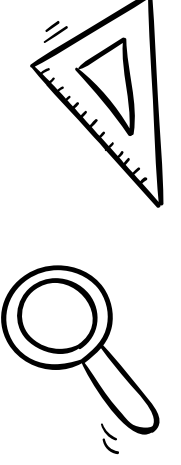
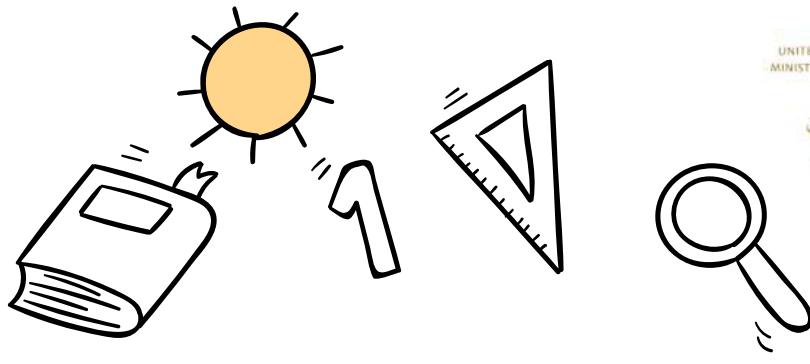


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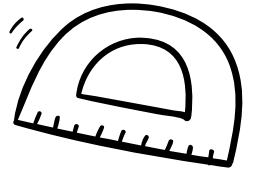
الإمارات العربية المتحدة
وزارة التربية والتعليم

مدرسة الخير للتعليم الأساسي والثانوي
Al khair school C2-C3



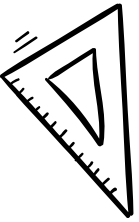
Math Booklet

“Success is the sum of small efforts, repeated day in and day out.”

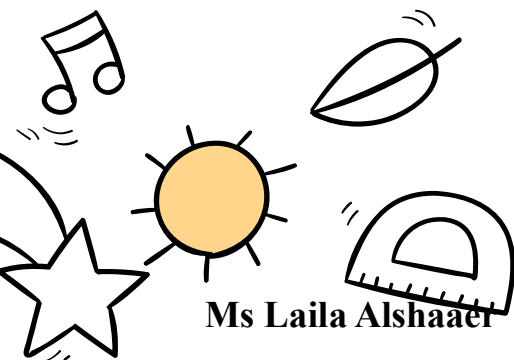


Students Name: _____

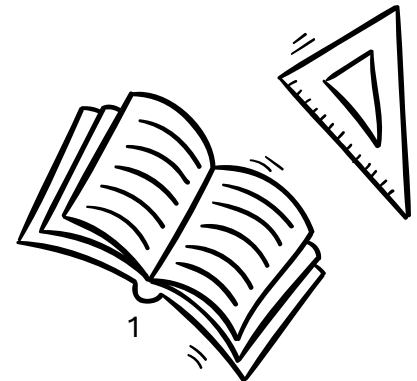
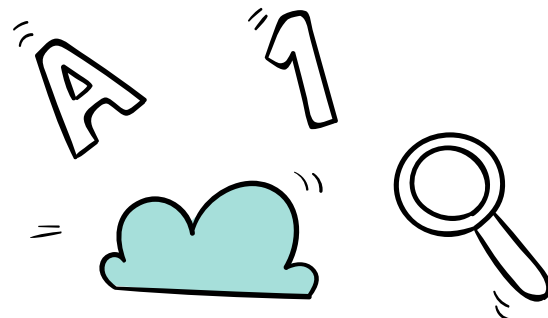
Class: _____



Ms Laila Alshaaer



Ms Laila Alshaaer



[illegible]

2.2 Roots

Simplify using rational numbers. If the expression cannot be simplified, explain why.

1. $\sqrt{289} =$ _____

2. $\sqrt{36} =$ _____

3. $\sqrt{1.69} =$ _____

4. $\sqrt{\frac{4}{25}} =$ _____

5. $\pm\sqrt{2.25} =$ _____

6. $\pm\sqrt{\frac{49}{64}} =$ _____

7. $-\sqrt{4.41} =$ _____

8. $-\sqrt{\frac{81}{100}} =$ _____

9. $\sqrt{-225} =$ _____

10. $-\sqrt{-49} =$ _____

Simplify using rational numbers.

