Different: Only three of them are perfect squares, only three of them are odd, only one if less than ten **1.** 31.5 **2.** b **3.** 20 **4.** 60 **5.** 5

**Day 2: NSR:** 2.5% should be first and close to zero, 0.25 is next and should be about a half of the way between 0 and 0.5, and 2/5 should be last and close to 0.5
**1.** $151.36 **2.** $18.75 **3.** $17.95 **4.** c **5.** $3.20

**Day 3: NSR:** Sample answers: Alike: They are all equal to 20. Different: 20 is the only one simplified, one uses a fraction, another a percent. **1.1** 1.∠K **1.2.**∠L **1.3.**∠M **1.4.**∠N **1.5.**KL **1.6.**KM **1.7.**MN **1.8.**LM **2.** 80° **3.** ∆GOJ **4.** 20°

**Day 4: NSR:** Possible answers: Option A because you only have to sell 16 cookies to break even. Option B because you will make a larger profit. **1.** b,c,d **2.** Option B **3.** False (two isosceles triangles will NOT always be similar because in order to be similar all corresponding angles in both triangles MUST be congruent; you can have two isosceles triangles that have different angle measures; ex. 50-50-80 and 45-45-90 both are isosceles yet they are not similar) **4.** 3

**Day 5**: **1.** Yes, by converting 198,000 feet to 37.5 miles I was able to set up a proportion of $\frac{100}{80} = \frac{37.5}{30}$. The cross products are equal, so the statement is true. **2.** In setting up a proportion with corresponding sides, their cross products are equal to each other. . **3.** Answers may vary.

# Equations and Inequalities

**Weekly Learning Outcomes:**

- **I can solve two-step equations, including practical problems.**
- **I can solve one- and two-step inequalities, including practical problems.**

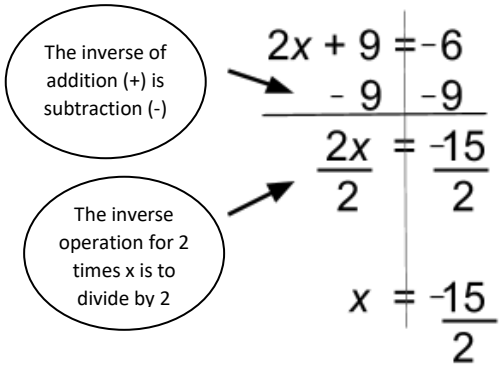
---

**Day 1: Two-step equations, including practical problems**

**Number Sense Routine:** Using the numbers 1-9, fill in the blanks to make the statement true.

$$\square > \left|\square\right|$$

**Teaching:** The goal in solving equations is to get the <u>variable</u> by itself.

| | |
|---|---|
| 1. **Use inverse operations to move all the constants to one side**<br>2. **Use inverse operations to solve for the variable**<br><br>Check out these videos to support your learning!<br>1. https://bit.ly/2A7ycGh<br>2. https://bit.ly/2XLEdkN |  |

**Application: Solve for the variable.**

1. $2x + 3 = 12$ 2. $-7 + 13a = 29$ 3. $3n - 5 = 10$ 4. $5 - x = 9$

5. $11 = -4 + 5y$

6. A new one-year membership at Roswell Tennis Center costs $160. A registration fee of $28 is paid up front, and the rest is paid monthly. How much do new members pay each month?

7. For a field trip 20 students rode in cars and the rest filled nine buses. How many students were in each bus if 236 students were on the trip? Write an equation and solve

**Check & Reflect: Use page 29 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

**Day 2: Two-step equations, including practical problems**

**Number Sense Routine:** Using the numbers 1 through 0, fill in the blanks to make the statement true.

$$\frac{\square}{\square} < \frac{\square}{\square} < \frac{\square}{\square}$$

**Teaching**

| | |
|---|---|
| **1. Use inverse operations to move all the constants to one side**<br><br>**2. Use inverse operations to solve for the variable**<br><br>Check out this video for additional support: **https://bit.ly/2BNLWpZ** | $7 = \frac{1}{2}k - 6$<br>$+6 \qquad +6$<br>$\frac{2}{1} \cdot 13 = \frac{1}{2}k \cdot \frac{2}{1}$<br>$\frac{26}{1} = k$<br>$26 = k$<br><br>The inverse of addition (+) is subtraction (-)<br><br>Remember the Multiplicative Inverse. You have to multiply by 2/1 on both sides. |

**Application**

**1.** $\frac{1}{2}x + 6 = 16$

**2.** $-22 = 5y + 13$

**3.** $17 = 5 + \frac{2}{3}k$

**4.** $-10 = \frac{x}{3} - 6$

**5.** $-\frac{1}{4}x + 5 = 7$

**6.** $\frac{n - 31}{4} = 2$

**7**. Chris sold half of his comic book collection then purchased 10 more. He now has 24 comic books. How many books did Chris begin with? Write an equation and solve.

**8.** Netflix charges David $15 per month for a membership, plus a $5 one-time fee for streaming on his phone. How many months will David have his membership if Netflix charges him $50?

**9.** Penelope is going to the carnival to ride the rides. It costs $20 to get into the carnival and ride tickets are $ 0.50 each. She spends $35 in all. How many tickets did she buy?

