TEKSING TOWARD STAAR

MATHEMATICS®

GRADE 8

TEKS/STAAR-BASED

LESSONS

TEACHER GUIDE

Scope and Sequence
Six Weeks 1

SIX WEEKS 1

Lesson	TEKS-BASED LESSON	STAAR Category Standard	Spiraled Practice	Student Activity	Problem Solving	Skills and Concepts Homework
Lesson 1 ____ days	**8.2A**/extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers.	Category 1 Supporting	SP 1 SP 2	SA 1 SA 2	PS 1 PS 2	Homework 1 Homework 2
Lesson 2 ____ days	**8.2B/**approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line	Category 1 Supporting	SP 3 SP 4	SA 1 SA 2	PS 1 PS 2	Homework 1 Homework 2
Lesson 3 ____ days	**8.2D/**order a set of real numbers arising from mathematical and real-world contexts	Category 1 Readiness	SP 5 SP 6	SA 1 SA 2	PS 1	Homework 1 Homework 2
Lesson 4 ____ days	**8.10A/** generalize the properties of orientation and congruence of ….dilations of two-dimensional shapes on a coordinate plane **8.8D/**use informal arguments to establish facts about …the angle-angle criterion for similarity of triangles **8.3A/**generalize the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation	Category 3 Supporting Category 3 Supporting Category 3 Supporting	SP 7 SP 8	SA 1 SA 2 SA 3	PS 1 PS 2	Homework 1 Homework 2
Lesson 5 ____ days	**8.8A/**write one-variable equations and inequalities with variables on both sides that represent problems using rational number coefficients and constants **8.8C/**model and solve one-variable equations with variables on both sides that represent mathematical and real-world problems using rational number coefficients and constants	Category 2 Supporting Category 2 Readiness	SP 9 SP 10 SP 11	SA 1 SA 2 SA 3	PS 1 PS 2	Homework 1 Homework 2
Lesson 6 ____ days	**8.6A/**describe the volume formula $V = Bh$ of a cylinder in terms of its bases area and its height **8.6B/**model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect the relationship to the formula **8.7A/**solve problems involving the volume of cylinders, cones…	Category 3 Supporting NOT TESTED Category 3 Readiness	SP 12 SP 13	SA 1 SA 2 SA 3	PS 1 PS 2 PS 3	Homework 1 Homework 2

SIX WEEKS 1

Lesson	TEKS-BASED LESSON	STAAR Category Standard	Spiraled Practice	Student Activity	Problem Solving	Skills and Concepts Homework
Lesson 7 _____ days	**8.2C/**convert between standard decimal notation and scientific notation	Category 1 Supporting	SP 14 SP 15	SA 1 SA 2	PS 1	Homework 1 Homework 2
Lesson 8 _____ days	**8.8D/**use informal arguments to establish facts about the angle sum and exterior angles of triangles…	Category 3 Supporting	SP 16 SP 17	SA 1 SA 2	PS 1	Homework 1 Homework 2
Lesson 9 _____ days	**8.5A/**represent linear proportional relationships with tables…, **8.5E/**solve problems involving direct variation	Category 2 Supporting Category 2 Supporting	SP 18	SA 1 SA 2 SA 3	PS 1 PS 2	Homework 1 Homework 2
Lesson 10 _____ days	**8.12A/**solve real-world problems comparing how interest rate and loan length affect the cost credit	Category 4 Supporting	SP 19 SP 20	SA 1 SA 2	PS 1	Homework 1
Review Assessment 2 days	**Six Weeks 1 Open-Ended Review** **Six Weeks 1 Assessment**					

TEACHER NOTES:

Materials List

GRADE 8 MATERIALS LIST - SIX WEEKS 1

SIX WEEKS	LESSON	ITEM	QUANTITY
1	1	Math Notes Page Problem-Solving Plan Problem-Solving Questions Page	1 per student 1 per student 1 per student
1	2	Irrational Number Cards (copy on cardstock. Cut apart and put Irrational Number Cards in one zipper gallon plastic bag and w the 0, -10 and 10 cards in a snack size bag). Adding machine tape or blue painter tape	1 set 15-20 feet
1	3	Real Number Cards and Blank Number Cards (copy on cardstock, cut out, and laminate.) Put in a baggie. Wide blue painter's tape line. Ticky tack or tape to tape number cards on number line	1 set 15-20 feet 2 per pair of students
1	4	protractor ruler $\frac{1}{4}$-inch grid paper colored pens or pencils	1 per student 1 per student 1 per student 1 set per pair of student
1	5	Equation Cards (copy on cardstock cut apart and put in baggie Solution Set Cards (copy on cardstock, cut apart and put in baggie. white paper	1 set per Group of 4 students 1 set per pair of students 1-2 sheets per pair of students
1	6	No Materials Needed	
1	7	Scissors glue sticks colored construction paper (11 by 18) collection of newspapers, magazines, and old science books that may be cut up	1 per group of 4 students 1 per group of 4 students 1 per group of 4 students 1 per group of 4 students
1	8	Protractor	1 per student

GRADE 8 MATERIALS LIST - SIX WEEKS 1

1	9	Table Cards (copy on cardstock, cut apart and put in a baggie) Equation Cards (copy on cardstock, cut apart and put in a baggie) calculator	1 set per pair of students 1 set per pair of students 1 per student
1	10	No materials needed	

Mini-Assessment Answer Key

GRADE 8 TEKS-BASED ASSESSMENTS – SIX WEEKS 1
TEKS Correlation and Answer Key for Mini-Assessments

Mini-Assessment And TEKS Assessed	Question Number									
	1	2	3	4	5	6	7	8	9	10
Lesson 1 8.2A	D	G	D	J	C	G	B	J	B	F
Lesson 2 8.2B	B	H	B	J	C	F	A	H	A	G
Lesson 3 8.2D	C	J	D	G	C	J	C	J	C	J
Lesson 4 8.10A/8.8D/8.3A	A 8.3A	F 8.10A	D 8.8D	J 8.3A	D 8.8D	J 8.3A	A 8.10A	G 8.10A	C 8.3A	H 8.8D
Lesson 5 8.8A/8.8C	B 8.8A	G 8.8C	B 8.8C	H 8.8A	A 8.8A	3 8.8C	D 8.8C	F 8.8C	D 8.8C	F 8.8A
Lesson 6 8.6A/8.6B/8.7A	A 8.6A	F 8.7A	C 8.6B	F 8.6B	B 8.7A	18 8.7A	D 8.7A	5 8.7A	A 8.6A	H 8.6A
Lesson 7 8.2C	C	G	C	2150	B	H	C	G	A	G
Lesson 8 8.8D	D	G	D	H	C	H	D	H	D	G
Lesson 9 8.5A/8.5E	B 8.5A	J 8.5E	B 8.5A	G 8.5E	C 8.5E	135 8.5A	C 8.5A	H 8.5A	C 8.5E	F 8.5E
Lesson 10 8.12A	B	J	D	H	A	G	A	H	A	4317.6

Six Weeks 1
Lesson 1

8.2A Lesson and Assessment

Lesson Focus

For TEKS 8.2A, students should be able to demonstrate an understanding of how to represent and manipulate numbers and expressions. Students are expected to apply mathematical process standards to represent and use real numbers in a variety of forms.

Students are also expected to extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers.

Process Standards Incorporated Into Lesson

8.1B Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution

8.1D Communicate mathematical ideas, reasoning and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate

8.1F Analyze mathematical relationships to connect and communicate mathematical ideas

Materials Needed for Lesson

1. **Math Background**
   Per Student: 1 Math Notes page

2. **Problem Solving 1**
   Per Student: 1 copy of Problem-solving Plan for math notebook, 1 copy of Problem-solving Questions

3. **Per Student:** 1 copy of all pages for student activities for this lesson, Skills and Concepts Homework, and mini-assessment for this lesson

Math Background-Understanding Real Numbers

A group of items or numbers is called a set. A part of that set is called a **subset**. The set of numbers we use in our every day lives is the set of real numbers. These are the numbers that are located on a number line. One subset of the real numbers is the set of whole numbers. **Whole numbers** are the numbers 0, 1, 2, 3, 4… Each of these numbers has an opposite 0, -1, -2, -3, -4… When the whole numbers and their opposites are joined together the set of **integers** is created.

The set of integers are indicated in set notation as {…-4, -3, -2, -1, 0, 1, 2, 3, 4…}.

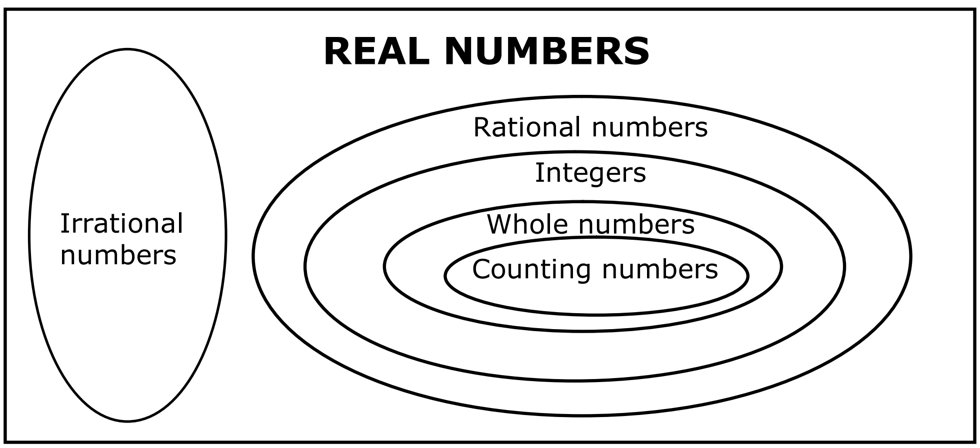
If zero is removed from the set of whole numbers, the set of **natural numbers** or **counting numbers** is created. The natural numbers can be indicated in set notation as $\{1, 2, 3, 4, 5, 6, 7, ...\}$.
The whole numbers, counting numbers, and integers are all subsets of a larger set called the rational numbers. When a number of the form $\frac{a}{b}$ is created where *a* and *b* are both integers but $b \neq 0$, then

the set of **rational numbers** is created. For example, the ratio of 3 to 5 creates $\frac{3}{5}$, so $\frac{3}{5}$ is a rational number. The ratio of 20 to 2 creates $\frac{20}{2}$ or 10 which is a whole number as well as a rational number. A mixed number like $5\frac{1}{2}$ is a rational number because it can be rewritten as an improper fraction, $\frac{11}{2}$, which is the ratio of two integers.

The real numbers, which are all the numbers on a number line, are divided into 2 large subsets. The **rational numbers** and the **irrational numbers**.

The irrational numbers are made up all numbers that CANNOT be expressed as a ratio of two integers. Some irrational numbers are numbers like $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$ and π. Any decimal that does NOT terminate and does NOT repeat is an irrational numbers. For example, 5.123456… is an irrational decimal. A repeating decimal has a block of one or more digits that repeats indefinitely. These decimals, such as 0.3333333…. or 4.1212121212….are rational decimals.

The relationship between these sets of subsets of the real numbers can be shown with a Venn diagram.



This diagram shows that the rational numbers and the irrational number are disjointed. They do NOT share any numbers. The prefix Ir means "not" so irrational means not rational.

In determining if a radical number such as $\sqrt{a}$ is an irrational number or a rational number, be sure to simplify it first. If the number *a* is a perfect square number, then the radical will simplify into an integer. For example, if $b^2 = a$ and *b* is an integer, then a is a perfect square number and $\sqrt{a} = b$ and $-\sqrt{a} = -b$.

Example: Is $\sqrt{25}$ an irrational or rational number?

Since $5^2 = 25$, then 25 is a perfect square and $\sqrt{25} = 5$. 5 is rational number.

Therefore, $\sqrt{25}$ is a rational number.

Example: Is $\sqrt{90}$ an irrational or rational number?

Since 90 is between 81 and 100, then $\sqrt{90}$ is between 9 and 10. Since there are no integers between 9 and 10, $\sqrt{90}$ is a decimal. Using your calculator, find the decimal approximation the calculator will give you for $\sqrt{90}$. The calculator will give 9.486832981…. depending upon how many decimal places you request.

Therefore, $\sqrt{90}$ is an irrational number that can be approximated with the rational number 9.5 or 9.49.

Identifying Number Sets Used in Real-World Situations

Numbers used in real-world situations can be rational numbers or irrational numbers.

Example: The number of dollar bills in a person's wallet

Whole numbers This set best describes the number of dollar bills because the person may have 0, 1, 2, 3, … dollar bills in his wallet.

Example: The length of a side of a square with an area of 25 square feet

Whole Number Since the formula for the area of a square is $s^2 = A$, then $s = \sqrt{A}$ (take square root of both sides but use only the positive or principal root since length has to be positive.)
$s = \sqrt{25} = 5$ and 5 is a whole number.

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If the square root of a whole number is rational, then its prime factorization can be divided into two equal sets.

Example: $\sqrt{144}$ is rational because the prime factorization of 144 is $(3 \times 2 \times 2)(3 \times 2 \times 2)$. Since the two sets are identical, the $\sqrt{144} = 3 \times 2 \times 2 = 12$, which is a whole number and thus rational.

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rational number. The ratio of 20 to 2 creates $\frac{20}{2}$ or 10 which is a whole number and also a rational number.