11. $\sqrt[3]{216} =$ _____

12. $\sqrt[3]{1} =$ _____

13. $\sqrt[3]{64} =$ _____

14. $\sqrt[3]{-8} =$ _____

15. $\sqrt[3]{-1} =$ _____

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

2.3 Real Numbers

Identify whether each number is *rational* or *irrational*.

1. $1.\bar{6}$

2. 17

3. $\sqrt{15}$

4. $\frac{1}{12}$

5. $\sqrt{49}$

6. π

7. $\frac{\sqrt{5}}{\sqrt{5}}$

8. 0.18

Select all the sets of numbers to which each real number belongs.

9. $-\sqrt[3]{125}$

10. $\frac{1}{\sqrt{3}}$

11. $\sqrt{110}$

12. $\frac{9}{1}$

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

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

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

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

2.4 Estimate Irrational Numbers

Estimate each square root or cube root to the nearest integer.

1. $\sqrt{5} \approx$ _____

2. $\sqrt{11} \approx$ _____

3. $\sqrt{39} \approx$ _____

4. $\sqrt{80} \approx$ _____

5. $\sqrt[3]{11} \approx$ _____

6. $\sqrt[3]{26} \approx$ _____

7. $\sqrt[3]{60} \approx$ _____

8. $\sqrt[3]{205} \approx$ _____

Estimate each square root to the nearest tenth.

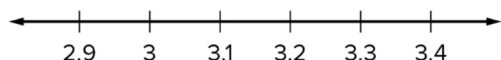
9. $\sqrt{8} \approx$ _____

10. $\sqrt{19} \approx$ _____

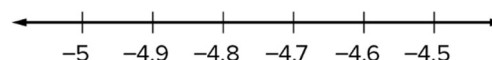
2.5 Compare and Order Real Numbers

Complete each statement using $<$, $>$, or $=$. Then graph the numbers on the number line.

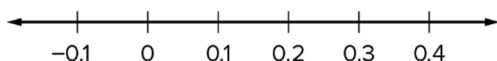
1. $\frac{22}{7}$ _____ $\sqrt{11}$



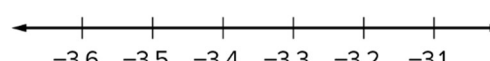
2. $\frac{-56}{12}$ _____ $-\sqrt{24}$



3. $\frac{1}{\pi}$ _____ $\sqrt{\frac{1}{81}}$

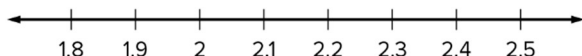


4. $-\sqrt{13}$ _____ $-\pi$

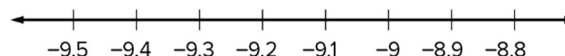


Order each set of numbers from least to greatest. Then graph the set on the number line.

1. $\left\{2\frac{1}{3}, \frac{26}{12}, \sqrt{6}, \frac{4\pi}{7}\right\}$



2. $\left[-\sqrt{79}, -\frac{46}{5}, -9\frac{1}{2}, -3\pi\right]$



1. The table shows the statistics for the number of students who packed their lunches on three consecutive days. On which day did the least number of students pack their lunches?

Day	Packed Lunch Statistic
1	7 out of 12
2	63%
3	$\frac{9}{16}$

3.1 Solve Equations with Variables on Each Side

Solve each equation. Check your solution.