**Check & Reflect: Use page 29 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

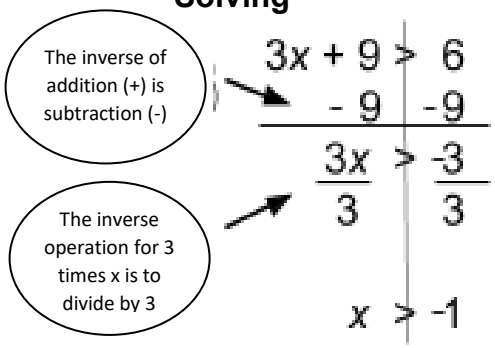
**Day 3: One- and Two-step Inequalities**
**Number Sense Routine:** Which one doesn't belong? Justify with mathematical reasoning.

| $-2+(3+4)$ | $(3+4)+(-2)$ | $-2+(4+3)$ | $(-2+3)+4$ |
|---|---|---|---|
| **A** | **B** | **C** | **D** |

____ doesn't belong because _____.

**Teaching:** Solving inequalities is the same process as solving equations. However, when we solve inequalities, there are an infinite number of solutions.

**Solving**



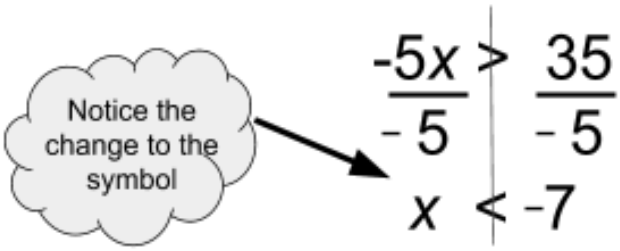

**Graphing Inequalities**

1. Draw and label the number line
2. Determine if you will use an open circle **(<,>)** or a filled in circle **(≤,≥)**
3. Substitute 2 values into your inequality to determine the direction of your arrow, draw your arrow towards the true statement

Check out these videos: https://bit.ly/37bJoO9
https://bit.ly/2AUideI

**When solving inequalities,** if you multiply or divide by a negative number, you must change the inequality symbol to its opposite to identify the solutions.

Check out this video for further support: https://bit.ly/3dMr3cX



**Application: Solve and graph.**

| | | |
|---|---|---|
| 1. $x - 15 > -12$ | 2. $\frac{2}{3}x > 7$ | 3. $-9y \leq 6$ |
| 4. $5a - 5 > 1$ | 5. $-4n + 6 \geq -10$ | 6. $8 \leq -4 + 2c$ |
| 7. $\frac{3}{4}w - 6 \geq -3$ | 8. A weightlifter's maximum amount he can lift is 300 pounds. Write and solve an inequality to find the number of 50-pound weights he can possibly lift. | |

**Check & Reflect: Use page 29 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

---

**Day 4: One- and Two-step inequalities, including practical problems**

**Number Sense Routine:** Fill in the boxes using 0 – 9 at most once each to make the statement true.

$$\square(\square + \square) = \square + \square = \square\square$$

**Application: Solve and graph**

| | | |
|---|---|---|
| 1. $15 + y \leq 0$ | 2. $6 > \frac{n}{3} + 4$ | 3. $-7x - 7 \geq 56$ |

| | |
|---|---|
| 4. Demi is saving for a new $500 bike. She currently has $125. If she saves $15 per week, how long must she wait to save at least $600 to cover tax and extras. Write and solve an inequality. | 5. Pablo makes $300 a day and works 20 days a month, but he is fined $20 every day he is late. How many days can he be late if he wants to make at least $5,910? Write and solve an inequality. |

**Check & Reflect: See below to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

**Day 5: Weekly Reflection:** Study the incorrect work below. Then, find the mistake and explain your reasoning. Find the correct answer by showing the correct work in the appropriate box. Explain your correct work and solution.

| Incorrect Work and Solution | What was the mistake? Explain | Correct Work and Solution |
|---|---|---|
| $2x - 10 = 22$<br>$-10 \quad -10$<br>$2x = 12$<br>$\div 2 \quad \div 2$<br>$x = 6$ | | $2x - 10 = 22$ |
| $\frac{x}{4} + 6 > -2$<br>$-6 \quad -6$<br>$\frac{x}{4} > -8$<br>$x < -32$ | | $\frac{x}{4} + 6 > -2$ |

**Answer Guide:**

**Day 1: NSR:** Sample answers: 2 and 1, 4 and 3, 9 and 2 **1.** $\frac{9}{2}$ **2.** $\frac{36}{13}$ **3.** 5 **4.** $-4$ **5.** 3 **6.** $11.00 **7.** 24 students

**Day 2: NSR:** Sample answer: $\frac{1}{9} < \frac{2}{8} < \frac{3}{5}$ **1.** 20 **2.** $-7$ **3.** 18 **4.** $-12$ **5.** $-8$ **6.** 39 **7.** 28 comic books **8.** 3 months **9.** 30 tickets

**Day 3: NSR:** Sample answers: A because -2 is written first, B because everything is in parentheses, C because the 3 and 4 are switched, D because 2 and 3 are in the parenthesis **1.** x>3; **2.** x>$\frac{21}{2}$; **3.** y≥-$\frac{2}{3}$; **4.** a>$\frac{6}{5}$; **5.** n≤4; **6.** c≥6; **7.** w≥4; **8.** 50w ≤ 300; w≤6;