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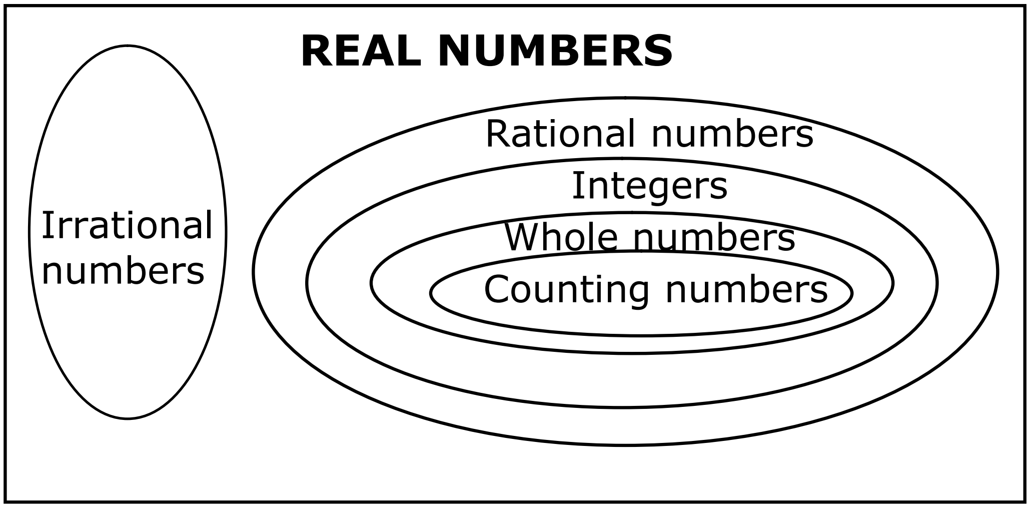

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Therefore, $\sqrt{90}$ is an irrational number that can be approximated with the rational number 9.5 or 9.49.

Problem-Solving Model

Step	Description of Step
1	**Analyze the given information.** • Summarize the problem in your own words. • Describe the main idea of the problem. • Identify information needed to solve the problem.
2	**Formulate a plan or strategy**. • Draw a picture or diagram. • Guess and check. • Find a pattern. • Act it out. • Create or use a chart or table. • Work a simpler problem. • Work backwards. • Make an organized list. • Use logical reasoning. • Brainstorm. • Write a number sentence or an equation
3	**Determine a solution.** • Estimate the solution to the problem. • Solve the problem.
4	**Justify the solution.** • Explain why your solution solves the problem.
5	**Evaluate the process and the reasonableness of your solution.** • Make sure the solution matches the problem. • Solve the problem in a different way.

Problem-Solving Questions

Directions:
- **Work with a partner.**
- **Write your answers on notebook paper.**
- **Answer questions 1-3.**
- **Complete the solution to the problem(s).**
- **Answer questions 4-10.**

1. What is the main idea of this problem?

2. What are the supporting details in this problem?

3. What skills, concepts, and understanding of math vocabulary are needed to be able to answer this problem?

4. Did this problem involve mathematics arising in everyday life, society, or the work place?

5. What is a good problem solving strategy for this problem?

6. Can you explain how you used any math tools, mental math, estimation, or number sense to solve this problem?

7. Did this problem involve using multiple representations (symbols, diagrams, graphs, math language)?

8. Did you use any relationships to solve this problem?

9. How can you justify your solution to the problem?

10. How can you check for reasonableness of your solution to this problem?

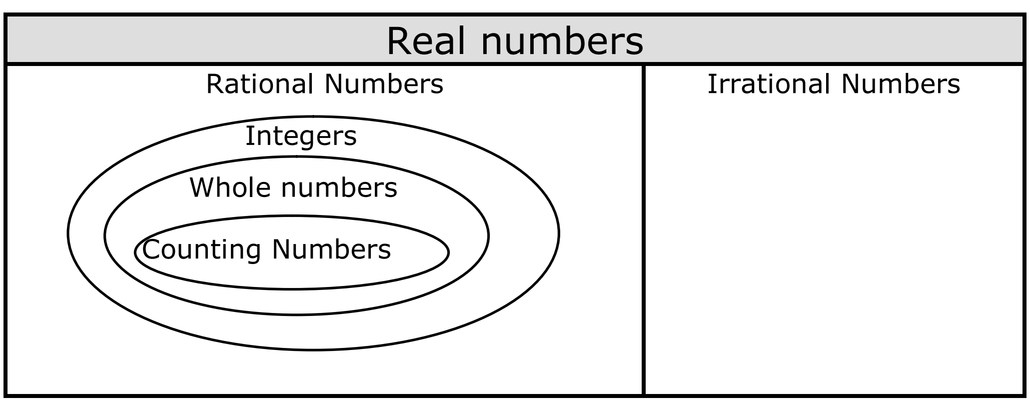
Problem-Solving 1

Problem 1: Which of the following statements are true? Use T or NT.

______1. All integers are rational numbers.
______2. Any rational number can be expressed as the ratio of two integers.
______3. If a decimal does not terminate, it is an irrational number.
______4. Some integers are irrational numbers.
______5. The set $\{8,\ 8.5,\ \sqrt{10},\ -23\}$ are all rational numbers.
______6. The set $\{-3,\ 19,\ 20,\ 0,\ -1\}$ are all integers.

For any statement you listed as NT, explain your reasoning.

Problem 2: Place -6, 0, $\sqrt{7}$, $\dfrac{12}{4}$, $-3\dfrac{1}{2}$ and $0.\overline{45}$ in the appropriate place on the Venn diagram.



Student Activity 1

Work with your partner to answer the following questions.

Problem 1: Complete the following statements by filling in the blank with an appropriate word or words.

A set of numbers is a __________ of numbers.

A subset is a ___________ of a set.

The set {1, 2, 3, 4, 5, 6, …} is called the set of ______________ ____________.

The set {…-6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, …} is called the set of ______________.

The set of numbers that can be expressed as the ratio of two integers is the set of ___________ numbers.

A non-terminating, non-repeating decimal is a(n) ____________________ number.

A repeating decimal is a decimal that ________________________ and is a(n) _________ number.

4.01020304…. is a ____________________, _________________ decimal and is a __________ number.

Problem 2: Place a √ in each column that names a set the given number belongs to.

	Irrational Number	Rational Number	Integer	Whole Number	Counting Number
-16					
0					
1.5					
$\frac{21}{4}$					
$-\sqrt{42}$					
$-35\frac{2}{3}$					
$1{,}250$					
$0.\overline{12}$					
3.11121314…					
$-8.\overline{4}$					

Problem 3: Name 3 decimals that are irrational.

__________ __________ ___________

Problem 4: Name 3 radical numbers that are irrational.

__________ __________ ___________

Problem 5: Name a rational number that would be between 3 and 3.1 on a number line. ________

Name an irrational number that would be between 3 and 3.1 on a number line.

Problem 6: Draw a Venn diagram that shows the relationship of the subsets of the real numbers.

Real Numbers

Problem 7: Place the following numbers in the appropriate set on the Venn diagram you drew in Question 6.

218 -4 1.1 $\frac{21}{3}$ $\sqrt{3}$ 125 $0.\overline{4}$ $-2\frac{1}{2}$

$-4.\overline{3}$ $2.3031323334\ldots$ π $\pi + 6$ $\sqrt{49}$ $-3 + \sqrt{16}$

Problem 8: Identify each statement below as T(true) or NT(not true).

______1. All prime numbers are integers.

______2. All decimals are rational numbers.

______3. All whole numbers are counting numbers.

______4. All whole numbers are integers.

Problem 9: Name 2 counting numbers that will be between 3 and 6.5 on a number line.
_________ and ___________

Name two radical numbers that would be between 4 and 5 on a number line.
___________ and __________

Problem 10: Using a C for counting numbers, W for whole numbers, I for integers, R for rational numbers, and IR for irrational numbers identify all the sets of numbers that have members in the given set.

$\{-1,\ -3,\ -14,\ -13\}$ ____________________

$\left\{\frac{22}{7},\ 3.\overline{14},\ \sqrt{41},\ 0\right\}$ ____________________

$\left\{-20,\ -1.1,\ \frac{4}{3},\ -3,\ 2.121121112...\right\}$ ________________

Problem 11: Read each statement below. Decide if the statement is true or false. If it is false, give an explanation for your decision.

- If a number is negative, it is an integer.____

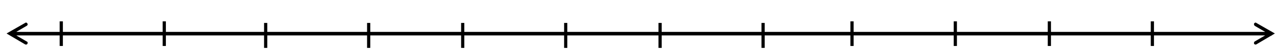
  ____.

- If a decimal is irrational, it can not be written exact. _____________________________________

  ____.

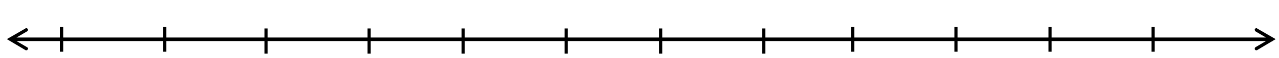
Problem 12: Place the following numbers on the number line below.

$$\left\{-4,\ 3\frac{2}{3},\ \sqrt{6},\ 2.5,\ \frac{2}{5},\ \frac{-11}{3}\right\}$$



Problem 13: Place the following numbers on the number line below.

$$\left\{-2,\ 1\frac{1}{3},\ \sqrt{16},\ \sqrt{24},\ \frac{1}{4},\ \frac{-12}{3}\right\}$$



Understanding Number Sets in Real-World Situations

Numbers used in real-world situations can be rational numbers or irrational numbers. However, irrational numbers are often approximated with a rational number to do calculations. For example, if the circumference of a circle is 16π inches, a carpenter would approximate it by using a rational substitution for π. Depending on the accuracy needed, he could use 3 or 3.14 or 3.14156.

Example: The number of dollar bills in a person's wallet

Whole numbers This set best describes the number of dollar bills because the person may have 0, 1, 2, 3, … dollar bills in his wallet.

Example: The length of a side of a square with an area of 25 square feet

Whole Number Since the formula for the area of a square is $s^2 = A$, then $s = \sqrt{A}$ (take square root of both sides but use only the positive or principal root since length has to be positive.)
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If the square root of a whole number is rational, then its prime factorization can be divided into two equal sets.

Example: $\sqrt{144}$ is rational because the prime factorization of 144 is $(3 \times 2 \times 2)(3 \times 2 \times 2)$. Since the two sets are identical, the $\sqrt{144}$ = $3 \times 2 \times 2 = 12$, which is a whole number and thus rational.

Problem-Solving 2

Problem 1: Identify the set(s) of numbers that best describe the situations below.

- Numbers used in an area code

____

- Score for the home team in soccer

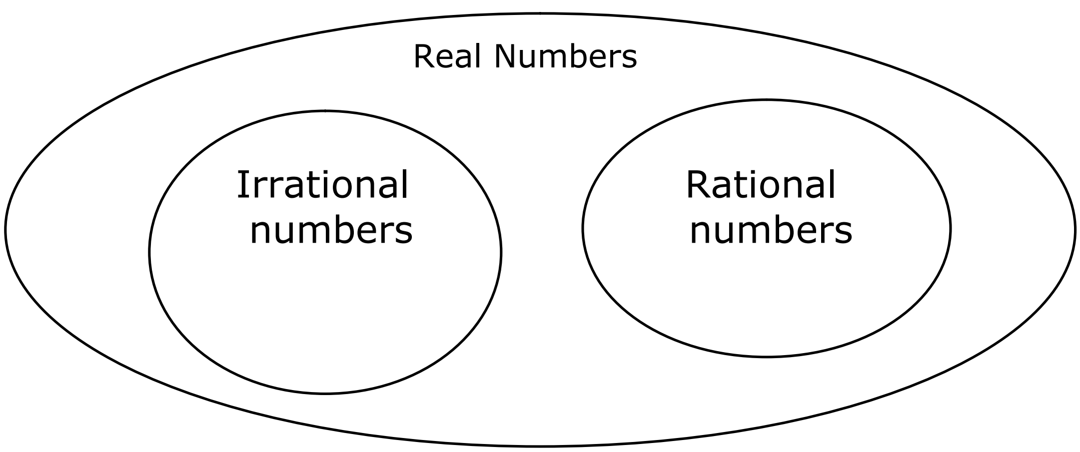
____

- Length of a side of a square with area *A*

____

Problem 2: Place the square root of each counting number 1-18 on the Venn diagram below.

Square Roots of Counting Numbers 1-18



Student Activity 2

Work with your partner to answer the following questions.

Problem 1: Identify the set of numbers that best describes each situation.

- The height of an airplane as it descends to land
- The number of free throws made by the school's basketball team in their last game
- A board game has a spinner with 3 sections- Lose your Turn, Move Forward, and Move Backward and a number cube with the numbers 1-6. The number of moves you make after a spin and a roll
- The length of a side of a square whose area is a whole number between 10 and 15 square units.
- The whole numbers and their opposites
- The balance in a person's check register
- The amount of water in a rain gauge after a rain storm

Problem 2: How can you show the relationship among the subsets of the real numbers?

Problem 3: Fill in the following graphic organizer with the following numbers: Place the number in all the sets it belongs to.

$$\left\{0,\ -12,\ \sqrt{32},\ \frac{3}{4},\ 50\%,\ -1.2,\ 3.12345...,\ 0.\overline{8},\ 125\right\}$$

<table>
<tr><th colspan="2">Real Numbers</th></tr>
<tr><td>Rational Numbers</td><td rowspan="4">Irrational Numbers</td></tr>
<tr><td>Integers</td></tr>
<tr><td>Whole Numbers</td></tr>
<tr><td>Counting numbers</td></tr>
</table>

Problem 4: Name a negative number that is not an integer. ______________________

Problem 5: Name a negative number that is irrational.

