

AL Wishah Boys SCHOOL, GRADE 8 Advance
Math EOT Term 1 2025 – 2026

NAME: _____ CLASS _____ DATE: _____

My Score Goal is _____

My Preparation

Objectives I am
Confident

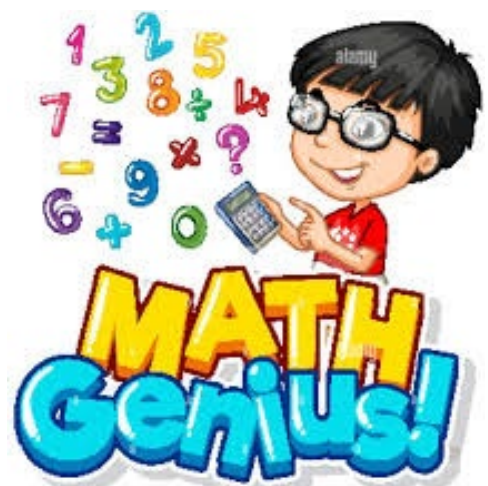
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Objectives I need
practice

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Objectives I need
help

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25



Multiple Choice Question 1

Q1) Use the Laws of Exponents to multiply and divide monomials with common bases. Q 1 to 9 Pg 23.

Simplify each expression. (Examples 1–3)

1. $3^8 \cdot 3 =$ _____

2. $m^5 \cdot m^2 =$ _____

3. $3m^3n^2 \cdot 8mn^3 =$ _____

4. $9p^4 \cdot (-8p^2) =$ _____

5. Simplify $\frac{b^{12}}{b^5}$. (Example 4)

6. Simplify $\frac{5^5 \cdot 6^3 \cdot 8^{10}}{5^3 \cdot 6 \cdot 8^9}$. (Example 6)

7. A publisher sells 10^6 copies of a new science fiction book and 10^3 copies of a new mystery book. How many times as many science fiction books were sold than mystery books? (Example 5)

8. Simplify $\frac{45x^{15}}{9x^{10}}$. (Example 7)

Test Practice

9. Equation Editor Simplify $\frac{a^4c^6}{a^2c}$.

←

→

↶

↷

✕

1

2

3

+

−

×

÷

4

5

6

<

≤

=

≥

>

7

8

9

$\frac{x}{n}$

x^n

()

||

$\sqrt{x}$

$\sqrt[n]{x}$

π

0

.

−

Multiple Choice Question 2

Q2) Use the Power of a Power Property and the Power of a Product Property to simplify expressions with integer exponents. Q 1 to 10 Pg 31.

Simplify each expression. (Examples 1–4)

1. $(7^2)^3 =$ _____

2. $(8^3)^3 =$ _____

3. $(d^7)^6 =$ _____

4. $(z^7)^3 =$ _____

5. $(2m^5)^6 =$ _____

6. $(7a^5b^6)^4 =$ _____

7. $(-3w^3z^8)^5 =$ _____

8. $(-5r^4s^{10})^4 =$ _____

9. Which is greater: 1,000 or $(6^2)^3$? Explain.

Test Practice

10. Multiselect Select all of the expressions that simplify to the same expression.

☐ $(x^3y^4)^2$

☐ $(x^2y)^2$

☐ $(x^3)^2y^6$

☐ $x^6(y^4)^2$

☐ $(x^3)^2(y^2)^4$

Multiple Choice Question 3

Q3) Use the Zero Exponent Rule Quotient of Powers Property to simplify expressions with zero and negative integer exponents. Q 1 to 12 Pg 41.

Simplify each expression. (Example 1)

1. $46^0 =$ _____

2. w^0 , where $w \neq 0$

Express each using a positive exponent.

(Example 2)

3. $8^{-4} =$ _____

4. $y^{-9} =$ _____

Express each fraction using a negative exponent. (Example 3)

5. $\frac{1}{d^6} =$ _____

6. $\frac{1}{10^5} =$ _____

Simplify each expression. (Examples 4 and 5)

7. $9^4 \cdot 9^{-6} =$ _____

8. $y^{-9} \cdot y^3 =$ _____

9. $\frac{x^{-8}}{x^{-12}} =$ _____

10. $\frac{d^{-13}}{d^{-2}} =$ _____

11. Simplify $8^{-7} \cdot 8^7 \cdot 10^4 \cdot 10^{-4}$.

Test Practice

12. Multiselect Select all of the expressions that are simplified.

- ☐ n^4
- ☐ $\frac{1}{n^{-5}}$
- ☐ $n^6 \cdot n^{-8}$
- ☐ $n^7 \cdot p^8$
- ☐ $\frac{1}{n^3}$

Multiple Choice Question 4

Q4) Write very large and very small numbers using Scientific Notation.
Q 1 to 2 and Q 5 to 10 Pg 53.

Write each number in standard form. (Examples 1 and 2)

1. $1.6 \times 10^3 =$ _____

2. $1.49 \times 10^{-7} =$ _____

3. A calculator screen shows a number in scientific notation as $8.3E-6$. Write this number in standard form. (Example 3)

4. A calculator screen shows a number in scientific notation as $7E11$. Write this number in standard form. (Example 3)

Write each number in scientific notation. (Examples 4 and 5)

5. $2,204,000,000 =$ _____

6. $0.0000000642 =$ _____

7. A common race is a 5K race, where runners travel 5 kilometers. Is it more appropriate to report the distance as 5 kilometers or 5×10^6 millimeters? Explain your reasoning. (Example 6)

8. The population of Florida was recently recorded as 20,612,439 people. Write an estimation in scientific notation for the population. (Example 7)

9. The diameter of a grain of sand is 0.0024 inch. Write an estimation in scientific notation for the diameter. (Example 7)

Test Practice

10. **Equation Editor** The mass of planet Earth is about 5.98×10^{24} kilograms. When this number is written in standard notation, how many zeros are in the number?