**Day 4: NSR:** Sample answer: 2(5+3) = 9 + 7 = 16 **1.** y≤-15; **2.** n<6; **3.** x≤-9; **4)** 15x+125 ≥ 600;x≥32 weeks; **5.** 6000-20d ≥ 5910;d≤4 days;

**Day 5: Equation** x=16; subtracted 10 when should have added 10 **Inequality** x>-32; flipped the inequality symbol when should not have

# Introduction to Functions

**Weekly Learning Outcomes:**

- **Determine the slope, *m*, as rate of change in a proportional relationship**
- **Graph a line representing a proportional relationship given the slope and an ordered pair, or given the equation in *y* = *mx*- form**
- **Determine the *y*-intercept, *b*, and write an equation in the form *y* = *x* + *b* to represent the relationship**
- **Graph a line representing an additive relationship given the *y*-intercept and an ordered pair, or given the equation in the form *y* = *x* + *b*, where *b* represents the *y*-intercept**
- **Make connections between and among representations of a proportional or additive relationship between two quantities using verbal descriptions, tables, equations, and graphs.**

---

**Day 1: Identifying slope (*m*) and *y*-intercept**
**Number Sense Routine:** Which one doesn't belong?

| | |
|---|---|
| **20% off of $25.00** | **20% tip on $25.00** |
| **7% tax on $25.00** | **25% of $25.00** |

I think _____ does not belong because _____

**Teaching: Finding the y-intercept**

**Finding the *y*-intercept from a table**

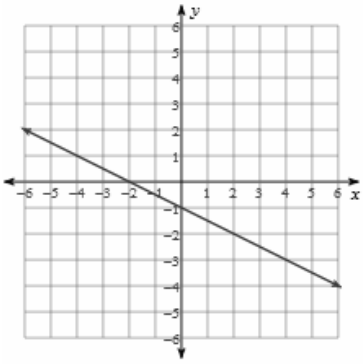
| *x* | *y* |
|---|---|
| -2 | 10 |
| -1 | 8 |
| 0 | 6 |
| 1 | 4 |

**Step 1**: See if there is a **0** in the x-column. The *y*-intercept is where the *x* value is zero. If not, use the pattern to find what zero would be.

**Step 2**: Identify the y-value to the right of the **0** (also known as the zero term!)

*That is your y-intercept!*
**(0, 6)**

**Finding the *y*-intercept from a graph**




**Step 1**: Find the y-axis (feel free to highlight it or put your finger on it).

**Step 2:** Find the point where the line crosses the *y*-axis.

**Step 3:** Write the *y*-value of that point.

*That is your y-intercept!*
**(0, -1)**

Finding the y-intercept from an **equation in slope-intercept form (*y* = m*x* + b)**

***y* = –4*x* - 6**

Find the number that comes **after** the variable *x* (also known as the *constant*).

*That is your y-intercept!* **(0, -6)**

## Teaching: Finding Slope

### Finding the slope from a table

| x | y |
|---|---|
| 5 | 10 |
| 8 | 8 |
| 11 | 6 |
| 14 | 4 |

**Step 1:** Choose two ordered pairs from the table.

**Step 2**: Identify the difference in the y's (Subtract the y's)

**Step 3**: Identify the difference in the x's (subtract the x's)

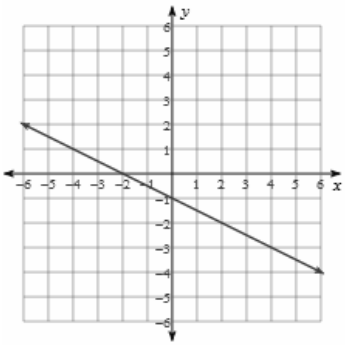
Put the y-difference over the x-difference (write as a fraction)

*That is your slope!*

***Don't forget to simplify!***

$$-\frac{-2}{3}$$

### From the slope from a graph



**Step 1**: Find two points on the graph

**Step 2**: Draw a line **up** and then **over** to connect the dots.

**Step 3**: Count the amount that is **rising up**.

**Step 4**: Count the amount that is **running over** (if going left, then the number is negative)**.**

**Step 5**: Create a fraction using the rise in the numerator and the run in the denominator.

*That is your slope!*

$$\frac{-1}{2}$$

Find the slope from an **equation in slope-intercept form (*y* = m*x* + b)**

***y= -4x - 6***

Find the number that is in front of the variable (*x)* (also called the *coefficient*) **-4**

*That is your slope (m = slope)!*

## Application

1. Identify the slope and *y*-intercept of the given equation

| | Slope | *y*-intercept |
|---|---|---|
| a. y = 3x + 4 | | |
| b. y = -2x + 8 | | |
| c. y= $\frac{1}{2}$x | | |
| d. y = - $\frac{3}{4}x - 1$ | | |

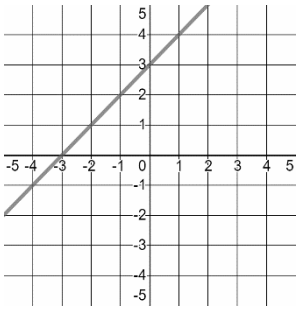
2. Find the slope and *y*-intercept

| x | y |
|---|---|
| -4 | 0 |
| 0 | -2 |

a) Slope: ____

b) *y*-intercept: ___

3. Find the slope and *y*-intercept



a) Slope: ____

b) *y*-intercept: ___

**Check & Reflect: Use page 36 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

**Day 2: Multiplicative Linear Equations**

**Number Sense Routine:** Fill in the blanks using the number 1-9, without repeating. Place each number into one of the blanks to find the largest possible result.