Problem 6: What do you think the repeating decimal 0.999999…. represents?

Problem 7: Circle the irrational numbers below.

$\sqrt{64}$	1.213141	1.213141…
$\sqrt{72}$	8.1	3π
$-0.1234...$	$\frac{\sqrt{3}}{2}$	$\pi + 4$

Problem 8: To find the ratio of integers that a repeating decimal represents, look at the steps below.

Find the ratio of integers to represent 0.12121212….

Let $x = 0.12121212...$ Since there are two repeating digits, we multiply both sides by 100.

$100x = 12.121212...$

$$\begin{aligned} 100x &= 12.12121212.... \\ x &= 0.12121212... \end{aligned}$$

Then we subtract the first equation from the second.

$99x = 12$ Divide both sides by 99

$\frac{99x}{99} = \frac{12}{99} = \frac{4}{33}$ 0.121212…… represents the rational number $\frac{4}{33}$.

Following those steps find the ratio of integers that represents 0.10101010…

NAME____________________ DATE______________________ SCORE ___/5

8.2A Skills and Concepts Homework 1

1. Draw a Venn diagram or graphic organizer to show the relationship of the subsets of the real numbers.

2. Place a √ in each column that the given number belongs to.

	Irrational Number	Rational Number	Integer	Whole Number	Counting Number
–32					
–8.123					
103					
$3\frac{5}{8}$					
0.343434...					
$\sqrt{7}$					
1.213141…					
0					

3. Name a whole number that is NOT a counting number. ________

4. Name 3 rational numbers that are NOT positive and are NOT integers.

___________ ___________ _________

5. Name a irrational number that is located between 31.5 and 31.6 on a number line. How do you know it is irrational?

NAME____________________ DATE______________________ SCORE ___/5

8.2A Skills and Concepts Homework 2

1. Identify the subset of real numbers that best describes each situation.

   - The number of cups of sugar in a cake recipe
   - Possible number of cookies in a package
   - Number of eggs in an Easter basket
   - Scores of the top 5 golfers on a leaderboard
   - Square of a whole number that is not a perfect square

2. Explain how the set of irrational numbers differs from the set of rational numbers.

3. What is a perfect square number?

   Give an example of 5 perfect square numbers.

4. Write the prime factorization of the following numbers. Then decide if the square root of the number will be a rational number or an irrational number.

   100 ______________________________

   225 ______________________________

   72 ________________________________

   144 ________________________________

5. Find the ratio of integers that is represented by the decimal 0.09090909….

NAME____________________ DATE______________________ SCORE ___/10

Mini-Assessment 8.2A

1. Which number is an irrational number?

   A $\sqrt{9}$

   B $\sqrt{49}$

   C $\sqrt{100}$

   D $\sqrt{120}$

---

2. Which represents a rational number?

   F $\sqrt{110}$

   G $\sqrt{324}$

   H $\sqrt{65}$

   J $\sqrt{80}$

---

3. Which statement is NOT true?

   A Every rational number is a real number.

   B Every counting number is a whole number.

   C Every integer is a rational number.

   D Every decimal number is an irrational number.

---

4. A square has an area of x square units. x is a whole number between 20 and 24. What set of number best describes the length of the side of the square?

   F Rational numbers

   G Counting numbers

   H Integers

   J Irrational numbers

5. Which of the following represents a set of irrational numbers?

A $\{\sqrt{3},\ \sqrt{4},\ \sqrt{6},\ \sqrt{5}\}$

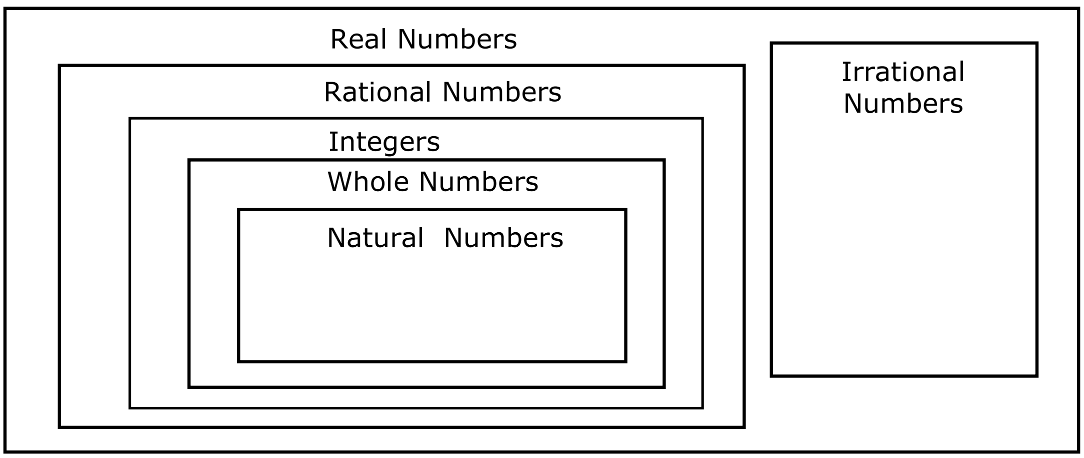
B $\{1.1,\ 1.234...,\ \sqrt{35},\ \pi\}$

C $\left\{\frac{11\pi}{4},\ \frac{\sqrt{2}}{4},\ 1.121314...,\ \sqrt{3}\right\}$

D Not Here

---

6. This diagram shows the relationship of the subsets of the real number system.



Which of the following sets contain only numbers that are NOT integers?

F $\{6,\ -5,\ 1.25\}$

G $\left\{\frac{3}{5},\ 4.5,\ 0.\overline{3}\right\}$

H $\{-8,\ 4,\ \sqrt{13},\ 25\}$

J $\left\{\frac{16}{4},\ 8,\ 7,\ \sqrt{9}\right\}$

---

7. Which statement is NOT true?

A 0.121212… is a rational number.

B 0.34353637 is an irrational number.

C 8.14 is a rational number.

D 5.12345… is an irrational number.

8. Which of the following is NOT a subset of the rational numbers?

   F Integers

   G Whole Numbers

   H Perfect square integers

   J Irrational numbers

---

9. Margaret was asked to write 4 irrational numbers. Her list included the following numbers:

   1.212223… $\sqrt{30}$ 3π $\frac{\sqrt{2}}{2}$

   Which of the numbers Margaret wrote are irrational numbers?

   A None of them

   B All of them

   C 1.212223… and $\sqrt{30}$ only

   D $\sqrt{30}$ and 3π and $\frac{\sqrt{2}}{2}$ only

---

10. Marian was asked to create a set of numbers so that 2 were integers, 2 were rational numbers that were not integers, and 2 were irrational numbers. Which of the following sets would satisfy the criteria for Marian's set?

    F $\left\{\sqrt{11},\ \pi, -3, 4, 1.5,\ \frac{5}{12}\right\}$

    G $\left\{9,\ 100, 1.1111...,\ \pi, -6,\ \frac{20}{3}\right\}$

    H $\left\{5\sqrt{2},\ 3\pi, 3, -14, 3.5,\ \frac{24}{12}\right\}$

    J $\left\{\sqrt{20},\ 12.3456..., 9, -14, 28, 4\frac{1}{2}\right\}$

Six Weeks 1 Review and Assessment

Six Weeks 1 Review

This review can be used in the same manner as a Student Activity from the lessons. Notes can be used to complete the review and they can work with a partner. You can assign different portions to different partner pairs to be responsible for debriefing for the entire class. Students can complete any answers they did not get before the debriefing. They just need to use a different color to record any additional answers.

It can be completed entirely in class, or it can be taken home to be completed and then debriefed in class prior to the six week assessment.

Six Weeks 1 Review

Lesson 1: 8.2A

1. Place a √ in each column that the given number belongs to.

	Irrational Number	Rational Number	Integer	Whole Number	Counting Number
-14					
-2.6					
113					
$\frac{5}{8}$					
$\sqrt{3}$					

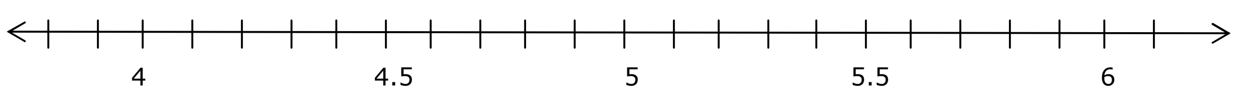
2. What type of decimals are irrational numbers?

3. What type of decimals are rational numbers?

Lesson 2: 8.2B

1. What is a good rational approximation for $\sqrt{20}$?

   Graph $\sqrt{20}$ on the number line below.



2. Between what two counting numbers is $\sqrt{75}$ located on a number line?

   Which counting number is it closer to? Why?

Lesson 3: 8.2D

1. Order the following sets of real numbers from least to greatest.

$4 \qquad 3.8 \qquad \sqrt{15} \qquad \sqrt{17}$

$4+\sqrt{2} \qquad 6 \qquad 5 \qquad 3+\sqrt{17}$

2. Place an inequality symbol between the following pairs of numbers to make a true statement.

- $4\frac{1}{2}$ ________ $\sqrt{17}$ -3.2 ________ $-\sqrt{8}$

Lesson 4: 8.10A 8.8D 8.3A

T or F

1. Two dilated figures in a coordinate plane with the origin as the center of dilation will always be similar. _________
2. Two dilated figures in a coordinate plane with the origin as the center of dilation will always have the same orientation in the plane. __________
3. An image is always larger than the preimage. __________

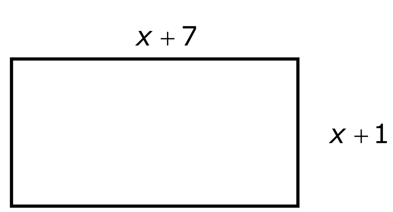
How many pairs of angles in two triangles must be congruent before you know the triangles are similar? ___________

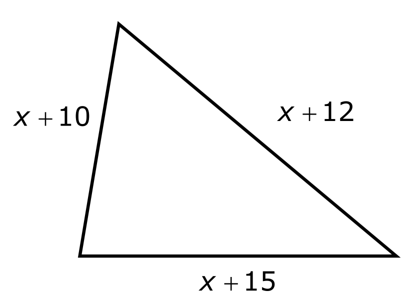
Triangle 1 has two interior angles that measure 37° and 79°. Triangle 2 has two interior angles that measure 37° and 64°. Are the two triangles similar? Explain your answer.

If triangle *ABC* is similar to triangle *FGH*, write the three ratios that must be equal.

Lesson 5: 8.8A 8.8C

1. The school choir is selling fruit cakes to earn money for new robes. The fruit cakes sell for $30 each. The company charges a $125 delivery fee and $9 per cake. Write an inequality that can be used to determine the number of cakes the choir must sell to make a profit.
2. If these two figures have the same perimeter, what is the perimeter of each figure?



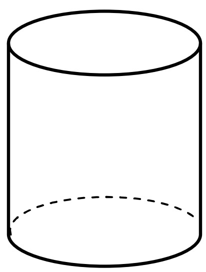


Lesson 6: 8.6A 8.6B 8.7A

1. Write the expression that represents the volume of a cylinder if its radius is 7 inches and its height is 12 inches.

2. A cone and a cylinder have congruent bases and heights. The volume of the cone is approximately 20 cubic inches. What is the approximate volume of the cylinder?

3. A cone has a diameter of 12 inches and a height of 10 inches. Draw and label a model of the cone. Find the volume of the cone.



- The cylinder at the left has a radius of 6 inches and a height of 14 inches. What is the volume of the cylinder?

- If the cylinder at the left has a volume of 300π cubic inches and a height of 12 inches, what is the radius of the cylinder?

  What is the diameter of the cylinder?

Lesson 7: 8.2C

1. Write the following numbers in scientific notation.

   36, 200 0.0045 12 billion

2. Write the following numbers in standard decimal notation.

   4.13×10^{3} 7.1×10^{-4} 8.423×10^{5}

Lesson 8: 8.8D

1. The angles of a triangle measures of 88°, 53° and 39°. What are the measures of the three exterior angles.

2. What is the sum of the measures of the three angles of any triangle?

3. If two angles of a triangle measure 54° and 72°. What is the measure of the third angle of the triangle?

   True or false: One exterior angle of the triangle will measure 126°.

Lesson 9: 8.5A 8.5E

1. In a linear proportional relationship, what is the constant of proportionality?

2. If (5, 10) belongs to a linear proportional relationship, name two more ordered pairs that would belong to the relationship.

3. If y varies directly with x and $y = 20$ when $x = 4$, what is the value of y when $x = 20$?

   The graph of a direct variation will be a ___________ that passes through the __________.

Lesson 10: 8.12A

1. What does APR stand for?

   Why is it important to know the APR when borrowing money or using a credit card?

2. Joseph can get a bank loan for $5,000 at 8% for 2 years with a monthly payment of $226.14. He can also borrow the money from an uncle who will charge him 8% but he wants to term of the loan to be 18 months. His monthly payment to the uncle would be $295.70.

   a. What is the payoff amount if he borrows the money from the bank?

   b. What is the payoff amount if he borrows the money from his uncle?

   c. Which will have the smaller payoff amount? How much less?

   d. If he figures the largest monthly payment he can afford is $300, which loan should he take?