←

→

↶

↷

✖

1	2	3
4	5	6
7	8	9
0	.	-

Multiple Choice Question 5

*Q5) Perform computations with numbers written in Scientific Notation.
Q 1 to 5 Pg 61.*

1. There are about 3×10^{11} stars in our galaxy and about 100 billion galaxies in the observable universe. Suppose every galaxy has as many stars as ours. How many stars are in the observable universe? Write in scientific notation.
(Example 1)

2. Humpback whales are known to weigh as much as 80,000 pounds. The tiny krill they eat weigh only 2.1875×10^{-3} pound. About how many times greater is the weight of a humpback whale? (Example 2)

Evaluate. Express each result in scientific notation. (Example 3)

3. $(1.28 \times 10^5) + (1.13 \times 10^3) =$

4. $(7.26 \times 10^6) - (1.3 \times 10^4) =$

5. The speed of light is about 1.86×10^5 miles per second. The star Sirius is about 5.062×10^{13} miles from Earth. About how many seconds does it take light to travel from Sirius to Earth? Write in scientific notation, rounded to the nearest hundredth.

Multiple Choice Question 6

Q6) *Convert Rational Numbers in to Repeating Decimal. Q 1 to 4 Pg 77.*

Write each rational number in decimal form. Then determine whether the decimal is a terminating decimal. (Examples 1 and 2)

1. $\frac{11}{16} =$ _____

2. $\frac{5}{33} =$ _____

3. $4\frac{3}{8} =$ _____

4. $-9\frac{11}{30} =$ _____

Multiple Choice Question 7

Q7) Find Square and Cube roots. Q 1 to 7 Pg 89.

Simplify using rational numbers. If the expression cannot be simplified, explain why. (Examples 1–4)

1. $\sqrt{361} =$ _____

2. $\pm\sqrt{1.96} =$ _____

3. $-\sqrt{\frac{9}{16}} =$ _____

4. $\sqrt{-441} =$ _____

5. Solve $m^2 = 0.04$. (Example 5) _____

Simplify using rational numbers. (Examples 6 and 7)

6. $\sqrt[3]{343} =$ _____

7. $\sqrt[3]{-512} =$ _____

Multiple Choice Question 8

Q8) Identify rational numbers and name the set(s) of real numbers to which a given real number belongs. Q 1 to 11 Pg 99.

Identify whether each number is *rational* or *irrational*. (Example 1)

1. $-\sqrt{10}$

2. $-\frac{3}{11}$

3. $0.\overline{3}$

4. $\sqrt{81}$

5. 0

6. $-\frac{\sqrt{2}}{2}$

7. $\sqrt{7}$

8. $\frac{\sqrt{2}}{\sqrt{2}}$

Select all the sets of numbers to which each real number belongs. (Examples 2–4)

9. $\sqrt[3]{343}$

- ☐ (A) Rational
- ☐ (B) Irrational
- ☐ (C) Integer
- ☐ (D) Whole
- ☐ (E) Natural

10. $\frac{7}{\sqrt{2}}$

- ☐ (A) Rational
- ☐ (B) Irrational
- ☐ (C) Integer
- ☐ (D) Whole
- ☐ (E) Natural

11. $-\frac{7}{1}$

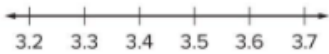
- ☐ (A) Rational
- ☐ (B) Irrational
- ☐ (C) Integer
- ☐ (D) Whole
- ☐ (E) Natural

Multiple Choice Question 9

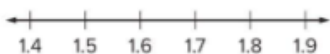
Q9) Use rational approximations to compare and order real numbers, including irrational numbers. Q 1 to 7 Pg 121.

Complete each statement using $<$, $>$, or $=$. Then graph the numbers on the number line. (Examples 1 and 2)

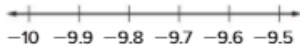
1. $\sqrt{11}$ _____ $3\frac{2}{3}$



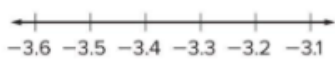
2. $\sqrt{3}$ _____ $\frac{\sqrt{10}}{2}$



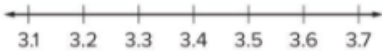
3. $-\pi^2$ _____ $-\sqrt{93}$



4. $-\sqrt{12}$ _____ -320%



5. Order the set $\left\{3\frac{1}{2}, \frac{10}{3}, \pi, \sqrt{13}\right\}$ from least to greatest. Then graph the set on the number line. (Example 3)



6. The table shows the foul-shot statistics for three players in a recent basketball game. Which player had the greatest foul-shot statistic? (Example 4)

Player	Foul-Shot Statistic
1	$\frac{7}{9}$
2	72%
3	8 out of 10

Test Practice

7. **Multiple Choice** Select the symbol that makes the sentence true.

$\sqrt{27}$ _____ $\frac{\sqrt{95}}{2}$

- (A) $<$
- (B) $>$
- (C) $=$
- (D) $\leq$

Multiple Choice Question 10

Q10) Use square and cube roots to solve equations involving perfect squares and cubes. Q 8 to 9 Pg 89 Q 11 to 13 Pg 90.

8. A basin of a water fountain is cube shaped and has a volume of 91.125 cubic feet. Solve $s^3 = 91.125$ to find the length s of one side of the basin. (Example 8)
9. Moesha has 196 pepper plants that she wants to plant in a square formation. How many pepper plants should she plant in each row?
11. A cement path consists of six equal-sized cement squares arranged in a row to form a rectangle. If the total area of the path is 96 square feet, what is the length in feet of the path?
12. A photo collage consists of seven equal-sized square photos arranged in a row to form a rectangle. If the total area of the collage is 567 square inches, what is the length of the collage?
13.  **Reason Inductively** Explain why $\sqrt[3]{8}$ is a rational number, but $\sqrt{8}$ is not a rational number.

Multiple Choice Question 11

Q11) Use the properties of equality to solve equations with variables on each side that have rational coefficients. Q 1 to 8 Pg 135.

Solve each equation. Check your solution. (Examples 1–3)

1. $-2a - 9 = 6a + 15$

2. $14 + 3n = 5n - 6$

3. $\frac{1}{2}x - 5 = 10 - \frac{3}{4}x$

4. $\frac{2}{3}y + 1 = \frac{1}{6}y + 8$

5. $5.4p + 13.1 = -2.6p + 3.5$

6. $0.15w + 0.35 = 0.22w - 0.14$

7. Twelve more than seven times a number equals the number less six. Solve the equation $7x + 12 = x - 6$ to find the number, x .

Test Practice

8. **Equation Editor** Solve the equation shown for x .
 $3x - 15 = 17 - x$

← → ↶ ↷ ⌫

1	2	3
4	5	6
7	8	9
0	.	-

Multiple Choice Question 12

Q12) Write Linear Equations in one variable with rational coefficients and use the properties of equality to solve them. Q 1 to 5 Pg 143.