$$\square(\square+\square)$$

**Teaching: $y = mx$; $m =$slope**

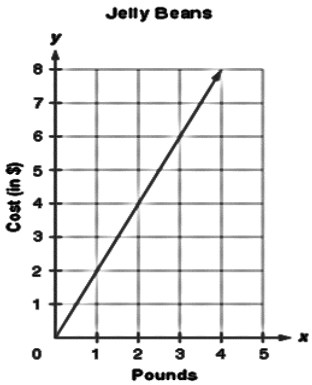
**From a table**: Cecil walks 3 meters every second. Does this relationship have a constant of proportionality (*the unit rate*)?

$$\frac{y}{x} = \frac{3}{1} = \frac{6}{2} = \frac{9}{3} = \frac{12}{4} = 3$$

| X (seconds) | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Y (meters) | 3 | 6 | 9 | 12 |

The table shows a proportional **relationship** of 3 which relates to the equation **y = 3x**

**From a graph:** This graph goes through the origin, which is a characteristic of a multiplicative equation. What is the equation of the graph?



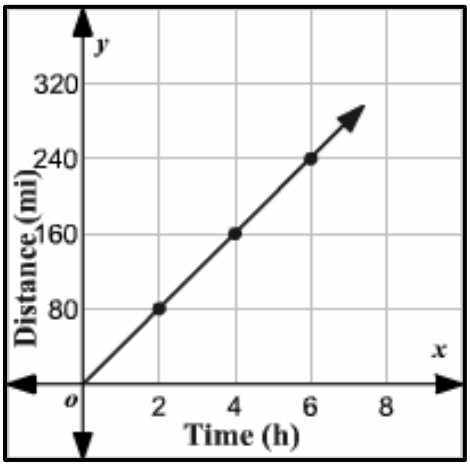

Identify the rate of change of the graph. 1 pound of Jellybeans cost $2.00, 2 pounds of Jelly Beans cost $4.00.

$$\frac{y}{x} = \frac{2}{1} = \frac{4}{2} = 2$$

The table shows a proportional **relationship** of 2 which relates to the equation **y = 2x**

**Application**

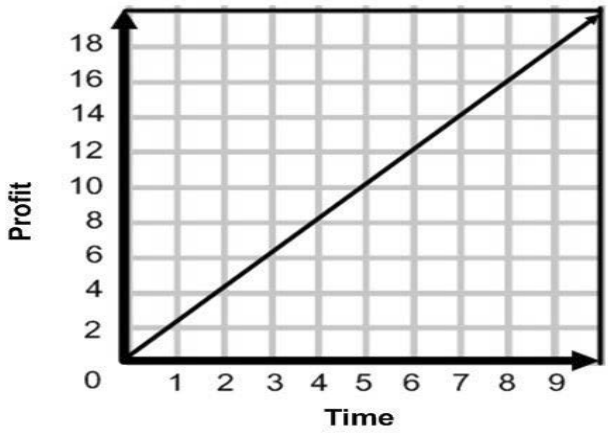
1. Danielle rode 80 miles in two hours on her scooter. She graphed her distances before stopping to rest. **Write an equation to represent Danielle's scooter ride.**



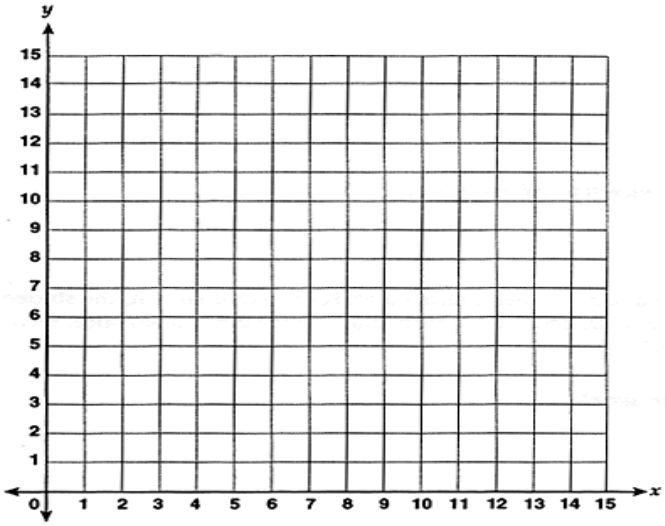

2. Kerry recorded the hours she rides her bike and the distance she travels over time in the chart below. **Write an equation to represent the relationship between the hours Kerry rides and the distance she travels.**

| **Hours (x)** | **1** | **2** | **3** | **4** |
|---|---|---|---|---|
| **Miles (y)** | **12** | **24** | **36** | **48** |

3. The graph displays the relationship between time and profit at Mr. Minor's auto repair shop. Write an equation to represent the relationship between time and profit.




4. Mrs. Mirzayan decides to go bowling. It costs $5.00 per game. This can be represented by the equation $y = 5x$. Graph this relationship.