GRADE 8 MATHEMATICS

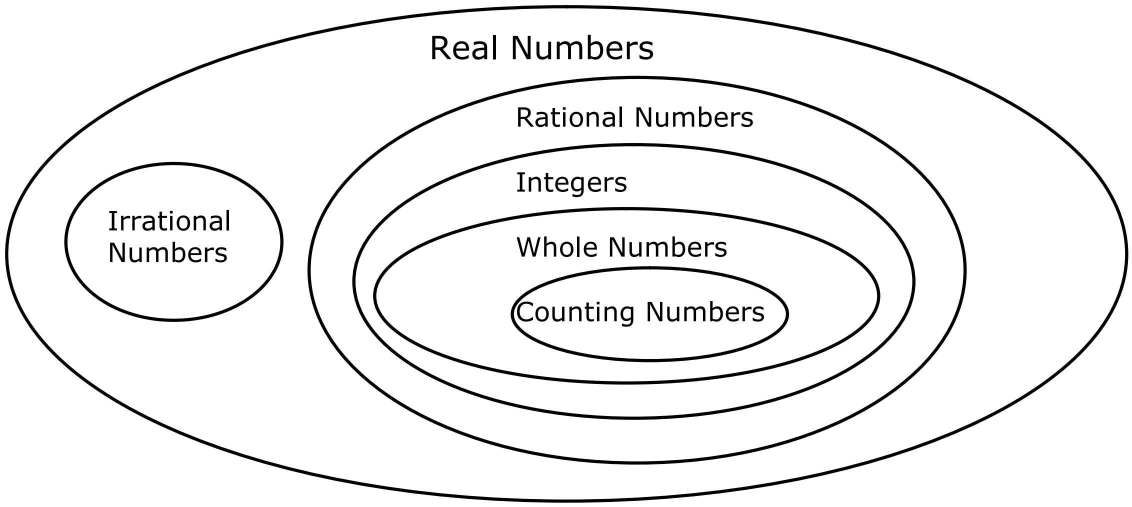
TEKS/STAAR Six Weeks 1 Assessment

Make 1 copy of the Six Weeks Assessment for each student. Students answer these questions individually. Record class performance on the Class Profile Sheet and individual student performance on the Individual Student Profile Sheet.

Answer Key:		STAAR Category/TEKS
1.	G	Category 1/8.2A
2.	H	Category 1/8.2B
3.	C	Category 1/8.2D
4.	J	Category 3/8.8D
5.	B	Category 3/8.3A
6.	F	Category 2/8.8C
7.	D	Category 3/8.7A
8.	G	Category 3/8.10A
9.	B	Category 1/8.2C
10.	H	Category 3/8.8D
11.	C	Category 2/8.5A
12.	811.08	Category 4/8.12A
13.	C	Category 2/8.5E
14.	G	Category 3/8.7A
15.	C	Category 1/8.2D
16.	F	Category 1/8.6B
17.	C	Category 2/8.5E
18.	J	Category 1/8.2C
19.	A	Category 2/8.8C
20.	G	Category 2/8.8A

TEKS/STAAR Six Weeks 1 Assessment

1. This Venn diagram shows the relationship of the subsets of the real number system.



Which of the following sets contain only irrational numbers?

A $\left\{\sqrt{7},\ -3,\ 17\right\}$

B $\left\{4.1121314...,\ \sqrt{3},\ 0.\overline{6}\right\}$

C $\left\{-5\sqrt{2},\ 14.3456...,\ \pi,\ \sqrt{125}\right\}$

D $\left\{\frac{24}{8},\ 3\pi,\ 17.616116111...,\ \sqrt{29}\right\}$

---

2. Which of the following is the best approximation for $\sqrt{38}$?

F 19

G 5.9

H 6.2

J 6.6

3. Which rational number is between $6\frac{2}{3}$ and $\sqrt{48}$?

A 6.3

B 6.5

C 6.7

D 7

---

4. The following pairs of angle measures are the measures of two angles of two triangles. Which pair of triangles would be similar because they have two pair of congruent angles?

F 51° and 30°; 109° and 30°

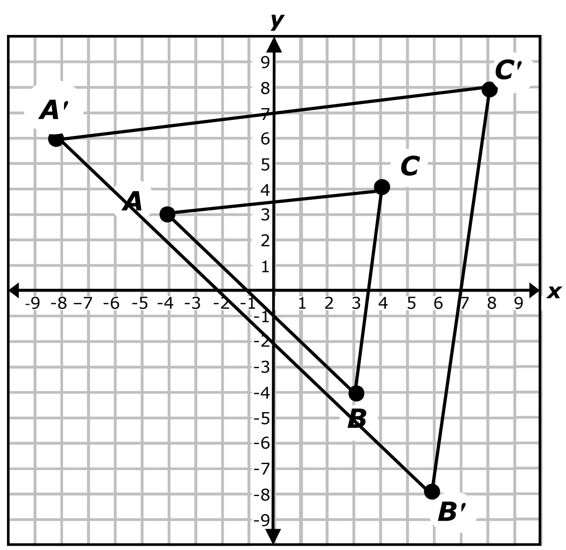
G 92° and 70°; 28° and 70°

H 58° and 30°; 90° and 58°

J 35° and 82°; 82° and 63°

---

5. Look at the triangles on the grid below. $\triangle A'B'C'$ is a dilation of $\triangle ABC$ with the origin as the center of dilation.



Which statement is NOT true?

A $\dfrac{A'B'}{AB} = \dfrac{B'C'}{BC}$

B $\dfrac{A'C'}{AC} = \dfrac{BC}{B'C'}$

C $\dfrac{A'B'}{AB} = \dfrac{A'C'}{AC}$

D $\dfrac{B'C'}{A'C'} = \dfrac{BC}{AC}$

6. Jules has $1,000 and is spending $40 per week. Kelsey has $400 and is saving $20 a week. In how many weeks, will Jules and Kelsey have the same amount of money?

F 10

G 12

H 20

J 15

---

7. A cone has a radius that is 10 inches long and a height of 15 inches. What is the volume of the cone?

A 81π cubic inches

B 480π cubic inches

C 320π cubic inches

D 500π cubic inches

---

8. David is listing the properties of orientation and congruence about a figure and its dilation in a coordinate plane with the origin as the center of dilation. His list is:

   a. The preimage and image will be similar.
   b. The preimage and image will have the same orientation in the plane.
   c. The preimage will always be smaller than the image.
   d. The preimage and the image will have corresponding angles congruent.

   Which of David's statements are correct?

F a and b only

G a, b, and d only

H a and d only

J All of the above

---

9. Which expression represents a number that is larger than 5,000 but smaller than 50,000?

A 6.0×10^4

B 6.0×10^3

C 5.8×10^4

D 5.8×10^2

10. Triangle *ABC* has two interior angles with measures of 102° and 43°. Which of the following could NOT be the measure of an exterior angle of triangle *ABC*?

F 78°

G 137°

H 88°

J 145°

---

11. The table below shows the relationship between the number of hours worked and the amount earned by Mr. Johnson.

Number of Hours, *h*	1	3	6	8
Amount earned, *e*	$11	$33	$66	$88

Which statement is NOT true about the proportional relationship represented in the table?

A Mr. Johnson earns $11 per hour.

B The constant of proportionality is 11.

C $h = 11e$

D Mr. Johnson will earn $110 for 10 hours of work.

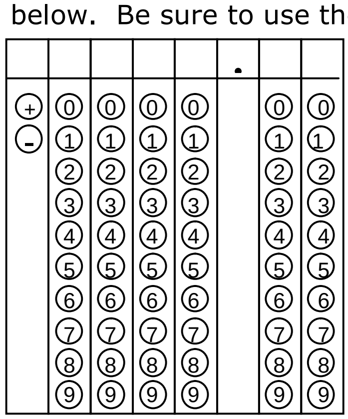
---

12. Mr. James is going to buy a car for $12,000. He can finance with the car dealer for 3 years at 12% or he can borrow the money at the bank for 3 years at 8%.

Loan Calculations			
Amount	Term	Interest Rate	Monthly Payment
$12,000	3 yr	12%	$398.57
$12,000	3 yr	8%	$376.04

What is the difference in the amount of interest he will pay at 12% for 3 years and 8% for 3 years?

Record your answer on the grid below. Be sure to use the correct place value.



13. The cost of a soft drink varies directly with the number of ounces you buy. If 12 ounces cost $0.90, how many ounces of the soft drink could you buy for $7.20?

A 45

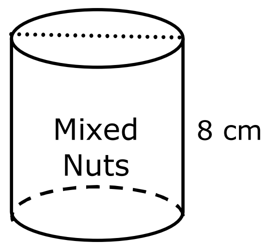
B 29

C 96

D 120

---

14. A can of mixed nuts is shown below. The volume of the can of nuts is 128π cubic centimeters.



What is the diameter of the mixed nuts can?

F 4 centimeters

G 8 centimeters

H 16 centimeters

J Not Here

---

15. Which of the following statements is true?

A $\sqrt{50} + 1 < 7$

B $\sqrt{99} + 2 < 10$

C $-3 + \sqrt{15} > 0$

D $\sqrt{103} + 2 < 12$

---

16. A cone and a cylinder have congruent bases and heights. The volume of the cone is approximately 20 cubic inches. What is the approximate volume of the cylinder?

F 60 cubic inches

G 6.6 cubic inches

H 23 cubic inches

J Not Here

17. If y varies directly with x and $y = 8$ when $x = 12$, what will be the value of y when $x = 15$?

A 12

B 22.5

C 10

D 6.4

---

18. In Canada in 1998 the estimated number of households that owned 2 or more vehicles was 3.939×10^6. How is this number written in standard decimal notation?

F 3,939,000,000

G 393,900

H 39,390,000

J 3,939,000

---

19. A square and a rectangle have the same perimeter. The square has a side length of $6x$ units. The rectangle has a length of $(5x + 8)$ and a width of 6 units. For what value of x, will the square and rectangle have the same perimeter?

A 2

B 4

C 5

D 3

---

20. Eight less than four times a number is the same as three times the number, x, increased by 24. Which equation describes this situation?

F $8x - 4 = 24x + 3$

G $4x - 8 = 3x + 24$

H $8 - 4x = 3x + 24$

J $4x + 8 = 3x - 24$

Scope and Sequence
Six Weeks 3

SIX WEEKS 3

Lesson	TEKS-BASED LESSON	STAAR Category Standard	Spiraled Practice	Student Activity	Problem Solving	Skills and Concepts Homework
Lesson 1 _____ days	**8.5B/**represent non-proportional linear relationships using … graphs, and equations that simplify to the form $y = mx + b,\ b \neq 0$. **8.5F/**distinguish between proportional and non-proportional situations using graphs, and equations in the form $y = kx$ or $y = mx + b,\ b \neq 0$	Category 2 Supporting Category 2 Supporting	SP 41 SP 42 SP 43	SA 1 SA 2 SA 3	PS 1 PS 2	Homework 1 Homework 2
Lesson 2 _____ days	**8.5C/**contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a line relationship from a graphical representation **8.5D/**use a trend line that approximates the linear relationship between bivariate sets of data to make predictions	Category 4 Supporting Category 4 Readiness	SP 44 SP 45 SP 46	SA 1 SA 2	PS 1 PS 2	Homework 1 Homework 2
Lesson 3 _____ days	**8.5I/**write an equation in the form $y = mx + b,\ b \neq 0$ to model a linear relationship between two quantities using ….tabular, and graphical representations	Category 2 Readiness	SP 47 SP 48	SA 1 SA 2	PS 1 PS 2	Homework 1 Homework 2
Lesson 4 _____ days	**8.5G/**identify functions using sets of … mappings and graphs	Category 2 Readiness	SP 49 SP 50	SA 1 SA 2	PS 1 PS 2	Homework 1 Homework 2
Lesson 5 _____ days	**8.6C/**use models and diagrams to explain the Pythagorean Theorem **8.7C/**use the Pythagorean Theorem and its converse to solve problems **8.7D/**determine the distance between two points on a coordinate plane using the Pythagorean Theorem	Category 3 Supporting Category 3 Readiness Category 3 Supporting	SP 51 SP 52 SP 53	SA 1 SA 2 SA 3	PS 1 PS 2 PS 3	Homework 1 Homework 2 Homework 3
Lesson 6 _____ days	**8.7A/**solve problems involving the volume of…. spheres	Category 3 Readiness	SP 54 SP 55 SP 56	SA 1 SA 2	PS 1 PS 2	Homework 1 Homework 2

SIX WEEKS 3

Lesson	TEKS-BASED LESSON	STAAR Category Standard	Spiraled Practice	Student Activity	Problem Solving	Skills and Concepts Homework
Lesson 7 _____ days	**8.7B/**use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prism, triangular prisms, …	Category 3 Readiness	SP 57 SP 58	SA 1 SA 2 SA 3	PS 1 PS 2	Homework 1 Homework 2
Lesson 8 _____ days	**8.11B/**determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a set of no more than 10 data points	Category 4 Supporting	SP 59 SP 60	SA 1 SA 2	PS 1 PS 2	Homework 1 Homework 2
Review Assessment 2 days	**Six Weeks 3 Open-Ended Review** **Six Weeks 3 Assessment**					

TEACHER NOTES:

Materials List

GRADE 8 MATERIALS LIST - SIX WEEKS 3

SIX WEEKS	LESSON	ITEM	QUANTITY
3	1	Graphing Calculator	1 per student
3	2	Graphing Calculator	1 per student
3	3	Graphing Calculator	1 per student
3	4	Graphing Calculator	1 per student
3	5	Graphing Calculator sheets of patty paper rulers scissors colored pencils Pythagorean Theorem Patty Paper Proof for projection	1 per student 4-5 per student 1 per student 1 pair per student 2 per student 1
3	6	calculator	1 per student
3	7	rectangular prism, metric ruler, centimeter grid paper calculator	1 Per Pair of Students 1 Per Pair of Students 1 Per Student 1 Per Student
3	8	1-6 number cubes, calculator a marker Class Data Sheet	1 per student 1 per student 1 per pair of students 1

Mini-Assessment Answer Key

GRADE 8 TEKS-BASED ASSESSMENTS – SIX WEEKS 3
TEKS Correlation and Answer Key for Mini-Assessments

Mini-Assessment And TEKS Assessed	Question Number									
	1	2	3	4	5	6	7	8	9	10
Lesson 1 8.5B/8.5F	B 8.5F	H 8.5F	C 8.5B	J 8.5B	C 8.5B	F 8.5F	B 8.5F	J 8.5B	D 8.5F	H 8.5B
Lesson 2 8.5C/8.5D	B 8.5D	H 8.5D	C 8.5C	J 8.5D	B 8.5D	J 8.5C	A 8.5C	G 8.5D	C 8.5D	J 8.5D
Lesson 3 8.5I	C	G	D	J	B	G	A	H	B	H
Lesson 4 8.5G	D	G	C	J	D	J	A	H	D	F
Lesson 5 8.6C/8.7C/8.7D	C 8.6C	G 8.7D	A 8.7C	J 8.6C	B 8.7C	F 8.7D	A 8.7C	F 8.7D	D 8.7C	H 8.7C
Lesson 7 8.7A	C	G	A	J	C	5425.9	B	103	B	G
Lesson 8 8.7B	A	204	B	G	C	J	B	448	C	J
Lesson 9 8.11B	B	G	C	G	A	G	D	H	A	H

Six Weeks 3
Lesson 8

8.11B Lesson and Assessment

Lesson Focus

For TEKS 8.11B, students should be able to demonstrate an understanding of how to represent and analyze data. Students are expected to apply mathematical process standards to use statistical procedures to describe data.