Write and solve an equation for each exercise. Check your solution.

(Examples 1 and 2)

1. Marko has 45 comic books in his collection, and Tamara has 61 comic books. Marko buys 4 new comic books each month and Tamara buys 2 comic books each month. After how many months will Marko and Tamara have the same number of comic books?
2. A fish tank has 150 gallons of water and is being drained at a rate of $\frac{1}{2}$ gallon each second. A second fish tank has 120 gallons of water and is being filled at a rate of $\frac{1}{4}$ gallon each second. After how many seconds will the two fish tanks have the same amount of water?
3. Shipping Company A charges \$14 plus \$2.25 a pound to ship overnight packages. Shipping Company B charges \$20 plus \$1.50 a pound to ship an overnight package. For what weight is the charge the same for the two companies?
4. A bicycle rental company charges a \$20 fee plus \$5.50 per hour to rent a bicycle. Another bicycle rental company charges a \$15 fee plus \$6.50 per hour to rent a bicycle. For what number of hours is the cost for the rental the same?

Test Practice

5. **Open Response** Deanna and Lulu are playing games at the arcade. Deanna starts with \$15, and the machine she is playing costs \$0.75 per game. Lulu starts with \$13, and her machine costs \$0.50 per game. After how many games will the two friends have the same amount of money remaining? Let g represent the number of games.

Equation:

Number of Games:

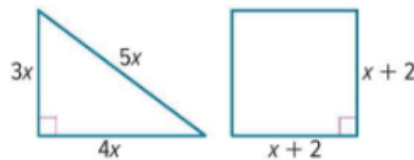
Multiple Choice Question 13

Q13) Solve Multi Step linear equations with rational coefficients by using Distributive property and combining like terms. Q 8 to 12 Pg 150.

Apply

8. At a health club, 96 members participate in the morning workout, and this number has been increasing by 2 people per week. In the afternoon workout, there are 80 members, and this number has been decreasing by 3 people per week. Solve the equation $96 + 2w = 2(80 - 3w)$ to find in how many weeks w the number of people working out in the morning will be double the number of people working out in the afternoon.

9. The triangle and the square shown have the same perimeter. Solve the equation $3x + 4x + 5x = 4(x + 2)$ to find the value of x . Then find the length of one side of the square.



10. **MP Find the Error** A student solved the equation $3(-4 + x) - 5x = 7x + 15$. Find her mistake and correct it.

$$\begin{aligned} 3(-4 + x) - 5x &= 7x + 15 \\ -12 + 3x - 15x &= 7x + 15 \\ -12 - 12x &= 7x + 15 \\ -12 - 12x + 12x &= 7x + 12x + 15 \\ -12 &= 19x + 15 \\ -12 - 15 &= 19x + 15 - 15 \\ -27 &= 19x \\ -\frac{8}{19} &= x \end{aligned}$$

11. **MP Identify Structure** Describe the role of the Distributive Property when solving multi-step equations that contain expressions with grouping symbols.

12. Suppose your friend says he can solve the equation $15 - (2x + 6) = \frac{1}{2}(7x - 4)$ by first using the Multiplication Property of Equality to multiply each side of the equation by 2. Is he correct? Justify your response.

Multiple Choice Question 14

Q14) Identify the number of solutions of a linear equation in one variable by simplifying each side and comparing coefficients and constants.

Q 1 to 9 Pg 167.

Solve each equation. Determine whether the equation has one solution, no solution, or infinitely many solutions. (Examples 1 and 2)

1. $4(x - 8) + 12 = 2(2x - 9)$

2. $3(2k - 5) = 6(k - 4) + 9$

3. $-4y - 3 = \frac{1}{3}(12y - 9) - 8y$

4. $6(3 - 5w) = 5(4 - 2w) - 20w$

Complete each equation so that it has infinitely many solutions. (Example 3)

5. $2x - 7(x + 10) = \square x - \square$

6. $12x - x + 8 + 3x = \square x + \square$

Complete each equation so that it has no solution. (Example 4)

7. $-15x + 4x + 2 - x = \square x + \square$

8. $9(x - 4) - 5x = \square x - \square$

Test Practice

9. **Multiple Choice** Which of the following explains why $\frac{2}{3}(x + 3) = \frac{2}{3}(x - 6)$ has no solution?

- (A) The coefficients are different, and the constants are different.
- (B) The coefficients are the same, and the constants are the same.
- (C) The coefficients are different, and the constants are the same.
- (D) The coefficients are the same, and the constants are different.

Multiple Choice Question 15

Q15) Graph and compare proportional relationships using words, equations and tables and interpret the unit rate as the slope of the line.
Examples 5 Page 195 Q1 to Q100

 Example 5 Compare Proportional Relationships

The cost y for computer repairs at Computer Access for x hours is shown in the table. Macro Repair charges \$23.50 per hour for computer repairs. Assume that the cost is proportional to the number of hours.

Which company has the lower repair cost? Explain.

Computer Access	
Number of Hours, x	Cost (\$), y
2	50
3	75
4	100
5	125

Note: The table is annotated with arrows showing a constant increase of +1 in hours and +25 in cost between consecutive rows.

Step 1 Find the unit cost for Computer Access.

Because the relationship is proportional, the constant rate of change is the same as the slope and unit rate.

$$\frac{\text{change in cost}}{\text{change in hours}} = \frac{\$25}{1 \text{ hour}}$$

As the cost increases by \$25, the number of hours increases by 1.
So, the unit cost is \$_____ per hour.

Step 2 Find the unit cost for Macro Repair and compare the unit costs.

From the problem, we know that Macro Repair charges \$_____ per hour. So, the rate for repairs at Macro Repair is less than the rate for repairs at Computer Access.

Since $\$23.50 < \$25$, _____ has the lower repair cost.

Multiple Choice Question 15

Q15) Graph and compare proportional relationships using words, equations and tables and interpret the unit rate as the slope of the line.
Examples 5 Page 185 Q 1 to 4 Pg 189.