**Check & Reflect: Use page 36 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

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**Day 3: Additive Linear Equations**

**Number Sense Routine:** Fill in the blanks using numbers $-4$ **through** $4$, without repeating, place a number into each of the blanks so $12$ is a solution to the inequality.

$$\square x < \square$$

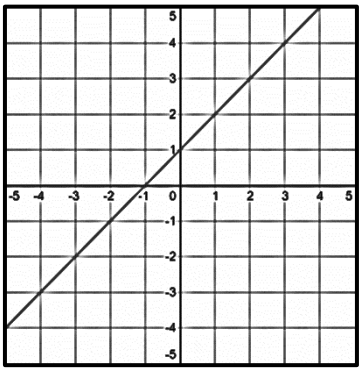
**Teaching:** Equation: ***y = x + b*** *b = y-intercept* , the slope(m) = 1

**From a table - Additive Relationships** are represented by the equation y = x + b. Ask yourself, "What do I need to **add** or **subtract** from x to get y?

The table shows an **additive** relationship of 2 which relates to the equation **y = x + 2**

| x | | y |
|---|---|---|
| 1 | + 2 → | 3 |
| 2 | + 2 → | 4 |
| 3 | + 2 → | 5 |

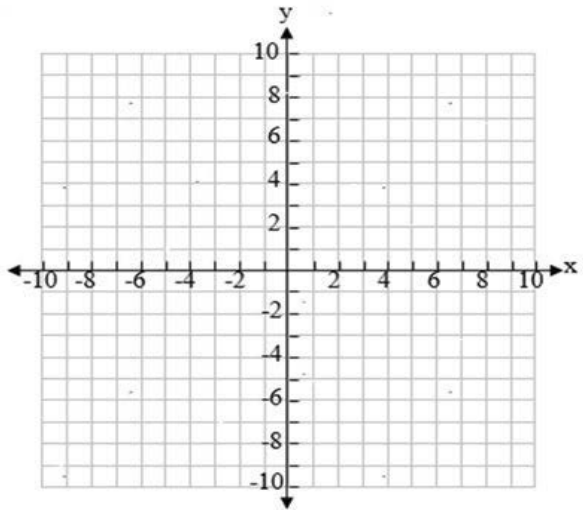
**From a graph -** Ask yourself, "Where does the graph cross the y axis?"



The graph shows an **additive** relationship of 1 which relates to the equation **y = x + 1**

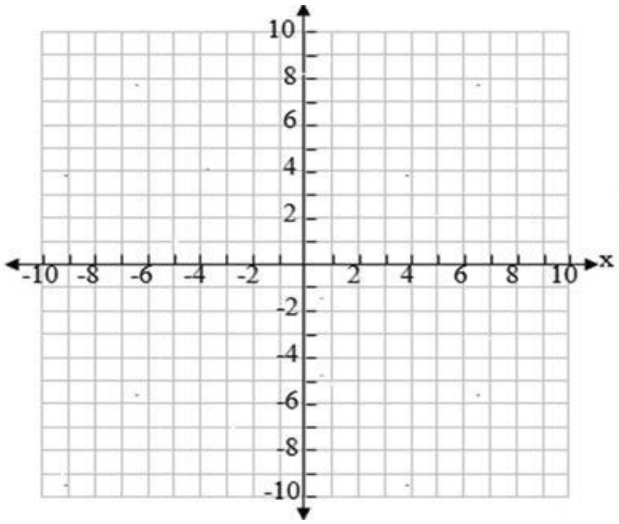
## Application

1. A line passes through points (-1, -5) and has a y-intercept of –4. Create a graph for the additive relationship.




2.The table represents an additive relationship. Create a graph and identify the y- intercept.

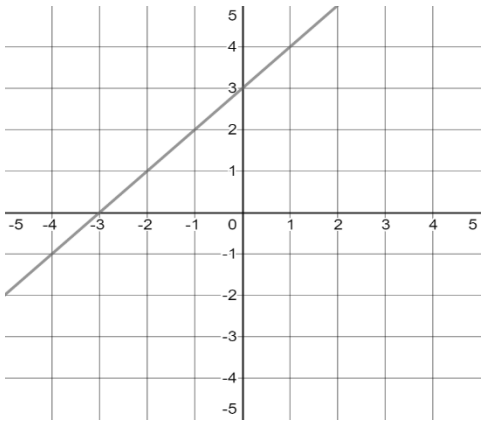
| x | y |
|---|---|
| -2 | -5 |
| 3 | 0 |




3. Use the table to determine the relationship between the values. Write your answer in the form of an equation.

| x | y |
|---|---|
| 10 | 2 |
| 11 | 3 |
| 12 | 4 |
| 13 | 5 |

4. Kathy has $3 in the bank and deposits $1 every day. What equation can represent this situation.




**Check & Reflect: Use page 36 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

## Day 4: Graphing Linear Equations

**Number Sense Routine:** Alike and Different

| | |
|---|---|
| $2x = 10$ | $2x < 10$ |

These are alike because _____

These are different because _____

**Teaching – For more support, consider watching this optional video: https://bit.ly/3cQjxMM**

**Strategy #1: Create a table of values that satisfy the equation**

**Example: Graph $y = 2x$**
1: Create a table
2: Choose the x values
3: Substitute x values into the equation for the y value
4: Record the points in the final column

| x | $y = 2x$ | y | (x, y) |
|---|---|---|---|
| -1 | $y = 2(-1)$ | -2 | (-1, -2) |
| 0 | $y = 2(0)$ | 0 | (0, 0) |
| 1 | $y = 2(1)$ | 2 | (1, 2) |