Students are expected to determine the mean absolute deviation and use this quantity as a measure of the average distance data points are from the mean using a data set of no more than 10 data points.

Process Standards Incorporated Into Lesson

8.1B Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution

8.1C Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including number sense as appropriate, to solve problems.

8.1E Create and use representations to organize, record, and communicate mathematical ideas.

Materials Needed for Lesson

1. **Per Student:** 1 copy of all pages for student activities for this lesson, Skills and Concepts Homework, and mini-assessment for this lesson
2. **Per Student**: Graphing Calculator
3. Student Activity 2: Per group of 2 students: 2 1-6 number cubes, 2 calculators, a marker

Math Background- Determining the Mean Absolute Deviation

A measure of center of data is a single number. One measure of center is the **median** (center data point). Another measure of center of data is the **mean**. The **mean** is the average of the data points. To find the mean, sum the data points and divide by the number of data points. The mean and median do not have to be a data point in the data set.

A measure of variability is a single number that is used to describe the spread of the data. The measure of variability we have already studied is the **range** of the data. Another measure of variability that we will study in this lesson is the **mean absolute deviation**. This value is often referred to as the MAD, which is the mean distance between each value of the data set and the mean of the data set.

The steps to find the mean absolute deviation of a data set are:

1. Find the mean of the data set. (Sum the data points and divide by the number of data points.)

2. Find the distance each data point is from the mean. (A table might be helpful for this step.)

3. Find the mean of these distances. (Use your calculator and round to the nearest tenth.)

A larger mean absolute deviation number tells you that the data is more spread out.

The smaller mean absolute deviation number tells you the values are all closer to the mean of the data set.

An outlier in your set can affect your MAD because it will be farther from the mean than the other data points.

Example: Find the mean deviation number for the set of values below. The values represent the number of blue marbles in various bags of marbles.

Data Set: 6, 8, 5, 2, 7, 7, 4, 6, 7, 8

Find the mean: $\frac{6+8+5+2+7+7+4+6+7+8}{10} = \frac{60}{10} = 6$

Find the distance each data point is from the mean.

Data point	6	8	5	2	7	7	4	6	7	8
Distance from mean	0	2	1	4	1	1	2	0	1	2

Find the mean of the distances.

$$\frac{0+2+1+4+1+1+2+0+1+2}{10} = \frac{14}{10} = 1.4$$

The MAD is 1.4. This is a small mean deviation number, but if the data point 2 had been a number closer to 6, the MAD would have been even smaller.

Example: The height of 6 team members of the boys' eighth grade basketball team is given as Data Set 1.The height of 6 team members of the girls' eighth grade basketball team is given as Data Set 2. The heights are given in inches.

Data Set 1 (boys' heights): 69, 62, 69, 60, 70, 72 Data Set 1 (girls' heights): 57, 60, 67, 63, 61, 62

Compare the mean absolute deviation for the two data sets.

Data Set 1:

Find the mean: $\frac{69+62+69+60+70+72}{6} = \frac{402}{6} = 67$

Find the distance each data point is from the mean.

Data point	69	62	69	60	70	72
Distance from mean	2	5	2	7	3	5

Find the mean of the distances.

$\frac{2+5+2+7+3+5}{6} = \frac{24}{6} = 4$ The MAD for the boys' heights is 4 inches.

Data Set 2:

Find the mean: $\frac{57+60+67+63+62+61}{6}=\frac{370}{6}\approx 61.7$

Find the distance each data point is from the mean.

Data point	57	60	67	63	62	61
Distance from mean	4.7	1.7	5.3	1.3	0.3	0.7

Find the mean of the distances.

$\frac{4.7+1.7+5.3+1.3+.3+.7}{6}=\frac{14}{6}\approx 2.3$ The MAD for the girls' heights is 2.3 inches.

The MAD for the girls' heights is smaller than the MAD for the boys' heights. The girls' height has less deviation in their heights. The heights of these six girls are closer to the mean of the data than the heights of the six boys to the mean of their data.

Determining the Mean Absolute Deviation

A measure of center of data is a single number. One measure of center is the **median** (center data point). Another measure of center of data is the **mean**. The **mean** is the average of the data points. To find the mean, sum the data points and divide by the number of data points. The mean and median do not have to be a data point in the data set.

A measure of variability is a single number that is used to describe the spread of the data. The measure of variability we have already studied is the **range** of the data. Another measure of variability that we will study in this lesson is the **mean absolute deviation**. This value is often referred to as the MAD, which is the mean distance between each value of the data set and the mean of the data set.

The steps to find the mean absolute deviation of a data set are:

1. Find the mean of the data set. (Sum the data points and divide by the number of data points.)

2. Find the distance each data point is from the mean. (A table might be helpful for this step.)

3. Find the mean of these distances. (Use your calculator and round to the nearest tenth.)

A larger mean absolute deviation number tells you that the data is more spread out.

The smaller mean absolute deviation number tells you the values are all closer to the mean of the data set.

An outlier in your set can affect your MAD because it will be farther from the mean than the other data points.

Example: Find the mean deviation number for the set of values below. The values represent the number of blue marbles in various bags of marbles.

Data Set: 6, 8, 5, 2, 7, 7, 4, 6, 7, 8

Find the mean:

$$\frac{6+8+5+2+7+7+4+6+7+8}{10} = \frac{60}{10} = 6$$

Find the distance each data point is from the mean.

Data point	6	8	5	2	7	7	4	6	7	8
Distance from mean	**0**	**2**	**1**	**4**	**1**	**1**	**2**	**0**	**1**	**2**

Find the mean of the distances.

$$\frac{0+2+1+4+1+1+2+0+1+2}{10} = \frac{14}{10} = 1.4$$

The MAD is 1.4. This is a small mean deviation number, but if the data point 2 had been a number closer to 6, the MAD would have been even smaller.

Example: The height of 6 team members of the boys' eighth grade basketball team is given as Data Set 1.
The height of 6 team members of the girls' eighth grade basketball team is given as Data Set 2. The heights are given in inches.

Data Set 1 (boys' heights): 69, 62, 69, 60, 70, 72

Data Set 1 (girls' heights): 57, 60, 67, 63, 61, 62

Compare the mean absolute deviation for the two data sets.

Data Set 1:

Find the mean:

$$\mathbf{\frac{69+62+69+60+70+72}{6}=\frac{402}{6}=67}$$

Find the distance each data point is from the mean.

Data point	69	62	69	60	70	72
Distance from	**2**	**5**	**2**	**7**	**3**	**5**

Find the mean of the distances.

$$\mathbf{\frac{2+5+2+7+3+5}{6}=\frac{24}{6}=4}$$ **The MAD for the boys' heights is 4 inches.**

Data Set 2:

Find the mean:

$$\frac{\mathbf{57+60+67+63+62+61}}{\mathbf{6}}=\frac{\mathbf{370}}{\mathbf{6}}\approx\mathbf{61.7}$$

Find the distance each data point is from the mean.

Data point	57	60	67	63	62	61
Distance from	**4.7**	**1.7**	**5.3**	**1.3**	**0.3**	**0.7**

Find the mean of the distances.

$$\frac{\mathbf{4.7+1.7+5.3+1.3+0.3+0.7}}{\mathbf{6}}=\frac{\mathbf{14}}{\mathbf{6}}\approx\mathbf{2.3}$$ **The MAD for the girls' heights is 2.3 inches.**

The MAD for the girls' heights is smaller than the MAD for the boys' heights. The girls' height has less deviation, or variation, in their heights. The heights of these six girls are closer to the mean of the data than the heights of the six boys to the mean of their data.

Problem-Solving 1

Problem 1: What does a small mean absolute deviation tell you about the data set?

Problem 2: How does an outlier affect your mean absolute deviation?

Problem 3: Find the MAD to the nearest tenth for the following data set.

55, 54, 53, 58, 56, 59, 55, 58

Problem 4: If a data set had a MAD of 0, what can you deduce about the data set?

Problem 5: At a cupcake factory, a machine is set to put two-thirds cup of batter in each muffin holder. When checking for accuracy of the amount of batter dispersed by the machine, the person found the MAD to be 0. What does that tell you about the machine?

Student Activity 1

Work with your partner to answer the following questions.

Problem 1:

- Explain how you determine the mean of a data set.
- Explain how you determine the distance each data point is from the mean.
- Explain how you determine the mean of the distances the data points are from the mean.
- What is the mean of the distances the data points are from the mean called?
- What does a small mean absolute deviation tell you about the data set?

Problem 2: Seven friends' scores on their unit test in math class are:

83, 85, 88, 85, 85, 87, 88

What is the mean absolute deviation of the data set?

1. Find the mean of the set.
2. Find the distance each data point is from the mean.
3. Find the mean of the distances.

What does the MAD tell you?

Does the data set support that conclusion?

Problem 3: A data set has a mean of 55 and a MAD of 0.75. What do you know about the data set?

Problem 4: A data set has a mean of 105 and a MAD of 10. What do you know about the data set?

Problem 5: Compare the mean absolute deviations of the following two data sets.

Data Set 1: 12, 12, 14, 15, 11, 13, 10, 15

Data Set 2: 32, 35, 20, 31, 33, 33, 34, 35

Data Set 1:
1. Find the mean of the set.

2. Find the distance each data point is from the mean.

3. Find the mean of the distances.

Data Set 2:
1. Find the mean of the set.

2. Find the distance each data point is from the mean.

3. Find the mean of the distances.

What conclusion can you make about the two data sets based on the comparison of the MADs?

Problem 6: A history teacher compared scores for her first period class for the pretest and posttest for a unit. She found a mean of 65 and a MAD of 5.6 for the pretest and a mean of 85 and a MAD of 2.3 for the posttest. What conclusion can she make about the scores?

Teacher Notes for Student Activity 2

MATERIALS: Per group of 2 students: 2 1-6 number cubes, calculator, a marker to record their data on the class projection page

PROCEDURE:

- Students complete Student Activity 2 in groups of 2. Assign each student group a group number.
- Students generate a data set of 10 data points. They calculate the mean absolute deviation. Each group will post their data set and MAD on the projection page. The goal is have the smallest MAD.

Distribute the materials for Student Activity 2 and before students begin working, ask the following questions:

- Can each group create their data set as described on their student page?

During Student Activity 2, roam the room and listen for the following:

- Can the students correctly find the mean?

During Student Activity 2, roam the room and look for the following:

- Can the students correctly find the distance from the mean for each data point?
- Can the students correctly find the mean of the distances?

Answers to these questions can be used to support decisions related to further whole class instruction or group and individual student instruction during tutorial settings.

Student Activity 2

Problem: Did we create a data set with a small mean absolute deviation?

Materials: 1 graphing calculator per student, 2 1-6 number cubes per 2 students, a marker per group of 2

Procedure: Work in groups of 2 for this activity. Decide who will be Student 1. Decide who will Student 2. The teacher will assign you a group number.

Part I:
Round 1: Each student will roll the two number cubes.

- Student 1 rolls the 2 number cubes and finds the sum of the two numbers. Both students record the sum on the data point table as data point 1.
- Student 2 rolls the 2 number cubes and finds the product of the two numbers. Both students record the product of the data point table as data point 2.

Round 2:

- Student 1 rolls the 2 number cubes and finds the product of the two numbers. Both students record the product on the data point table as data point 3.
- Student 2 rolls the 2 number cubes and finds the sum of the two numbers. Both students record the sum of the data point table as data point 4.

Round 3:

- Student 1 rolls the 2 number cubes and finds the sum of the two numbers. Both students record the sum on the data point table as data point 5.
- Student 2 rolls the 2 number cubes and finds the product of the two numbers. Both students record the product of the data point table as data point 6.