1. The graph shows the amount of book sales over several days. Find and interpret the slope. Then find the unit rate and compare it to the slope. (Example 1)



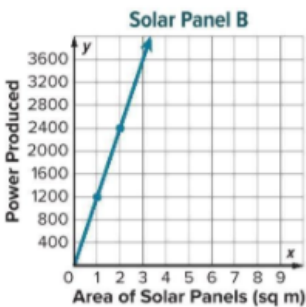
2. The cost y of renting a snowmobile for x hours is a proportional relationship. This can be represented by the equation $y = 33.75x$. Graph the equation. Then find and interpret the slope. (Example 2)



3. By the end of its fourth week, a movie had grossed \$9.2 million. Assume the revenue y in millions of dollars is proportional to the week x . Graph this relationship on the coordinate plane. Then find and interpret the slope. (Example 3)



4. The amount of power y solar panel A can produce with an area of x square meters can be represented by the equation $y = 1,020x$. The amount of power a solar panel B can produce is shown on the graph. Which solar panel can produce more power? Explain. (Example 4)

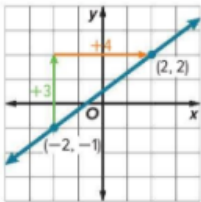


Multiple Choice Question 16

Q16) Identify the slope of a line and interpret it as the rate of change within the context of the problem. Examples 1 to 3 Page 192 – 195 Q 1 to 3 Pg 203.

Learn Find Slope from a Graph

The slope of a line can be found from a graph by finding the ratio of the rise to the run between any two points on the line.



$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\boxed{}}{\boxed{}}$$

 ← vertical change between $(-2, -1)$ and $(2, 2)$
 ← horizontal change between $(-2, -1)$ and $(2, 2)$

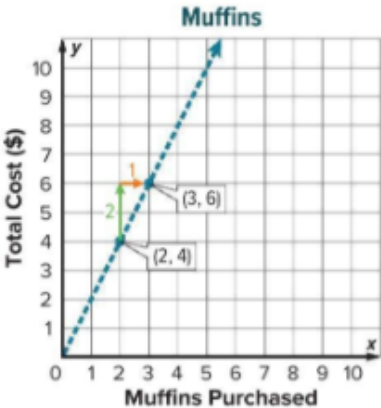
When reading the rise and run from a graph, a rise up is positive, a rise down is negative, a run to the right is positive, and a run to the left is negative.

Example 1 Find Slope from a Graph

The graph shows the cost of muffins at a bake sale.

Find the slope of the line.

To calculate the slope, find the ratio of the vertical change (rise) to the horizontal change (run) between any two points on the line. In this case, the points (2, 4) and (3, 6) are used.



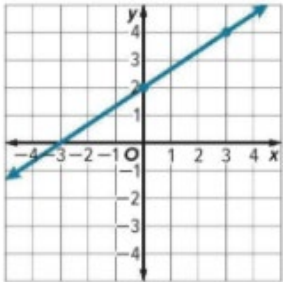
$$\text{slope} = \frac{\text{rise}}{\text{run}}$$
Definition of slope

$$= \frac{\boxed{}}{\boxed{}}$$
rise = 2, run = 1

So, the slope of the line is $\frac{2}{1}$ or 2.

Check

Find the slope of the line.



Multiple Choice Question 16

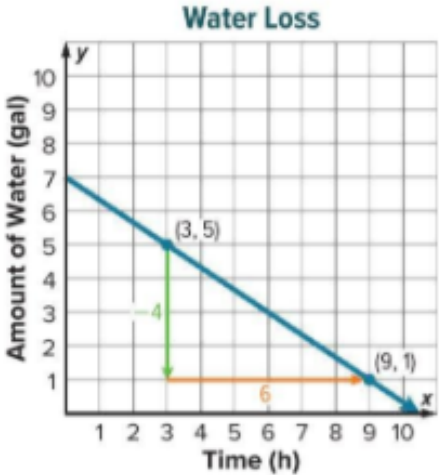
Q16) Identify the slope of a line and interpret it as the rate of change within the context of the problem. Examples 1 to 3 Page 192 – 195 Q 1 to 3 Pg 203.

 Example 2 Find Slope from a Graph

The graph shows the amount of water in a leaking bucket over time.

Find the slope of the line.

To calculate the slope, find the ratio of the vertical change to the horizontal change between any two points on the line.
In this case, the points (3, 5) and (9, 1) are used.



slope = $\frac{\text{rise}}{\text{run}}$ Definition of slope

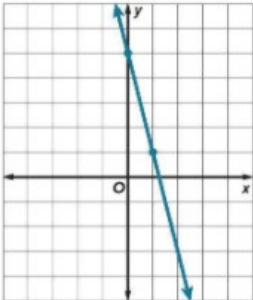
= $\frac{\boxed{}}{\boxed{}}$ rise = -4, run = 6

= $\frac{\boxed{}}{\boxed{}}$ Simplify the ratio.

Check
Find the slope of the line.



So, the slope of the line is $-\frac{2}{3}$ or $-\frac{2}{3}$.



Multiple Choice Question 16

Q16) Identify the slope of a line and interpret it as the rate of change within the context of the problem. Examples 1 to 3 Page 192 – 195 Q 1 to 3 Pg 203.

Learn Find Slope from a Table

You can determine the slope from a table by finding the ratio of the vertical change, y , to the horizontal change, x .

The table shows a linear relationship between the balance in a bank account and the number of transactions. The relationship is linear because there is a constant rate of change, or slope. The slope of the relationship shown is $-\$10$ per transaction.

	Number of Transactions, x	Balance (\$), y	
+3	3	170	-30
+3	6	140	-30
+3	9	110	-30
	12	80	

slope = $\frac{\boxed{}}{\boxed{}}$ $\leftarrow$ change in y

$\leftarrow$ change in x

= $\frac{\boxed{}}{\boxed{}}$

Example 3 Find Slope from a Table

The points given in the table lie on a line.

x	-6	-2	2	6
y	-2	-1	0	1

Find the slope of the line. Check your solution.

Choose any two points from the table to find the changes in the x - and y -values. In this example, the points $(-6, -2)$ and $(-2, -1)$ are used.

slope = $\frac{\text{change in } y}{\text{change in } x}$ Definition of slope

= $\frac{\boxed{} - \boxed{}}{\boxed{} - \boxed{}}$ Use the points $(-6, -2)$ and $(-2, -1)$.

= $\frac{\boxed{}}{\boxed{}}$ Simplify.

So, the slope of the line is $\frac{1}{4}$.