1. $a - 4 = 3a + 8$

2. $12b + 18 = 5b + 4$

3. $5c - 33 = 9 - c$

4. $3d + 8 = 12 + 2d$

5. $\frac{1}{6}p + 8 = -\frac{1}{3}p + 14$

6. $\frac{7}{16}y + 6 = 8 + \frac{3}{8}y$

7. $\frac{5}{9}s - 14 = \frac{7}{18}s - 16$

8. $-7 + \frac{3}{14}t = \frac{1}{7}t - 8$

9. $\frac{1}{3}v + 5 = \frac{2}{9}v + 7$

10. $3.4f + 8.5 = 2.8f + 6.1$

11. $5.8k - 11.5 = 3.3k + 13.5$

12. $0.4j + 8.4 = 1.2j - 1.2$

3.2 Write and Solve Equations with Variables on Each Side

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

1. A piano teacher charges \$20 per lesson plus a \$30 fee for supplies. Another teacher does not have a supply fee but charges \$30 per lesson. After how many lessons will the cost of the two teachers be the same?
2. A 9,000-gallon silo of wheat is being **drained** at a rate of 500 gallons per hour. A 7,000-gallon silo of wheat is being **filled** at a rate of 500 gallons per hour. After how many hours will the silos have the same amount of wheat?
3. Two students collect baseball cards. Shushu has 210 cards, and Vivak has 160 cards. Shushu adds 8 new cards to her collection each month, and Vivak adds 13 new cards each month. After how many months will they have the same number of baseball cards?
4. A bowling alley charges \$4 for shoes and \$2 per game to bowl. Another bowling alley charges \$6 for shoes and \$1.60 per game to bowl. How many games can be played for the total charge to be the same in both bowling alleys?

3.3 Solve Multi-Step Equations

Solve each equation. Check your solution.

1. $-x + 3(1 + x) = 3(x + 2)$

2. $7 + y = 5(2y - 1) + 3y$

3. $4(y + 2) - 3 = -y$

4. $-9 + 2(n + 3) = 4n - 7$

5. $0.5(2 - x) = 9.5 - (x + 1)$

6. $0.3(y + 2) = 1.7 + (8 - y)$

7. $7 + \frac{2}{5}(5y - 10) = \frac{4}{5}(y + 5) + \frac{1}{5}y$

8. $-9 + \frac{1}{4}(8n + 16) = \frac{1}{4}(20n + 4)$

3.4 Write and Solve Multi-Step Equations

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

1. Mariam's dad is installing a fence in the rectangular backyard. He purchased 110 feet of fencing and plans to use all the fencing. The width of the fenced area will be 5 feet less than twice the length of the fenced area. What is the length of the fenced area?

2. A rectangular television's length is 3 inches more than twice its width. The perimeter of the television is 144 inches. What is the width of the television?

3. Ahmed is building a raised garden bed. The perimeter of the garden bed is 28 feet. The length of the garden bed will be 4 less than twice the width. What is the width of Saul's garden bed?

4. Laila walks around a rectangular city block. She walks a total of 380 yards. The length of the block is 10 yards longer than the width. What is the width of the city block?

5. Ms. Laila's Math class and Mr. Ghalya's social studies class are going on two separate field trips. They have the same budget for their trips. Ms. Laila's class has 30 students, and they are taking a bus to a planetarium. Mr. Ghalya's class of 20 students is taking the subway to a museum. Admission to the planetarium is $\frac{1}{2}$ the cost of admission to the museum, as shown in the table. What is the cost of admission per student to the museum?

Mrs. Shaughnessy's Class	Mr. Ruth's Class
Planetarium admission: $\$ \frac{1}{2}x$ per student	Museum admission: $\$x$ per student
Bus: $\$3$ per student	Subway: $\$2$ per student

6. Sara's family is planning a reunion. Family members traveling from out of town have two options for airfare and hotels. As shown in the table, the cost of airfare for Option 2 is 0.75 times the cost of airfare for Option 1. For the same total cost, 12 family members can attend the reunion if they choose Option 2. Only 10 family members can attend if they choose Option 1.

What is the cost of airfare for Option 1?

Option 1	Option 2
Airfare: $\$x$	Airfare: $\$0.75x$
Hotel: $\$600$	Hotel: $\$800$

3.5 Determine the Number of Solutions

Solve each equation. Determine whether the equation has one solution, no solution, or infinitely many solutions.

1. $5(k + 4) = 2(2.5k - 3) + 12$

2. $7(m + 2) - 5 = \frac{1}{3}(21m + 9) - 6$

3. $-12w + 15 = 2(-6w + 9) - 3$

4. $\frac{1}{5}(25 + 15x) - x = 2(x + 3) - 1$

5. $3(a + 2) - 2a = \frac{1}{7}(-7a + 42)$

6. $2(2z + 7) = \frac{1}{2}(6z - 12) - 2$

Complete each equation so that it has infinitely many solutions.