Round 4:

- Student 1 rolls the 2 number cubes and finds the product of the two numbers. Both students record the product on the data point table as data point 7.
- Student 2 rolls the 2 number cubes and finds the sum of the two numbers. Both students record the sum of the data point table as data point 8.

Round 5:

- Student 1 rolls the 2 number cubes and finds the sum of the two numbers. Both students record the sum on the data point table as data point 9.
- Student 2 rolls the 2 number cubes and finds the product of the two numbers. Both students record the product of the data point table as data point 10.

Data Points									
Data Point 1	Data Point 2	Data Point 3	Data Point 4	Data Point 5	Data Point 6	Data Point 7	Data Point 8	Data Point 9	Data Point 10

Part II:

1. Both students work together to find the mean of their data set. _______________(nearest tenth)
2. Both students work together to find the distance each data point is from the mean.

Data										
Distance from mean										

3. Both students work together to find the mean of the distances. _______________(nearest tenth)

   This value is called the mean ___________ ____________ or MAD.

4. Student 1 will record their data on the class projection page.

5. After all the groups' have posted their data, which group had the smallest MAD?

   How did your MAD compare to their MAD?

Mean Absolute Deviations

Group #	Data					Mean of Data	Distances from Mean					Mean Absolute Deviation

NAME____________________ DATE______________________ SCORE ___/5

8.11B Skills and Concepts Homework 1

1. What are the measures of center?

2. What are the measures of variability or spread?

3. Find the mean absolute deviation for the following set of data:

   Calories in energy bars: 125, 90, 150, 100, 100, 125, 125, 110, 100, 100

   Step 1:

   Step 2:

   Step 3:

4. What does a small MAD tell you about your data?

5. Which group of data has the smaller MAD?

   Group 1: 10, 12, 15, 12, 12, 16
   Group 2: 22, 23, 24, 35, 25, 24

NAME____________________ DATE______________________ SCORE ___/5

8.11B Skills and Concepts Homework 2

1. What is the mean of this data set (nearest tenth)? {160, 158, 172, 140, 160}

   How far is 160 from the mean? __________ units
   How far is 158 from the mean? __________units
   How far is 172 from the mean? __________ units
   How far is 140 from the mean? __________units
   How far is 160 from the mean? __________ units

   What is the average of these distances? __________ ÷5 = _______

2. What is the mean of this data set (nearest tenth)? {50, 52, 48, 51, 55, 50}

   How far is 50 from the mean? __________ units
   How far is 52 from the mean? __________units
   How far is 48 from the mean? __________ units
   How far is 51 from the mean? __________units
   How far is 55 from the mean? __________ units
   How far is 50 from the mean? __________ units

   What is the average of these distances? __________ ÷6 = _______

3. Look at the table below. It shows a data set of 8 points. Find the mean and the fill in the second row of the table.

Data	0	0.5	1	1	3	3.5	4	4.5
Distance from Mean								

   What is the mean of the distances?

4. Which data set has the smallest MAD? Show your work .

   Set 1: 5, 6, 5, 6, 5, 7, 8

   Set 2: 4, 5, 6, 5, 4, 7, 5

   Set 3: 6, 4, 6, 7, 6, 8, 3

5. The table below shows the average number of hours 7 members of the basketball team practiced shooting 3-point shots per week. Find the mean of the data to the nearest tenth of an hour. Then complete the second row of the table.

Hours	1	2	1	2	3	3	4
Distance from Mean							

   What is the MAD for the data set?

NAME____________________ DATE______________________ SCORE ___/10

Mini-Assessment 8.11B

1. The chart below shows the perimeters of six parallelograms the class created for a class project.

Perimeters of Parallelograms		
50 inches	48 inches	40 inches
54 inches	48 inches	42 inches

What is the mean of the data?

A 48 in.

B 47 in.

C 49 in.

D 48.5 in.

---

2. What is the mean absolute deviation of the data in the table in Question 1?

F $3.\overline{6}$ in.

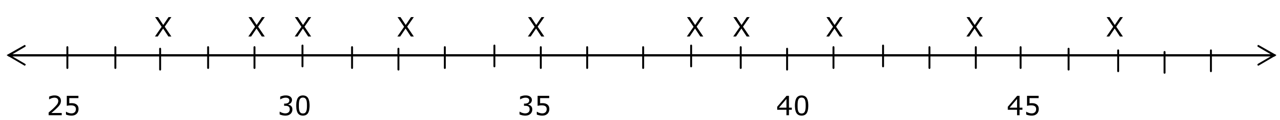
G 4 in.

H 3 in.

J 2.5 in.

---

3. Look at the data plotted on the line below.



Which describes the mean absolute deviation of the data?

A 6

B 5.25

C 5.6

D 6.1

4. Look at the two data sets below.

Set A	Set B
36 25 33 39 32	35 20 36 39 40

Which statement is true about the two sets?

F Set A has a mean that is 1 unit larger than the mean of Set B.

G Set B has a mean absolute deviation that is 2.2 units larger than the mean absolute deviation of Set A.

H The two sets have the same mean absolute deviation.

J Set B has a mean absolute deviation that is twice as large as the mean absolute deviation of Set A.

---

5. Which statement is true in describing the mean absolute deviation for a data set?

A If the data points are close together, then the mean absolute deviation will be small.

B The mean absolute deviation is not affected by an outlier data point.

C The mean absolute deviation is the average distance each data point is from the mode of the data set.

D It is not possible for the mean absolute deviation to be less than 1.

---

6. The data set below lists the heights of six friends. The heights are in inches.

{63, 67, 68, 72, 75, 69}

Which statement is true about the data?

F The mean of the data is 68 inches. The mean absolute deviation is 3.5 inches.

G The mean of the data is 69 inches. The mean absolute deviation is 3 inches.

H The mean of the data is 67 inches. The mean absolute deviation is $3.\overline{6}$ inches.

J The mean of the data is 68 inches. The mean absolute deviation is $3.\overline{6}$ inches.

---

7. During geography class students listed the number of countries outside the USA they had visited. The responses were:

1, 1, 3, 3, 4, 0, 2, 1, 2, 1

What is the mean for the data set?

A 3.2 countries

B 2 countries

C 2.5 countries

D 1.8 countries

8. If a data set has a mean of 40 and a mean absolute deviation of 6, which statement must be true?

   F Half of the data points must be less than 40 and half of the data points must be greater than 40.

   G The middle data point is 40.

   H The average distance between 40 and each data point is 6 units.

   J There must be at least 6 data points.

---

9. If a data set has a mean absolute deviation that is between 0 and 1, what do you know about the data set?

   A The data set must have data points that are close to the mean.

   B The data set must have data points that are close to 1.

   C The data set must have data points close to 0.

   D The data set must have outlier points.

---

10. Which data set has a mean of 12 and a mean absolute deviation less than 1?

   F {1, 14, 12, 21}

   G {9, 10, 17, 12}

   H {12, 13, 12, 11}

   J {15, 9, 12, 12}

Six Weeks 3 Review and Assessment

Six Weeks 3 Review

This review can be used in the same manner as a Student Activity from the lessons. Notes can be used to complete the review and they can work with a partner. You can assign different portions to different partner pairs to be responsible for debriefing for the entire class. Students can complete any answers they did not get before the debriefing. They just need to use a different color to record any additional answers.

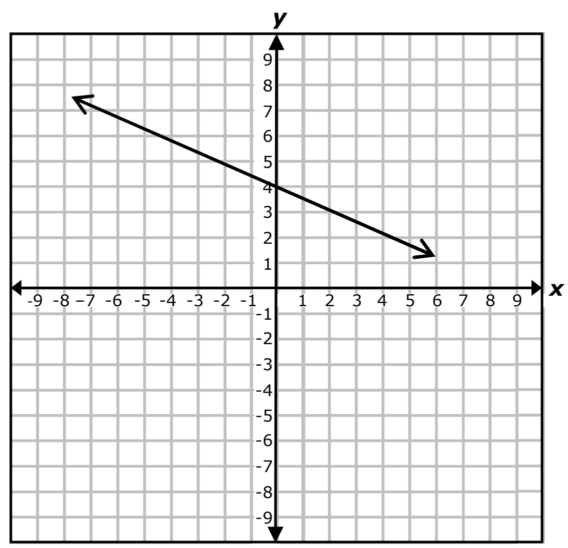
It can be completed entirely in class, or it can be taken home to be completed and then debriefed in class prior to the six week assessment.

Six Weeks 3 Review

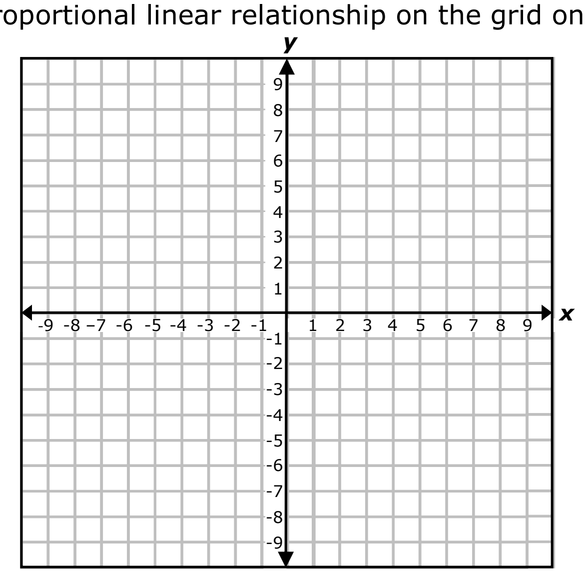
Lesson 1: 8.5B/8.5F

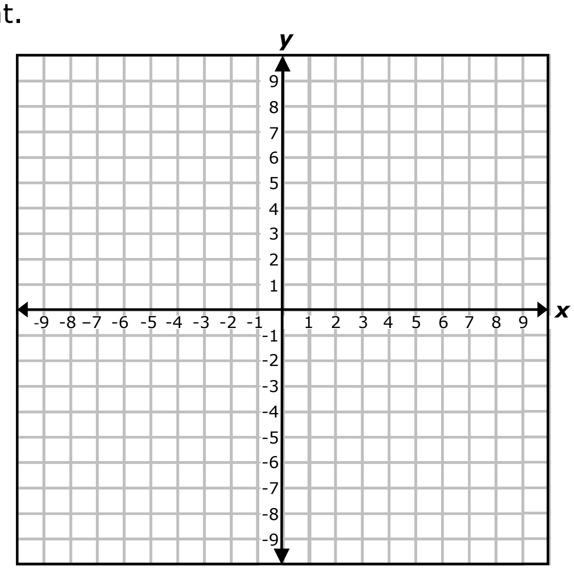
1. How do you know a graph represents a non-proportional linear relationship?

2. Write the equation that describes the graph below. Show your work.



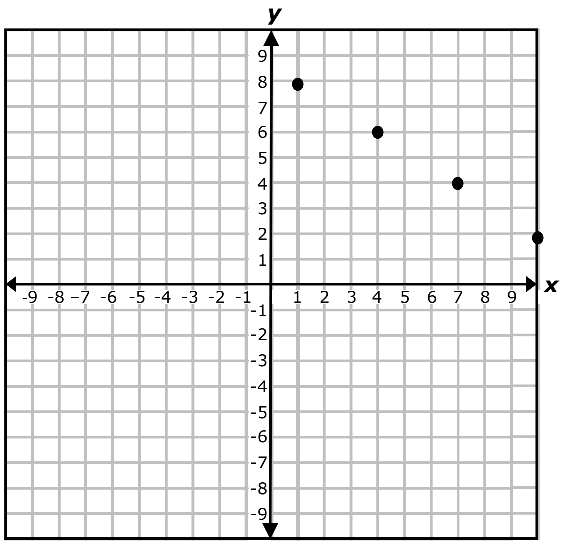
3. Draw a graph of a proportional relationship on the grid on the left. Draw a graph of a non-proportional linear relationship on the grid on the right.

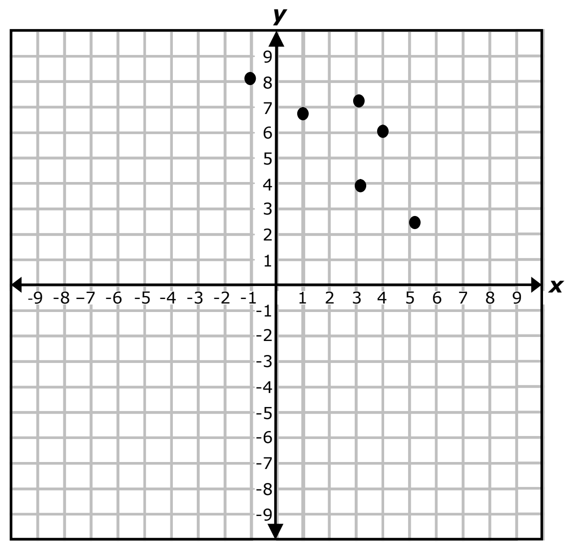




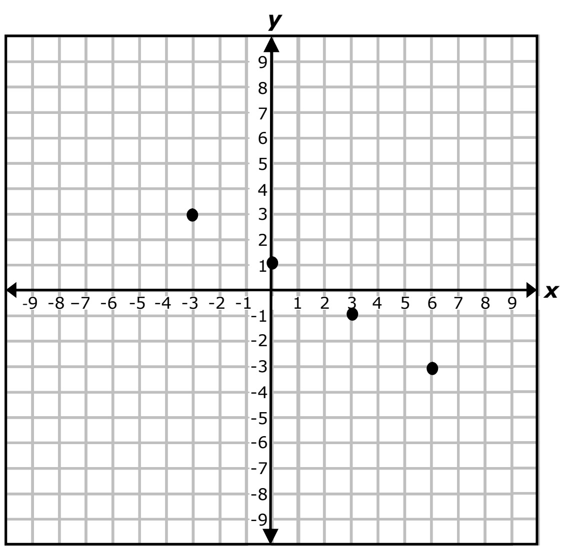
Lesson 2: 8.5C/8.5D

1. Which graph below suggests a linear relationship of bivariate data? Explain your decision.





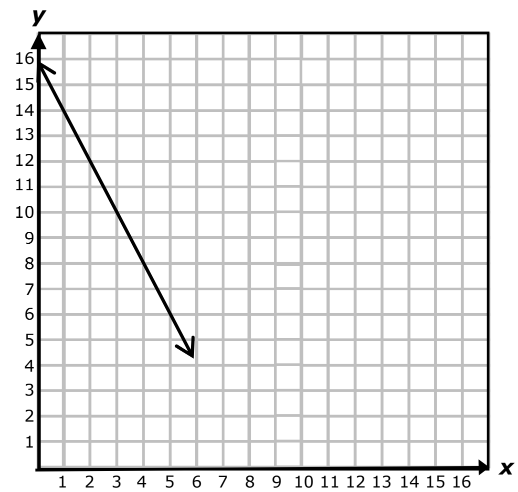
2. Draw a trend line for the following data.