To check, choose two different points from the table and find the slope.

slope = $\frac{0 - 1}{2 - 6}$ Use the points $(6, 1)$ and $(2, 0)$.

= $\frac{-1}{-4}$ or $\frac{1}{4}$ Simplify.

Check

The points given in the table lie on a line. Find the slope of the line.

x	y
1	3
-7	-1
-15	-5
-23	-9



Multiple Choice Question 16

Q16) Identify the slope of a line and interpret it as the rate of change within the context of the problem. Examples 1 to 3 Page 192 – 195 Q 1 to 3 Pg 203.

1. The graph shows the depth in feet of snow after each two-hour period during a snowstorm. Find the slope of the line. (Example 1)



2. The graph shows the amount of money left after buying video games. Find the slope of the line. (Example 2)



3. The points given in the table lie on a line. Find the slope of the line. (Example 3)

x	-1	2	5	8
y	3	-1	-5	-9

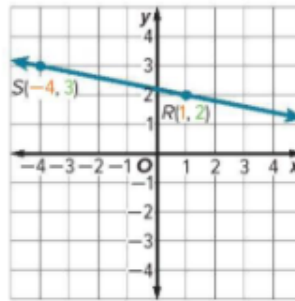
Multiple Choice Question 17

Q17) Find the slope using the formula.

Examples 4 to 6 Page 197 – 200 Q 4 to 6 Pg 203.

Example 4 Find Slope Using the Slope Formula

Find the slope of the line that passes through $R(1, 2)$, $S(-4, 3)$.
Check your solution.



$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope formula} \\ &= \frac{\boxed{} - \boxed{}}{\boxed{} - \boxed{}} && (x_1, y_1) = (1, 2); \\ & && (x_2, y_2) = (-4, 3) \\ &= \frac{\boxed{}}{\boxed{}} \text{ or } -\frac{1}{5} && \text{Simplify.} \end{aligned}$$

So, the slope of the line is $-\frac{1}{5}$.

To check, let $(x_1, y_1) = (-4, 3)$ and $(x_2, y_2) = (1, 2)$.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope formula} \\ &= \frac{2 - 3}{1 - (-4)} && (x_1, y_1) = (-4, 3); (x_2, y_2) = (1, 2) \\ &= \frac{\boxed{}}{\boxed{}} && \text{Simplify.} \end{aligned}$$

Check

Find the slope of the line that passes through $A(-3, 2)$, $B(5, -4)$.



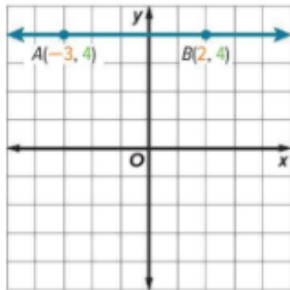
Multiple Choice Question 17

Q17) Find the slope using the formula.

Examples 4 to 6 Page 197 – 200 Q 4 to 6 Pg 203.

Example 5 Zero Slope

Find the slope of the line that passes through $A(-3, 4)$, $B(2, 4)$.



$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{Slope formula}$$

$$= \frac{\boxed{} - \boxed{}}{\boxed{} - \boxed{}} \quad \begin{array}{l} (x_1, y_1) = (2, 4); \\ (x_2, y_2) = (-3, 4) \end{array}$$

$$= \frac{\boxed{}}{\boxed{}} \text{ or } 0 \quad \text{Simplify.}$$

So, the slope of the line is 0.

Check

Find the slope of the line that passes through $A(-4, 5)$, $B(2, 5)$.



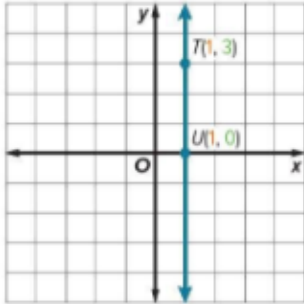
Multiple Choice Question 17

Q17) Find the slope using the formula.

Examples 4 to 6 Page 197 – 200 Q 4 to 6 Pg 203.

Example 6 Undefined Slope

Find the slope of the line that passes through $T(1, 3)$, $U(1, 0)$.



$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope formula} \\ &= \frac{0 - 3}{1 - 1} && (x_1, y_1) = (1, 3); (x_2, y_2) = (1, 0) \\ &= \frac{\cancel{3}}{\cancel{0}} && \text{The slope is undefined.} \end{aligned}$$

So, the slope of the line is _____.

Check

Which of the following represents the slope of the line that passes through $L(-2, 3)$, $M(-2, 8)$?

- (A) 0
- (B) 5
- (C) $-\frac{5}{4}$
- (D) The slope is undefined.



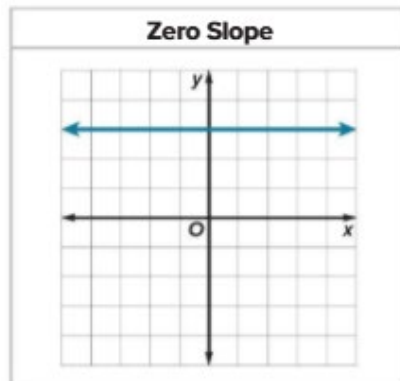
Multiple Choice Question 17

Q17) Find the slope using the formula.

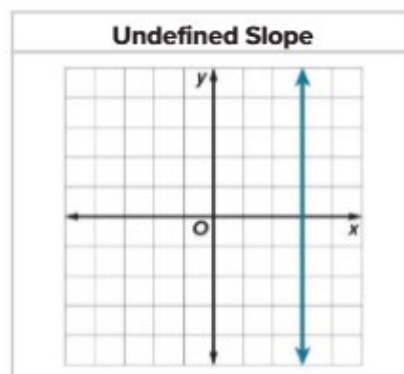
Examples 4 to 6 Page 197 – 200 Q 4 to 6 Pg 203.

Learn Zero and Undefined Slope

Horizontal lines have a slope of _____.



Vertical lines have an _____ slope.