7. $5(6b - 3) - 3b = \square b - \square$

8. $2r - (9r + 4) = \square r - \square$

9. $\frac{1}{6}(36v + 24) - v = \square v + \square$

10. $6c + 13 - 8c + 1 - c = \square c + \square$

Complete each equation so that it has no solution.

11. $5g + 12 + 4g - g - 7 = \square g + \square$

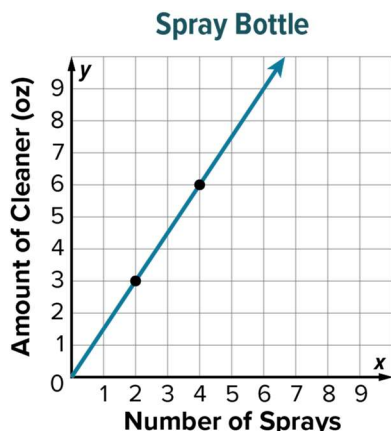
12. $-\frac{1}{8}(-24p - 64) + 5 = \square p + \square$

13. $5(-3h - 4) - 2h = \square h - \square$

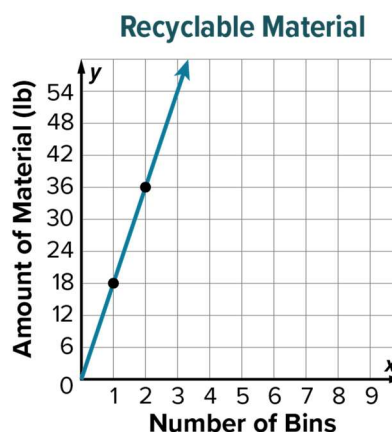
14. $9(2n - 4) + 6(n + 5) = \square n - \square$

4.1 Proportional Relationships and Slope

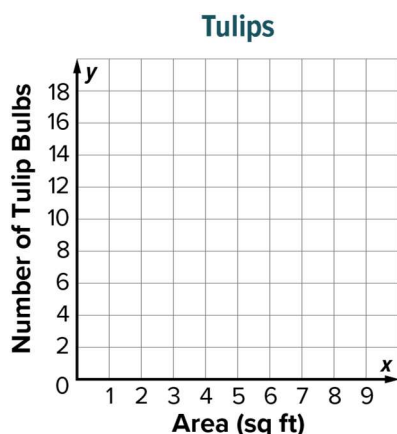
1. The graph shows the amount of cleaning products dispensed when using a spray bottle. Find and interpret the slope. Then find the unit rate and compare it to the slope.



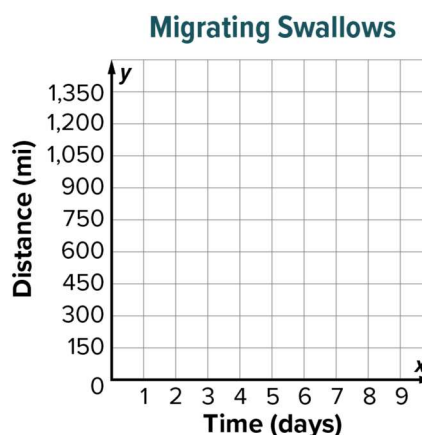
2. The amount of recyclable material transported in several bins is shown on the graph. Find and interpret the slope. Then find the unit rate and compare it to the slope.



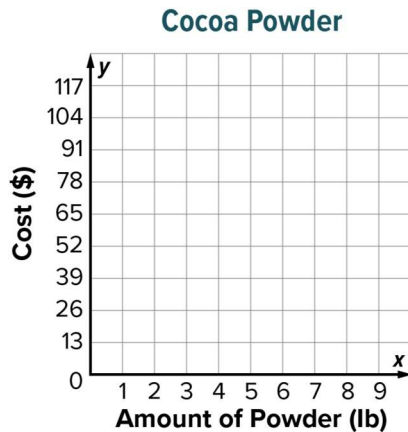
3. The number of tulip bulbs y and the area of the garden x , in square feet, can be represented by the equation $y = 5x$. Graph the equation. Then find and interpret the slope.