3. Find the equation for the trend line. Use the trend line to predict the value of *y* when *x* is 20.

Lesson 3: 8.5I

1. Look at the graph below. Determine the equation that describes the data.



2. Find the equation of the line that describes the table of values shown below. Show your work.

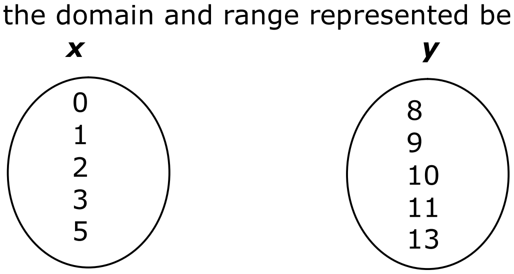
x	2	3	5	7
y	4	7	14	19

Lesson 4: 8.5G

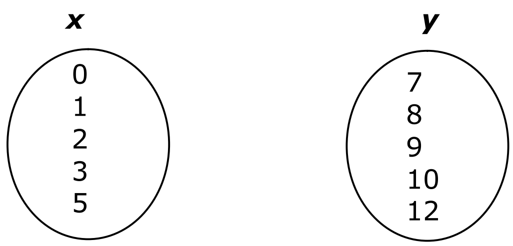
1. Explain what to look for in a graph to determine if the graph represents a function.

2. Explain what to look for in a mapping that describes a function.

3. Look at the domain and range represented below. Create a mapping that is a function.



4. Look at the domain and range represented below. Create a mapping that is NOT a function.



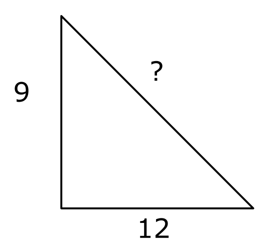
Lesson 5: 8.6C/8.7C/8.7D

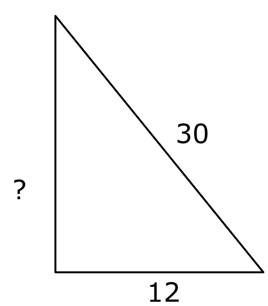
1. Draw a model that geometrically represents the Pythagorean Theorem.

2. State the Pythagorean Theorem as an equation.______ + _______ = ________

3. What is a set of Pythagorean triples?

4. Find the missing side in the following right triangles. Use your calculator and round to the nearest tenth unit when necessary. Show your work.





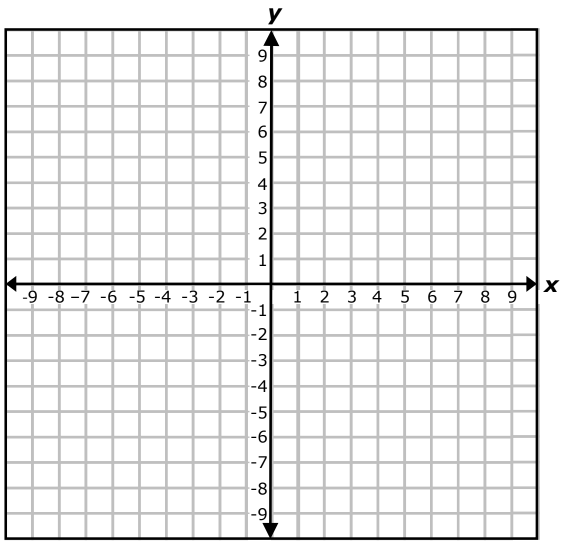
5. Decide if the following lengths could be the side lengths of a right triangle. Show work to support your answer.

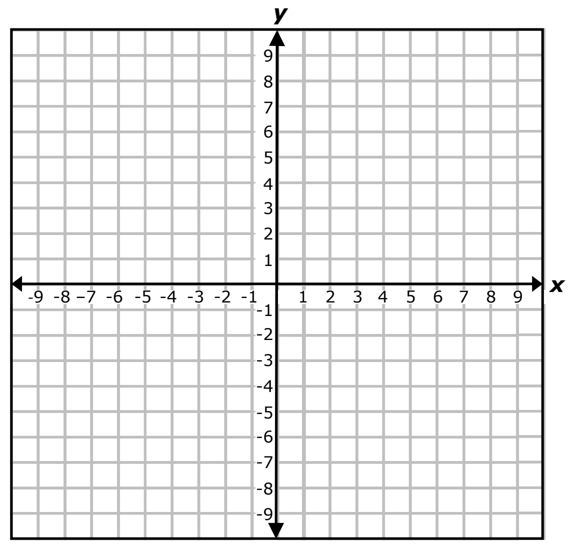
________ $\sqrt{5}, \sqrt{13},$ and $\sqrt{18}$

_________ 13, 12, and 5

_________ 24, 30, and 40

6. Find the distance between (2, 5) and (6, 8). Find the distance between (−1, 5) and (6, −8).





Lesson 6: 8.7A

1. What is a sphere?

2. Draw a sphere and label the center, radius, great circle, and circumference

3. What is the volume of a sphere with a radius of 8 inches (to the nearest cubic inch)? Show your work.

4. What is the radius of a sphere with a volume of 4500π cubic inches? Show your work.

Lesson 7: 8.7B

1. Find the total surface area of a rectangular prism with dimensions 4, 5, and 12 units.

2. A triangular prism has base edges of 3, 4, and 5 units. What is the lateral area and total surface area of the prism? (What kind of triangle is the base?)

Lesson 8: 8.11B

1. How do you find the mean of a set of data?

2. What is the mean absolute deviation of a set of data?

3. List the steps in finding the MAD for a data set.

4. What is the MAD of the data set below? Round to nearest tenth of a unit.

12, 15, 16, 18, 15, 20, 13, 18

5. What does a small MAD indicate for the data set?

GRADE 8 MATHEMATICS

TEKS/STAAR Six Weeks 3 Assessment

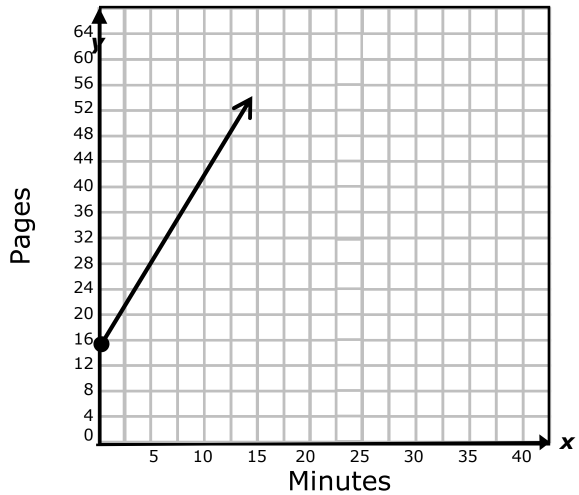
Make 1 copy of the Six Weeks Assessment for each student. Students answer these questions individually. Record class performance on the Class Profile Sheet and individual student performance on the Individual Student Profile Sheet.

Answer Key:		**STAAR Category/TEKS**
1.	A	Category 2/8.5B
2.	H	Category 4/8.5C
3.	D	Category 2/8.5I
4.	F	Category 3/8.7C
5.	A	Category 2/8.5G
6.	G	Category 3/8.6C
7.	C	Category 3/8.7D
8.	H	Category 3/8.7A
9.	B	Category 2/8.5I
10.	H	Category 3/8.7B
11.	A	Category 4/8.11B
12.	252	Category 3/8.7B
13.	C	Category 2/8.5G
14.	G	Category 3/8.7C
15.	C	Category 4/8.5D
16.	H	Category 3/8.7A
17.	B	Category 2/8.5F
18.	522	Category 3/8.7B
19.	A	Category 2/8.5B
20.	J	Category 3/8.6C

GRADE 8 MATHEMATICS

TEKS/STAAR Six Weeks 3 Assessment

1. The graph on the grid below shows the number of pages Billy has read in his history book. He started on page 16 and continued to read.



Which equation represents this situation?

A $y = 2.4x + 16$

B $y = \frac{2}{3}x + 16$

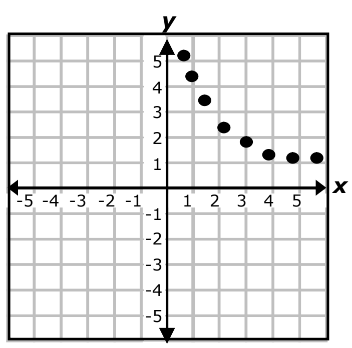
C $y = 16x$

D $y = x + 16$

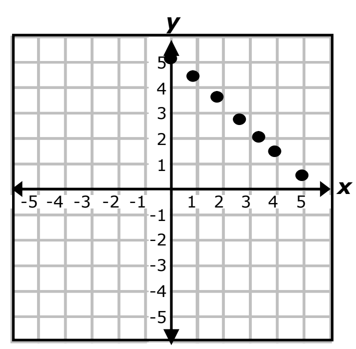
---

2. Which graph below suggests a linear relationship between x and y?

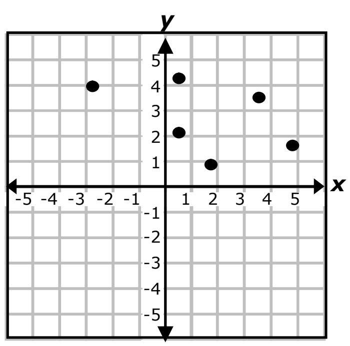
F



H



G



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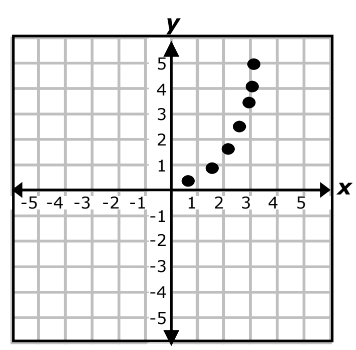


3. The table below represents a linear relationship.

x	0	3	5	7
y	5	11	15	19

Which equation represents the relationship?

A $y = x + 5$

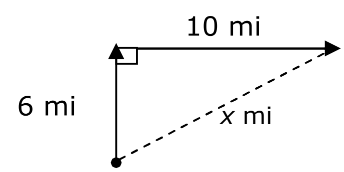
B $y = 5x + 2$

C $y = 3x + 5$

D $y = 2x + 5$

---

4. Marcie left her home and drove 6 miles north, then she drove 10 miles east. About how many miles from her home was she then?



F 11.7 mi

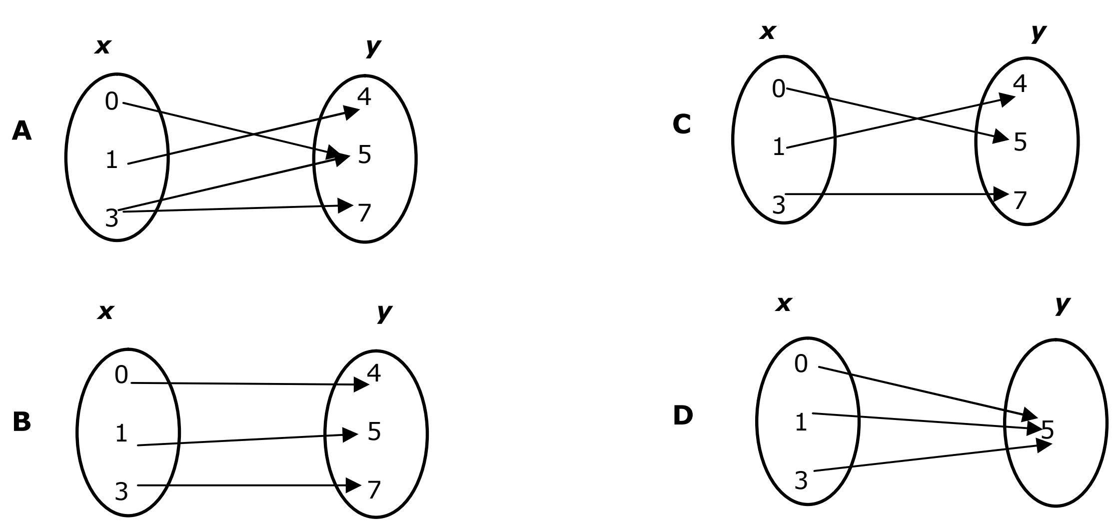
G 16 mi

H 10 mi

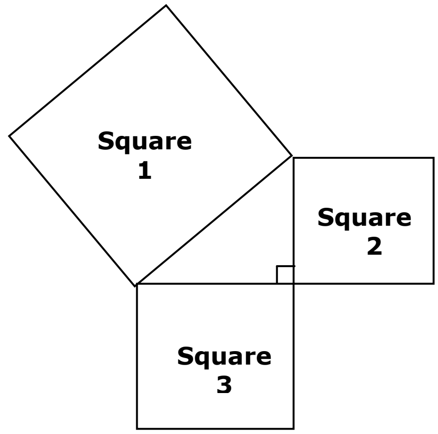
J 12.3 mi

---

5. Look at the mappings below. Which mapping is NOT a function?



6. The area of Square 2 is 49 square units and the area of Square 1 is 121 square units.



Which area for Square 3 will make the model a correct representation of the Pythagorean Theorem?