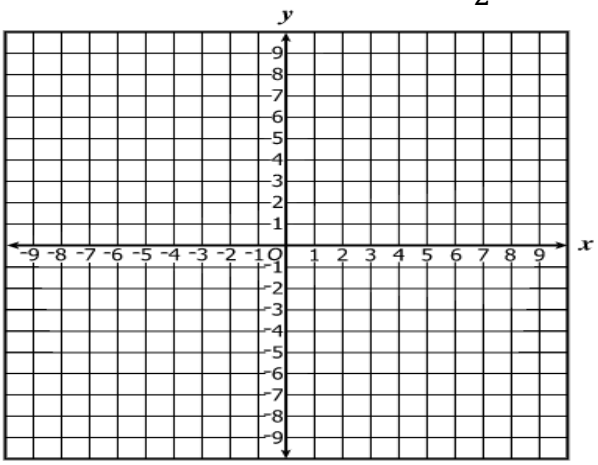
**Strategy #2: Use the slope and y intercept.**

**Example: Graph $y = x - 3$**

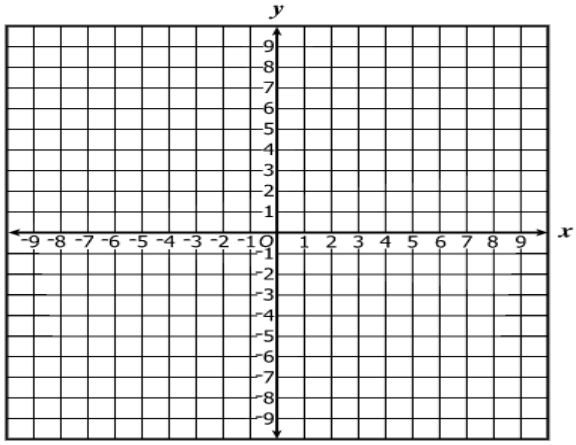
In this equation you can identify the y-intercept as -3, and the slope is 1. To graph this, plot the y intercept on the graph and apply the slope of 1 to create additional points on the graph.

**Application**

1) Graph the equation $y = \frac{1}{2}x$




2) Graph the equation $y = x - 5$

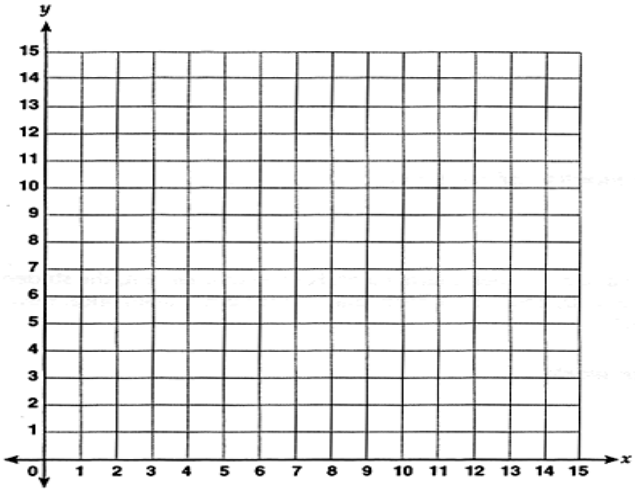



**Check & Reflect: Use page 36 to check your answers. What did you get correct? Can you work it a different way? What was incorrect? Can you find your mistake? What can you do differently?**

## Day 5: Weekly Reflection

Taylor buys candy at the store that costs $1.50 per candy bar. Create a table that could represent Taylor's cost per candy bar. Graph those points on the graph and create a rule (equation) that represents the relationship. Explain how you created the table and created the rule.

| Table | Graph | Rule |
|---|---|---|
| |  | |

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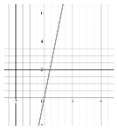
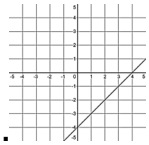
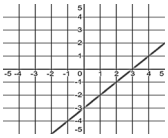
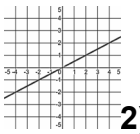
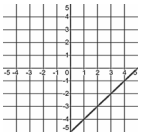
**Answer Guide: Day 1: NSR:** Sample answers: First one because the answer is 20 and you are subtracting. Second one because the answer is 30 and you are adding. Third one because the answer is 26.75 and you are adding. Fourth on because the answer is 18.75 and you are subtracting. **1a.**.slope = 3; y-intercept = 4 **1b.** slope= –2; y-intercept = 8 **1c.** slope = $\frac{1}{2}$; y-intercept = 0 **1d.** slope = $-\frac{3}{4}$; y-intercept = –1 **2**a. $-\frac{1}{2}$ **2b.** -2 **3a.** 1 **3b.** 3

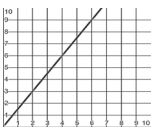
**Day 2: NSR:** 9(8+7) **1.** y=40x **2.** y=12x **3.** y=2x **4.** 

**Day 3: NSR:** Sample answer: Using -4 and 1, one possible answer is -4X < 1 **1.**  **2.** 
(0, -3) **3.** y=x-8 **4.** y=x+3

**Day 4: NSR:** Sample answers: You solve both by dividing by two. Different: One is an equation and the other is an inequality. **1)**  **2)** 

**Day 5:**

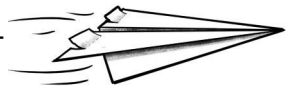
| X | y |
|---|---|
| 1 | $1.50 |
| 2 | $3.00 |
| 3 | $4.50 |

 $y = 1.50x$

SUMMER LEARNING QUEST:

# Paper Airplane Challenge

Have you ever made a paper airplane? A piece of paper can be turned into lots of different things. You can make them fly — all depending on how you design and fold the material.