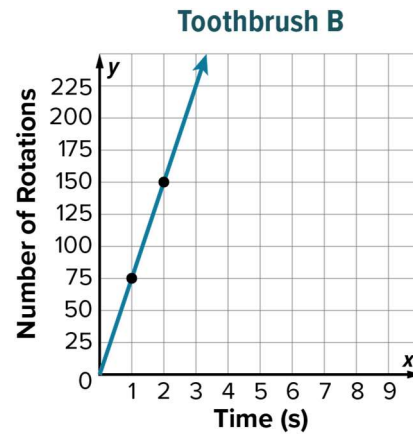
4. The distance traveled by migrating swallows can be represented by $y = 200x$, where y is the distance traveled in miles, and x is the time in days. Graph the equation. Then find and interpret the slope.



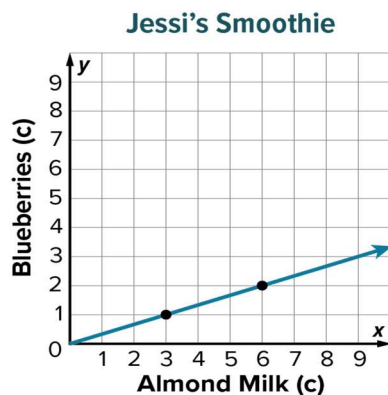
5. Jamal pays \$29.25 for 3 pounds of cocoa powder. Assume that the cost y , in dollars, is proportional to the amount of cocoa powder x , in pounds. Graph this relationship on the coordinate plane. Then find and interpret the slope.



6. The equation $y = 78x$ represents the number of rotations per second for electric toothbrush A. The graph shows the number of rotations for electric toothbrush B. Which toothbrush is faster? Explain.



7. The equation $y = 0.25x$ represents the number of cups of blueberries for each cup of almond milk in Awan's smoothie. The graph shows the relationship between blueberries and almond milk for Jessi's smoothie. Whose smoothie has a stronger blueberry flavor? Explain.

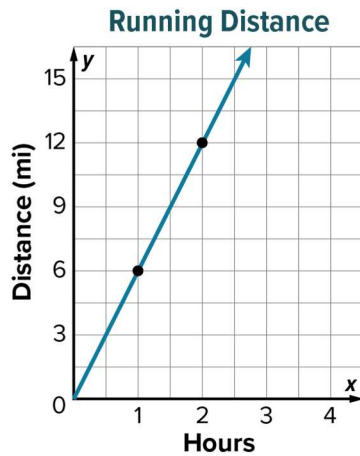


8. The equation $y = 0.25x$ represents the number of cups of blueberries for each cup of almond milk in Awan's smoothie. The graph shows the relationship between blueberries and almond milk for Jessi's smoothie. Whose smoothie has a stronger blueberry flavor? Explain.

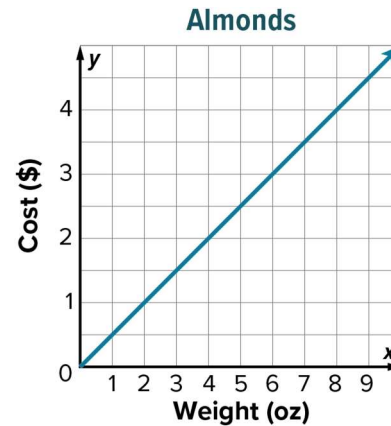
Time (min)	Distance (m)
15	783
20	1044
25	1305

4.2 Slope of a Line

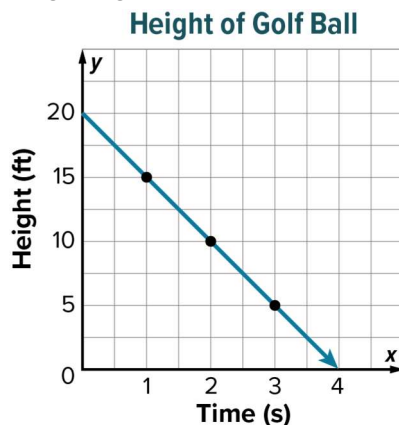
1. The graph shows the distance that an athlete runs. Find the slope of the line.