F 21 square units

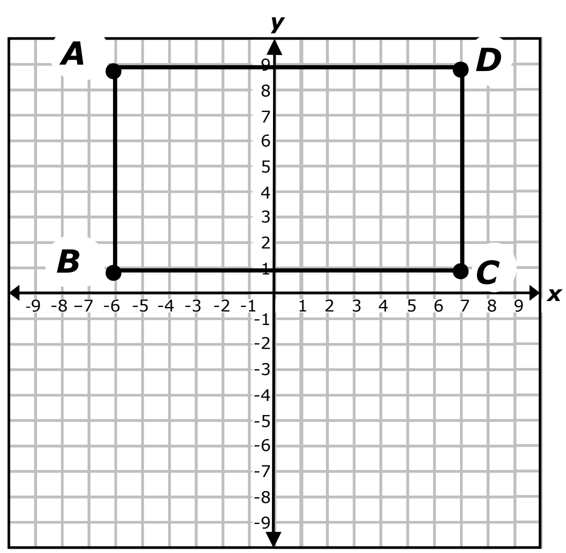
G 72 square units

H 27 square units

J 31 square units

---

7. A rectangle is graphed on the coordinate grid.



Which best describes the length of the diagonal AC of the rectangle?

A 14 units

B 12.8 units

C 15.3 units

D 16.8 units

8. A sphere has a radius of 4 meters. Which expression can be used to determine the approximate volume of the sphere?

F $4^3 \times 3.14$

G $\frac{4}{3} \times 4^2 \times 3.14$

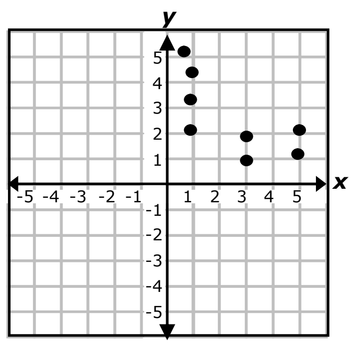
H $\frac{4}{3} \times 4^3 \times 3.14$

J $\frac{4}{3} \times 4^3$

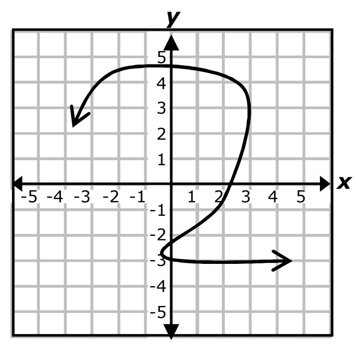
---

9. Which graph represents a function?

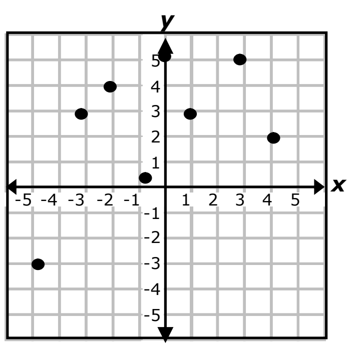
A



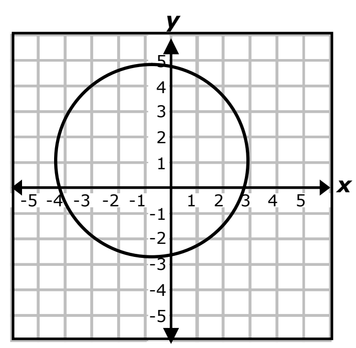
C



B



D



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10. What is the total surface area of a rectangular prism with dimensions of 6 inches, 9 inches, and 10 inches?

F 408 square inches

G 288 square inches

H 540 square inches

J 428 square inches

11. Look at the data set below. It represents the number of hours 5 students studied for a final exam.

{4, 6, 5, 4, 1}

What is the mean absolute deviation for the data set?

A 1 hour

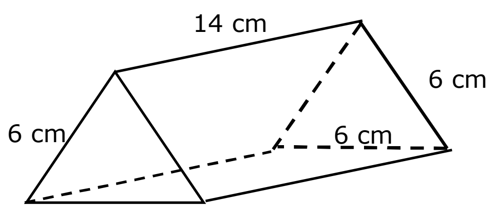
B 1.5 hours

C 1.2 hours

D 2 hours

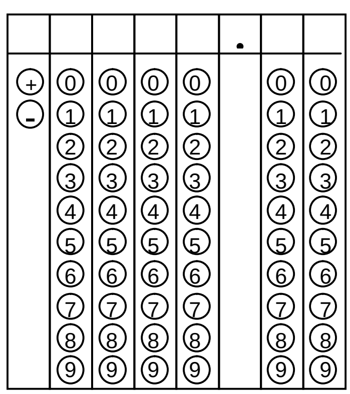
---

12. Look at the triangular prism below.



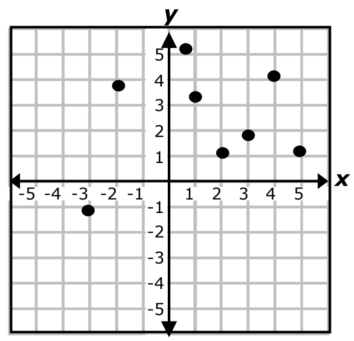
What is the lateral surface area of the prism?

Record your answer on the grid below. Be sure to use the correct place value.

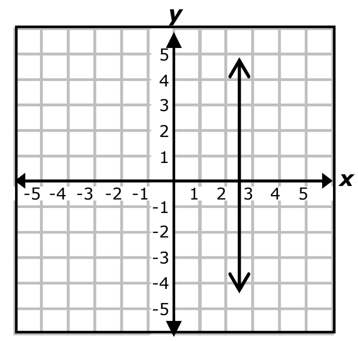


13. Which graph does NOT represent a function?

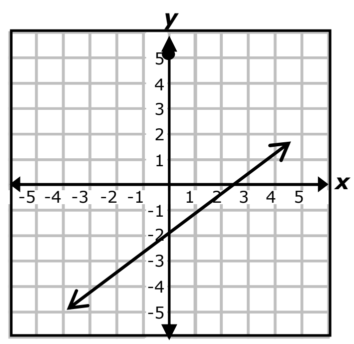
A



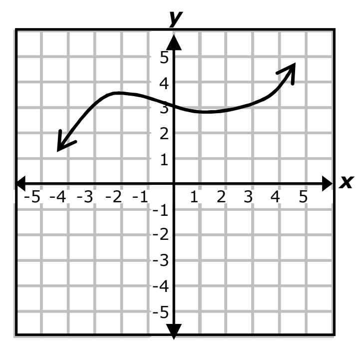
C



B



D



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14. A rectangle has a diagonal of 20 inches and a width of 11 inches. Which best represents the length of the rectangle?

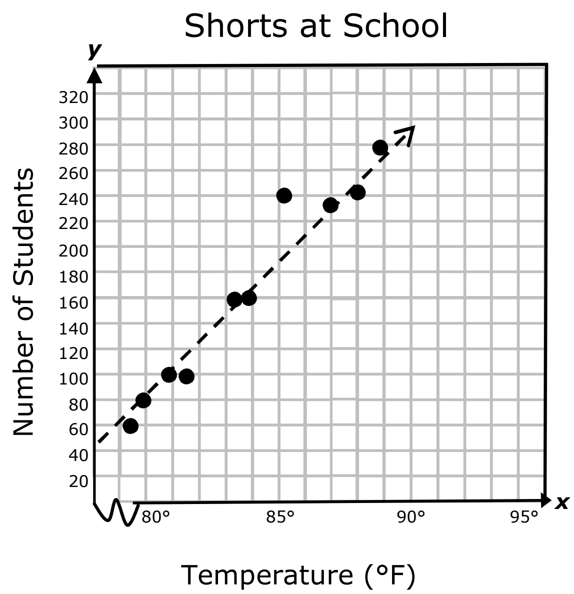
F 16 inches

G 16.7 inches

H 18 inches

J 15.8 inches

15. The graph below shows the number of students who wore shorts to school at different temperatures. A trend line for the scatter plot is shown on the grid.



Using the trend line, what is the best prediction of the number of students who will wear shorts to school when the temperature is 91°F?

A 400

B 380

C 320

D 340

---

16. The circumference of the great circle of a sphere is 24π units. What is the volume of the sphere?

F 288π cubic units

G 192π cubic units

H $2{,}304\pi$ cubic units

J Not Here

---

17. Look at the list of equations below.

a. $y = 3x + 5$ b. $y = 1 + x$ c. $y = \frac{5}{8}x$ d. $xy = 2$

Which equations in the list represent a proportional linear relationship?

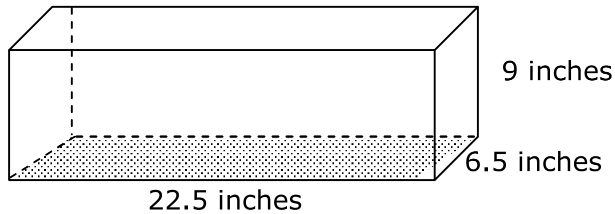
A a only

B c only

C a and b only

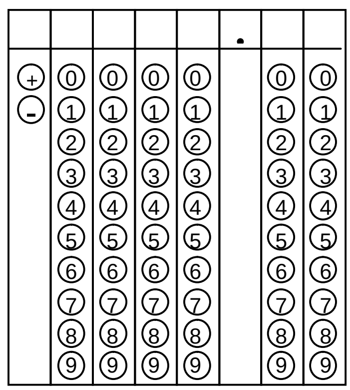
D None of the above

18. Look at the rectangular prism shown below. The base of the prism is shaded.



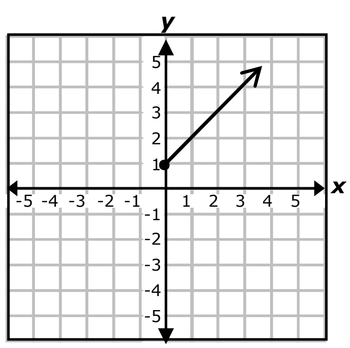
What is the lateral surface area of the prism in square inches?

Record your answer on the grid below. Be sure to use the correct place value.

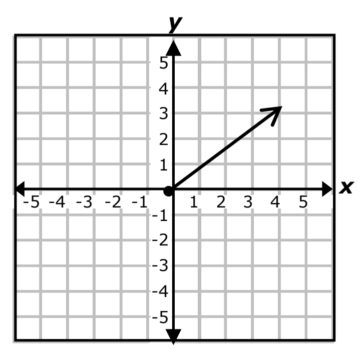


19. Which graph represents a non-proportional linear relationship?

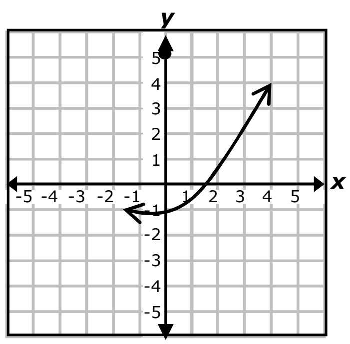
A



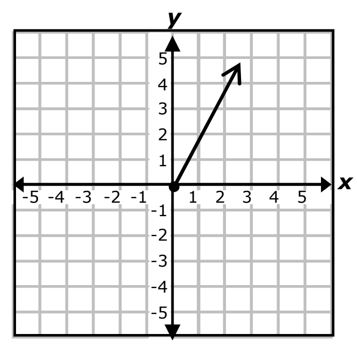
C



B

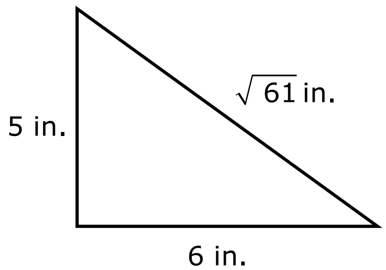


D

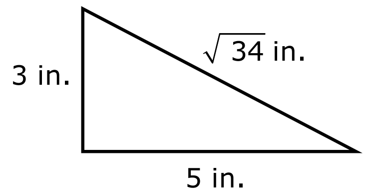


20. Which of the triangles below is NOT a right triangle?

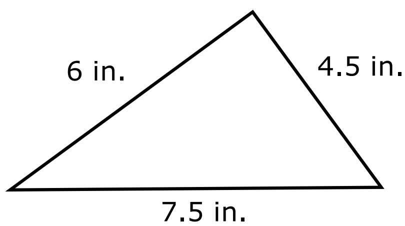
F



H



G



J