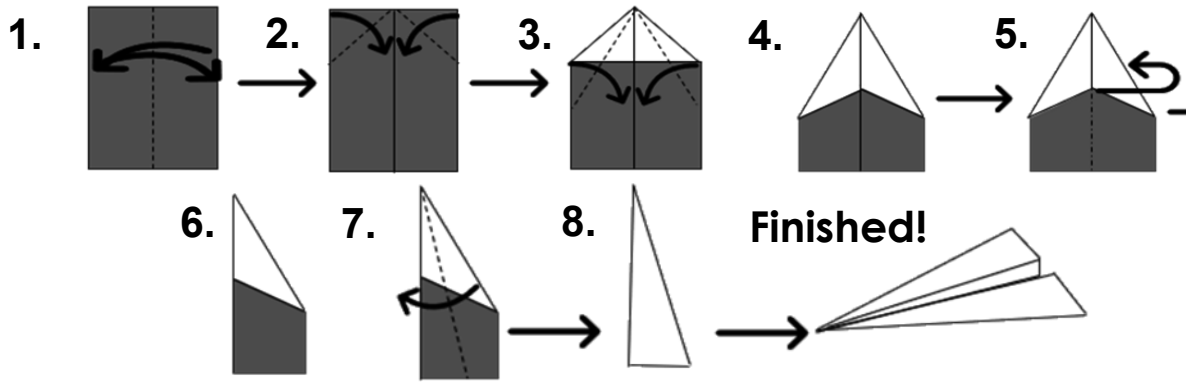


## How can you design a paper airplane that can fly as far as possible?

### Task Guidelines:

- Use one piece of paper per design.
- Try at least two designs.
- Consider using the steps below for your first design, then experiment on your second design idea.

**DESIGN #1: Remember our directions from the Language Arts packet?** Follow the same steps to make a paper airplane. Take your time and make nice folds like you are in art class!




**DESIGN #2: Plan for your own design:** Make a detailed drawing of your unique airplane design. Consider the steps and folds you want to take to create the best airplane. Use the space below. Then create your unique airplane.

**Go to the next page to test and revise your airplane design!**

**Test:** Find a place to test your airplane. For example, a sidewalk with adult permission.

- Measure the distance in steps or count sidewalk boxes.
- Adjust how hard or soft you throw the plane
- Try your test several more times. Did you get the same results? Which design worked best?

## How far did it go?

| Test 1 | Test 2 | Test 3 |
|---|---|---|
| On the first try, it went: | One the second try, it went: | On the third try, it went: |

**Improve:** Use this chart to think about your ideas

| What worked well? | What didn't work? |
|---|---|
| | |

**My ideas to improve my design**

- What ideas do you have to make your plan fly farther?
- Did your plane fly straight down the sidewalk? What changes can you make for it to fly more straight?

### Share your work with someone:

- Ask about any designs they may know of.
- What makes them think of that idea?
- What tips do they have that could help?

### Think about your work:

What did you like best?

What could you make better?

What is unique about your design?

## Questions and ideas to take this project further:

- Test your revised plane. How far did it fly? Estimate and then measure the distance.
- Did your plane fly straight? How do you know?
- Try new variations of paper airplane designs. Look here for ideas https://howthingsfly.si.edu/activities/paper-airplane
- Learn about flight https://howthingsfly.si.edu or see examples of flight in nature https://bit.ly/CCSSKZV.