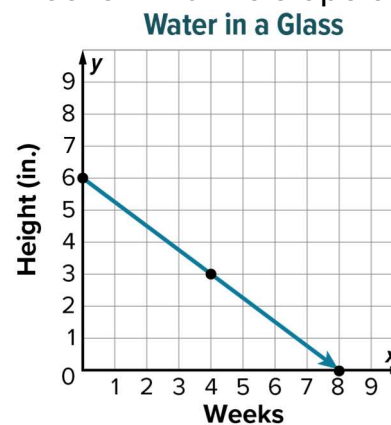
2. The graph shows the cost of roasted almonds per ounce. Find the slope of the line



3. The graph shows the height of a golf ball above the bottom of a pond as it sinks. Find the slope of the line.



4. The graph shows the height of water in a glass as it evaporates over a period of weeks. Find the slope of the line.



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

x	-2	3	8	13
y	1	4	7	10

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

x	-5	-3	-1	1
y	4	1	-2	-5

Find the slope of the line that passes through each pair of points.

1. $A(0, 6), B(2, 2)$

2. $D(-5, 4), G(3, 4)$

3. $T(4, 2), V(4, -3)$

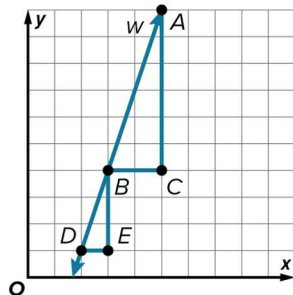
4. $J(0, 2), K(0, 4)$

5. $L(2, 3), M(3, -1)$

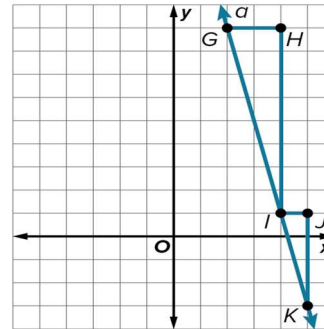
6. $P(1, -2), Q(9, -2)$

4.3 Similar Triangles and Slope

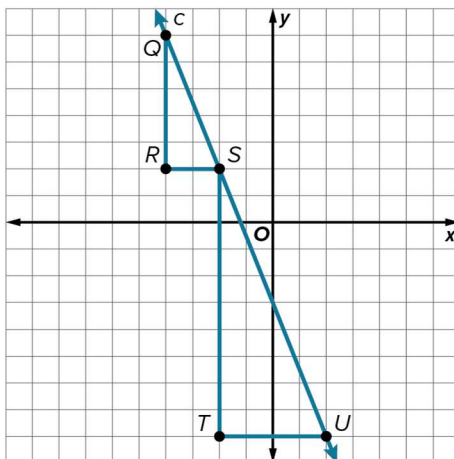
1. The graph of line w is shown. Use the similar slope triangles to compare the slopes of segment AB and segment BD .



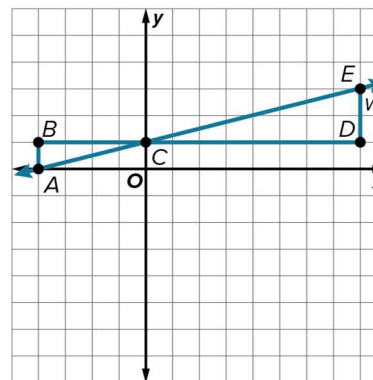
2. The graph of line a is shown. Use the similar slope triangles to compare the slopes of segments GI and IK .



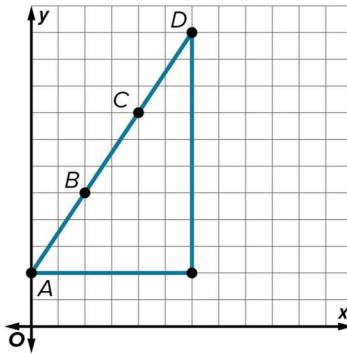
3. The graph of line c is shown. Use the similar slope triangles to compare the slopes of segment QS and segment SU .



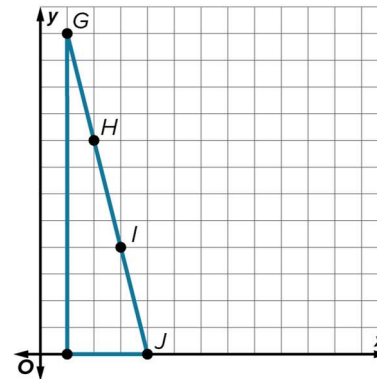
4. The graph of line w is shown. Use the similar slope triangles to compare the slopes of segments AC and CE .