Find the slope of the line that passes through each pair of points. (Examples 4–6)

4. $M(3, 5), N(2, 6)$

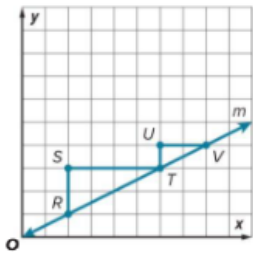
5. $G(-3, 2), H(7, 2)$

6. $E(6, 8), F(6, -2)$

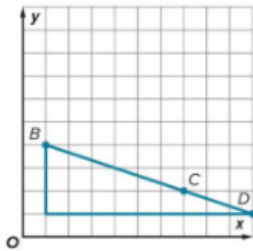
Multiple Choice Question 18

Q18) Identify similar triangles that fall on the same line in a coordinate plane and show that the slopes of the lines are equal. Q 1 to 5 Page 211.

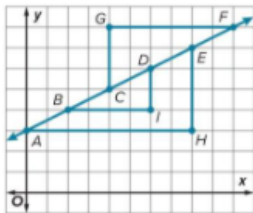
1. The graph of line m is shown. Use the similar slope triangles to compare the slope of segment RT and TV . (Example 1)



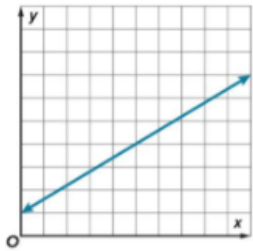
2. The plans for a zipline are shown. Use two points to determine the slope of the zipline. Then verify that the slope is the same by choosing a different set of points. (Example 2)



3. Name the slope triangles shown in the graph. What is the slope of the line?



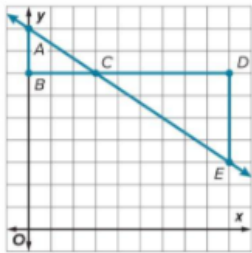
4. Draw two slope triangles on the line. Determine the slope of the line.



Test Practice

5. **Multiselect** The graph shows similar slope triangles on a line. Select all of the statements that are true.

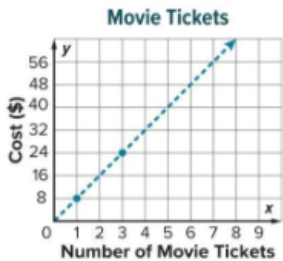
- ☐ The slope of the line is negative.
- ☐ The slopes of each triangle are the same because they lie on the same line.
- ☐ Triangle CDE has a greater slope because the triangle is larger.
- ☐ The slope of each triangle is $\frac{2}{3}$.
- ☐ The slope of the line is positive.



Multiple Choice Question 19

Q19) Derive the equation $y = mx$ from the slope formula and use direct variation equations to represent and solve real – world and Mathematical problems. Q 1 to 5 Page 223.

1. The cost y of movie tickets varies directly with the number of tickets x as shown in the graph. Write a direct variation equation to represent this relationship. Then identify the constant of variation and interpret its meaning. (Example 1)



2. The number of miles y varies directly with the number of hours x as shown in the graph. Write a direct variation equation to represent this relationship. Then identify the constant of variation and interpret its meaning. (Example 1)



3. The cost of paper varies directly with the number of reams bought. Suppose two reams cost \$5.10. Write a direct variation equation to represent this relationship. Then identify the constant of variation and interpret its meaning. (Example 2)
4. The amount of flour needed for a recipe varies directly with the number of servings planned. Three servings require $4\frac{1}{2}$ cups of flour. Write a direct variation equation to represent this relationship. Then identify the constant of variation and interpret its meaning. (Example 2)

Test Practice

5. **Open Response** The distance a bus travels varies directly with time as shown in the table. Write a direct variation equation to represent this relationship. Then identify the constant of variation and interpret its meaning. (Example 3)

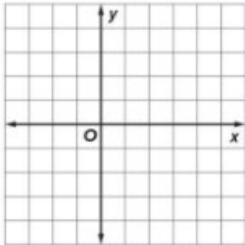
Time (h), x	Distance (mi), y
1.5	93.75
3	187.5
4.5	281.25
6	375

Multiple Choice Question 20

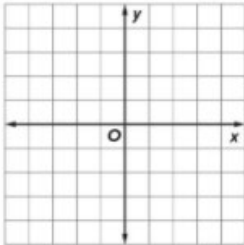
Q20) Interpret the slope and y – intercept of a line from an equation of the form $y = mx + b$ in order to graph the line on the coordinate plane. Q 1 to 6 Page 245.

Graph each equation using the slope and y -intercept. (Example 1)

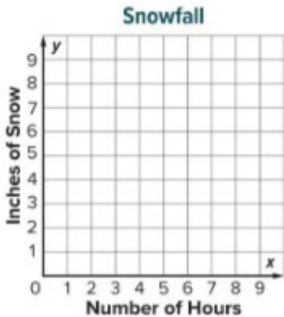
1. $y = \frac{3}{5}x - 3$



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



3. The equation $y = \frac{1}{5}x + 3.5$ can be used to find the amount of accumulated snow y in inches x hours after 5 P.M. on a certain day. Graph this equation. (Example 2)

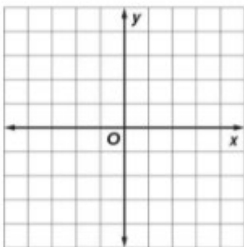


4. Alliyah's gift card balance can be represented by the equation $y = -5x + 50$, where y represents the gift card balance after x number of days. Graph this equation. (Example 2)

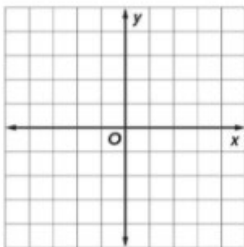


Graph each equation. (Examples 3 and 4)

5. $y = -3$



6. $x = 2$



Free Response Question 21

*Q21) Use Integer exponents to show repeated multiplication of Rational numbers.
Ex 4 and 5 Pg 8 Q 1 to 9 Pg 11*

Example 4 Evaluate Algebraic Expressions

Evaluate $a^2 + b^4$ if $a = 3$ and $b = \frac{1}{2}$.

$$a^2 + b^4 = 3^2 + \left(\frac{1}{2}\right)^4$$

Replace a with 3 and b with $\frac{1}{2}$.

$$= (3 \cdot 3) + \left(\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}\right)$$

Write the powers as products.

$$= \boxed{} + \frac{\boxed{}}{\boxed{}}$$

Multiply.

$$= \boxed{}$$

Add.

So, $a^2 + b^4$ when $a = 3$ and $b = \frac{1}{2}$, is $9\frac{1}{16}$.

Check

Evaluate $a^4 + b^2$ if $a = -3$ and $b = 6$.