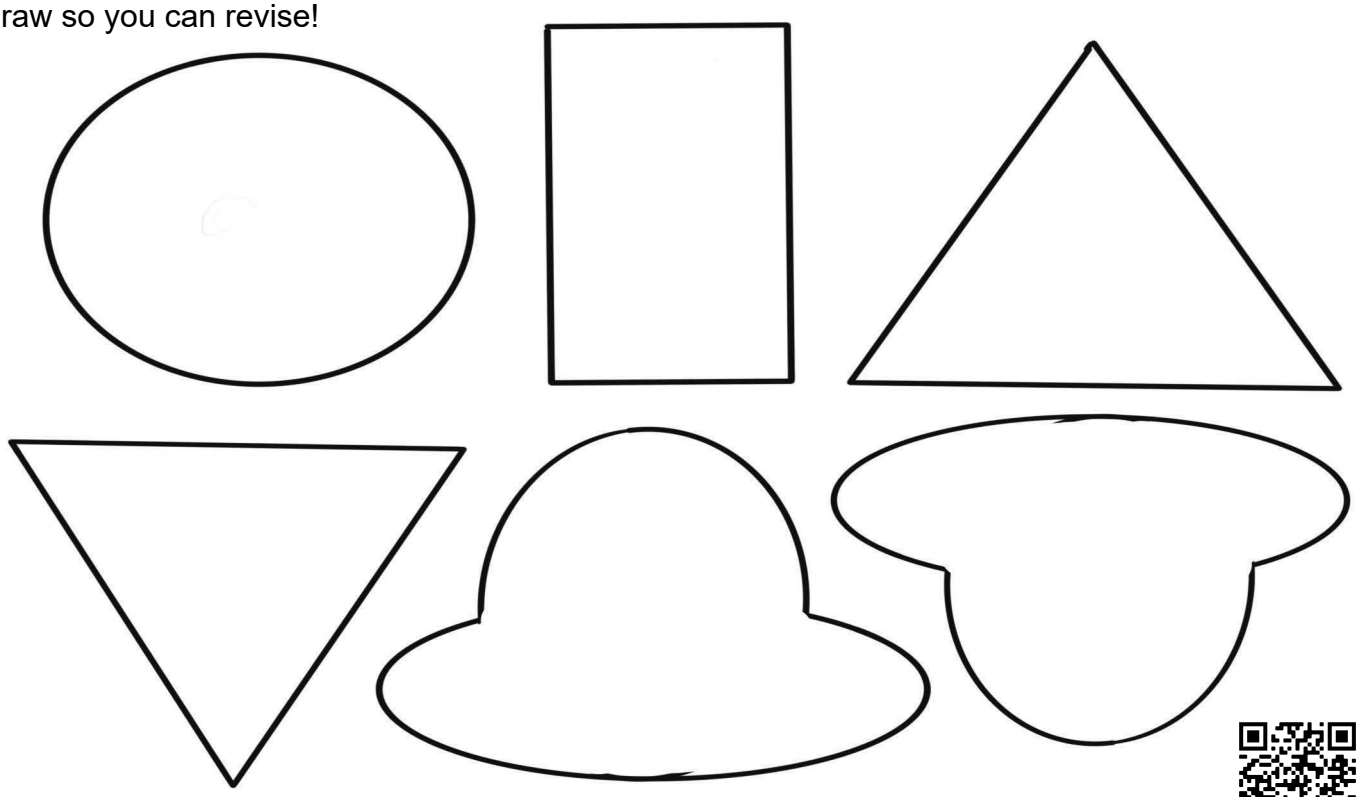
# SUMMER LEARNING QUEST:
# CARTOONING WITH SIMPLE SHAPES

**Critical and creative thinkers can create unique ideas.**

Take a look around! What shapes do you see?
Most things are made up of simple shapes– from tables, to televisions, to plants, and even our phones.
Today we're going to use the simple shapes to build creativity and have fun!

## How can you, as a cartoonist, create unique characters from simple shapes?

Your task: Use the shapes below to create characters. Be creative and use a light touch as you draw so you can revise!



To go even deeper into cartooning with shapes, visit: https://bit.ly/shapecartooning

**Reflect: Which of your designs is best? Why? What could you do to make it even better?**

## Ideas to take it further:

- Give your favorite design a name
- Now that you know your design is made from a basic shape, consider making the same character again. This time, add emotion by changing the eyebrows, eyes and mouth! (Try happy, angry, surprise, sadness, disgust and scared)
- Remember– you can do this anytime! Just draw shapes and start creating!

## SUMMER LEARNING QUEST:
# WHAT SHOULD YOU KNOW ABOUT COVID-19?

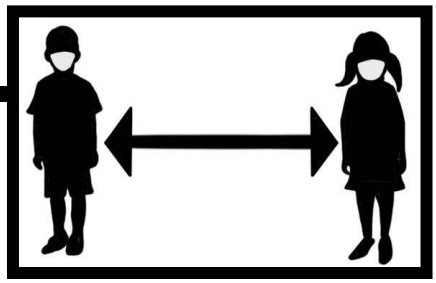
**What can I do to prevent spreading COVID-19?**

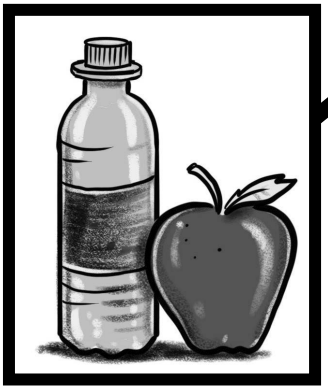
**Wear a mask or face covering when in crowded places.**


**Wash your hands with warm soap and water for 20 seconds.**

**Avoid touching your face.**

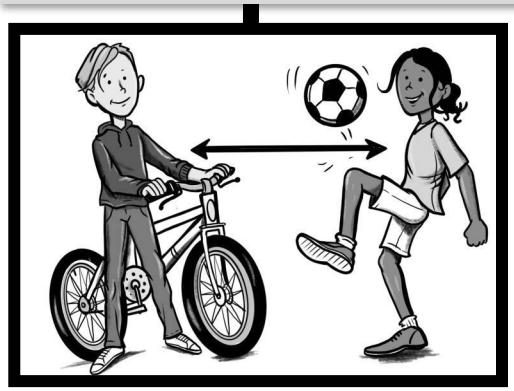

**Practice social distancing by staying at least six feet away from people who do not live with you.**





**Keep yourself healthy by exercising, eating fruits and vegetables, and getting enough sleep.**

**It's OK to play outside if you stay at least 6 feet away (about 3 BIG steps) from other people that you do not live with.**



**Stay home if you are sick, ask others to do the same.**
**If someone who lives with you is sick, try to stay away from them.**

**Look at the back cover of the Language Arts practice book to learn more about COVID-19!**

Information Sources: Centers for Disease Control and Prevention, Mayo Clinic, Nemours Children's Hospital 