Free Response Question 21

Q21) Use Integer exponents to show repeated multiplication of Rational numbers.
Ex 4 and 5 Pg 8 Q 1 to 9 Pg 11

Example 5 Evaluate Algebraic Expressions

Evaluate $d^3 + (c^2 - 2)$ if $c = -4$ and $d = \frac{2}{5}$.

$$d^3 + (c^2 - 2) = \left(\frac{2}{5}\right)^3 + [(-4)^2 - 2]$$

Replace c with -4 and d with $\frac{2}{5}$.

$$= \left(\frac{2}{5}\right)^3 + \boxed{}$$

Perform the operations in grouping symbols.

$$= \boxed{}$$

Simplify.

So, $d^3 + (c^2 - 2)$ when $c = -4$ and $d = \frac{2}{5}$, is $14\frac{8}{125}$.

Check

Evaluate $x^2 + (y^3 - 85)$ if $x = -\frac{1}{3}$ and $y = 5$.



Free Response Question 21

*Q21) Use Integer exponents to show repeated multiplication of Rational numbers.
Ex 4 and 5 Pg 8 Q 1 to 9 Pg 11*

Write each expression using exponents. (Examples 1 and 2)

1. $(-7) \cdot (-7) \cdot 5 \cdot 5 \cdot 5 \cdot 5 =$ _____

2. $n \cdot n \cdot p \cdot p \cdot r \cdot r \cdot r =$ _____

Evaluate each numerical expression. (Example 3)

3. $3^4 - (-4)^2 =$ _____

4. $6 + 2^6 =$ _____

5. Evaluate $x^3 - y^2$ if $x = 2$ and $y = \frac{3}{4}$.
(Example 4)

6. Evaluate $(g + h)^3$ if $g = 2$ and $h = -3$.
(Example 5)

7. Replace $\square$ with $<$, $>$, or $=$ to make a true statement: $(-3)^4 \square (-4)^3$.

8. A scientist estimates that, after a certain amount of time, there would be $2^5 \cdot 3^3 \cdot 10^5$ bacteria in a Petri dish. How many bacteria is this?

Test Practice

9. **Multiselect** Select all of the expressions that evaluate to negative rational numbers.

☐ $(-9)^4$

☐ $\left(-\frac{4}{5}\right)^3$

☐ $3^5 - 10^4$

☐ $(9.8)^2 - 10^2$

☐ $\left(-\frac{3}{8}\right)^2$

Free Response Question 22

Q22) Estimate Irrational numbers by approximating their locations on a number line or by truncating their decimal expansions.

Ex 3 Pg 104 Q 1 to 4 Pg 109

Example 3 Estimate Cube Roots to the Nearest Integer

Estimate $\sqrt[3]{320}$ to the nearest integer.

Step 1 Find two perfect cubes between which 320 lies. Find their cube roots.

The greatest perfect cube less than 320 is _____, and
 $\sqrt[3]{216} = \underline{\hspace{2cm}}$.

The least perfect cube greater than 320 is _____, and
 $\sqrt[3]{343} = \underline{\hspace{2cm}}$.

Step 2 Plot $\sqrt[3]{216}$, $\sqrt[3]{320}$, and $\sqrt[3]{343}$ on the number line.
Approximate the location of $\sqrt[3]{320}$.



Step 3 Estimate the cube root.

$$216 < 320 < 343 \quad \text{Write an inequality.}$$

$$6^3 < 320 < 7^3 \quad 216 = 6^3 \text{ and } 343 = 7^3$$

$$\sqrt[3]{6^3} < \sqrt[3]{320} < \sqrt[3]{7^3} \quad \text{Find the cube root of each number.}$$

$$\boxed{} < \sqrt[3]{320} < \boxed{} \quad \text{Simplify.}$$

So, $\sqrt[3]{320}$ is between 6 and 7. Since 320 is closer to _____, the best integer estimate for $\sqrt[3]{320}$ is 7.

Check

Estimate $\sqrt[3]{51}$ to the nearest integer.

Free Response Question 22

Q22) Estimate Irrational numbers by approximating their locations on a number line or by truncating their decimal expansions.

Ex 3 Pg 104 Q 1 to 4 Pg 109

Estimate each square root or cube root to the nearest integer. (Examples 1 and 3)

1. $\sqrt{125} \approx$ _____

2. $\sqrt{55} \approx$ _____

3. $\sqrt[3]{70} \approx$ _____

4. $\sqrt[3]{923} \approx$ _____

Free Response Question 23

Q23) Convert a repeating decimal in to a rational number.

Ex 3 and 4 Pg 73 – 74 Q 5 to 8 Pg 77

Example 3 Write Repeating Decimals as Fractions

Write $0.\overline{5}$ as a fraction in simplest form.

Assign a variable to the value $0.\overline{5}$. Let $N = 0.555\ldots$. Then perform operations on N to determine its fractional value.

$$N = 0.555\ldots$$

$$10(N) = 10(0.555\ldots)$$

Multiply each side by 10 because one digit repeats.

$$10N = 5.555\ldots$$

Multiplying by 10 moved the decimal point one place to the right.

$$-(N = 0.555\ldots)$$

Subtract $N = 0.555\ldots$ to eliminate the repeating part.

$$9N = 5$$

Simplify.

$$N = \frac{\boxed{}}{\boxed{}}$$

Divide each side by 9.

So, the decimal $0.\overline{5}$ can be written as the fraction $\frac{5}{9}$.

Check

Write $-\overline{0.7}$ as a fraction in simplest form.



Free Response Question 23

Q23) Convert a repeating decimal in to a rational number.

Ex 3 and 4 Pg 73 – 74 Q 5 to 8 Pg 77

Example 4 Write Repeating Decimals as Mixed Numbers

Write $2.\overline{18}$ as a mixed number in simplest form.

Assign a variable to the value $2.\overline{18}$. Let $N = 2.\overline{18}$. Then perform operations on N to determine its fractional value.

$$N = 2.\overline{18}$$

$$100(N) = 100(2.\overline{18})$$

Multiply each side by 100 because two digits repeat.

$$100N = 218.\overline{18}$$

Simplify.

$$- (N = 2.\overline{18})$$

Subtract $N = 2.\overline{18}$ to eliminate the repeating part.

$$99N = \boxed{}$$

Simplify.

$$N = \frac{\boxed{}}{\boxed{}}$$

Divide each side by 99.

$$N = \boxed{}$$

Write as a mixed number in simplest form.

So, the decimal $2.\overline{18}$ can be written as $2\frac{2}{11}$.

Check

Write $1.\overline{42}$ as a mixed number in simplest form.



Free Response Question 23

Q23) Convert a repeating decimal in to a rational number.

Ex 3 and 4 Pg 73 – 74 Q 5 to 8 Pg 77

Learn Write Repeating Decimals as Fractions

 **Go Online** Watch the animation to learn how to use an algebraic method to write a repeating, non-terminating decimal, such as $0.\overline{4}$, as a fraction.

$$N = 0.444\ldots$$

Assign a variable to the value of the decimal.

$$10(N) = 10(0.444\ldots)$$

Multiply each side by a power of 10.

$$10N = 4.444\ldots$$

Multiplying by 10 moves the decimal point one place to the right.

$$\underline{-(N = 0.444\ldots)}$$

Subtract the original equation to eliminate the repeating part.

$$9N = 4$$

Simplify.

$$\frac{9N}{9} = \frac{4}{9}$$

Divide each side by 9.

$$N = \frac{4}{9}$$

Simplify.

The decimal $0.444\ldots$ is equivalent to $\frac{4}{9}$.

Write each decimal as a fraction or mixed number in simplest form. (Examples 3 and 4)

5. $0.\overline{8} =$ _____

6. $-0.\overline{18} =$ _____

7. $-1.\overline{5} =$ _____

8. $4.\overline{45} =$ _____

Free Response Question 24

Q24) Write and solve multi – step equations with rational coefficients by using Distributive Property and combining Like Terms.
Q 1 to 7 Page 157 – 158.

Write and solve an equation for each exercise. Check your solution.
(Examples 1 and 2)

1. Mr. Reed is drawing a blueprint of a rectangular patio. The width of the patio is $40\frac{3}{4}$ feet shorter than twice its length. The perimeter of the patio is $86\frac{1}{2}$ feet. What is the length of the patio?
2. The Yearbook Club is going to an amusement park, and each of their 12 members will pay for admission and will also help pay for parking. The Robotics Club is going to a waterpark, and each of their 14 members will pay for admission and will also purchase a meal ticket. Admission to the amusement park is 1.5 times that of the waterpark's admission, as shown in the table. If the total cost is the same at both the amusement park and the waterpark, what is the admission per student to the waterpark?

Amusement Park	Waterpark
Admission: $\$1.5x$ per student	Admission: $\$x$ per student
Parking: $\$2$ per student	Meal Ticket: $\$10.50$ per student

Test Practice

3. **Open Response** Arjun purchased 5 tickets to a play, each with the same price. He was also charged an online service fee of $\$3.50$ per ticket. Emilia purchased 3 tickets to the same play and paid twice as much for her tickets as Arjun. Emilia was also charged a service fee of $\$2.75$ per ticket. If they spent the same amount, what is the cost of each of the tickets Arjun purchased? Let t represent the cost of each of Arjun's tickets.

Equation:

Cost of a Ticket:

Free Response Question 24

Q24) Write and solve multi – step equations with rational coefficients by using Distributive Property and combining Like Terms.
Q 1 to 7 Page 157 – 158.

Apply

4. Four siblings have a dog walking business. The table shows the hours worked by each sibling. Each sibling earns \$25.50 per hour and the total number of hours worked is represented by $10h + 15$, where h represents the number of hours Michael worked. What was the total amount the siblings earned?

Sibling	Hours Worked
Martin	$2.5h + 3$
Emilio	$4(h - 2)$
Michael	h
Mario	31

5. **Create** Write a real-world problem that can be solved using a multi-step equation. Then write and solve an equation for your problem.

6. **MP Persevere with Problems** Elijah put $2x + 3$ dollars in the bank the first week. The following week he doubled the first week’s savings and put that amount in the bank. The next week, he doubled what was in the bank and put that amount in the bank. He now has \$477 in the bank. Write and solve an equation to find how much money he put in the bank the first week.

7. **MP Find the Error** A student wrote the equation $4(x + 5.5) = 3(1.5x + 4.75)$ to represent the problem shown. Find her mistake and correct it.

Petra and her 4 friends went to the movies. They each bought a ticket for x dollars and spent \$5.50 each on snacks. Valentina and her 3 friends went to the movies and paid 1.5 times as much for each of their tickets as Petra. Everyone in Valentina’s group also spent \$4.75 each on snacks. If both groups spent the same amount, what is the cost of a ticket for Petra’s group?

Free Response Question 25

Q25) Write Equations of the form $y = mx + b$ when given a table, graph or a verbal description. Q 1 to 10 Page 235.

Identify the slope and y-intercept of the graph of each equation. (Example 1)

1. $y = \frac{1}{2}x - 5$

2. $y = 3x - 1$

Write the equation of a line in slope-intercept form with each slope and y-intercept. (Example 2)

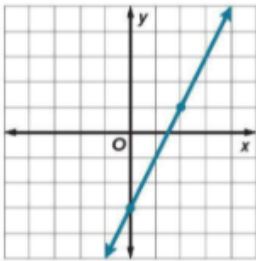
3. slope = $-\frac{1}{3}$, y-intercept = 4

4. slope = $\frac{3}{2}$, y-intercept = -3

5. slope = 4, y-intercept = -2

6. slope = -1, y-intercept = 6

7. Write an equation in slope-intercept form for the graph shown. (Example 3)



8. The Augello family is driving from Columbus to St. Louis at a constant rate of 65 miles per hour. The distance between the two cities is 420 miles. Write an equation in slope-intercept form to represent the distance y in miles remaining after driving x hours. (Example 4)

9. The table shows the costs for art show participants, including the \$30 registration fee. Write an equation in slope-intercept form that represents the data in the table. (Example 5)

Number of Pieces of Art	Cost (\$)
0	30
2	90
4	150
6	210
8	270

Test Practice

10. **Multiselect** Select all of the statements that are true about the equation $y = -\frac{3}{5}x + 8$.

- ☐ The slope of the line is negative.
- ☐ The slope of the line is 8.
- ☐ The y-intercept of the line is 8.
- ☐ The y-intercept of the line is $-\frac{3}{5}$.
- ☐ The slope of the line is $-\frac{3}{5}$.