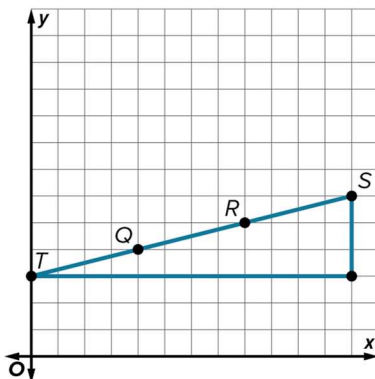
5. The plans for the upward climb of a roller coaster are shown. Use two points to determine the slope of the roller coaster. Then verify that the slope is the same by choosing a different set of points.



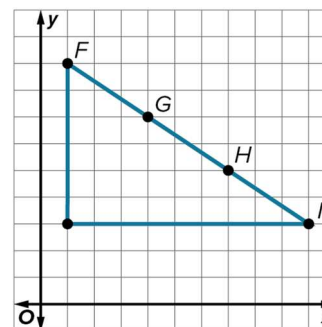
6. The diagram of the shadow from a building is shown. Use two points to determine the slope of the shadow. Then verify that the slope is the same by choosing a different set of points.



7. The diagram of a hill is shown. Use two points to determine the slope of the hill. Then verify that the slope is the same by choosing a different set of points.

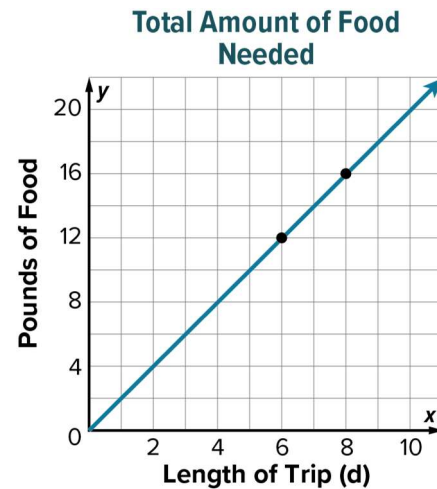
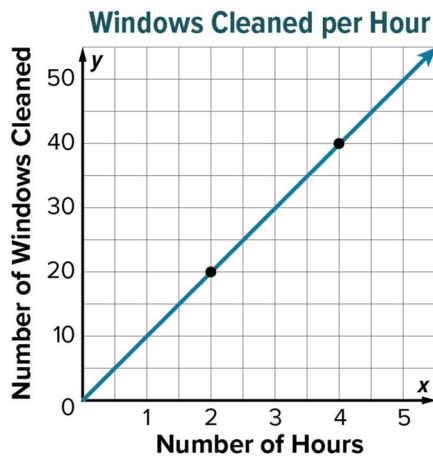


8. The plans for an escalator are shown. Use two points to determine the slope of the escalator. Then verify that the slope is the same by choosing a different set of points.



4.4 Direct Variation

1. The number of windows cleaned y varies directly with the number of hours the cleaners worked 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.
2. The total amount of food y needed for a backpacking trip varies directly with the trip length 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.



3. The total number of scarves knitted varies directly with the number of days. Four scarves require 6 days to knit. Write a direct variation equation to represent this relationship. Then identify the constant of variation and interpret its meaning.
4. The total number of fence posts Edwin installs varies directly with the number of hours worked. He installs 40 fence posts in 8 hours. Write a direct variation equation to represent this relationship. Then identify the constant of variation and interpret its meaning.

5. The cost of bell peppers varies directly with the weight of bell peppers, as shown in the table. Write a direct variation equation to represent this relationship. Then identify the constant of variation and interpret its meaning.

Weight (lb), x	Cost (\$), y
3	5.25
4	7
5	8.75
6	10.50

6. The total time it takes to clean a house varies directly with the number of rooms, as shown in the table. Write a direct variation equation to represent this relationship. Then identify the constant of variation and interpret its meaning.

Rooms, x	Time (min), y
3	165
6	330
9	495
12	660

4.5 Slope-Intercept Form

Identify the slope and y-intercept of the graph of each equation.

1. $y = \frac{3}{8}x - 9$

2. $y = -4x + 7$

3. $y = 6x - 4$

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

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

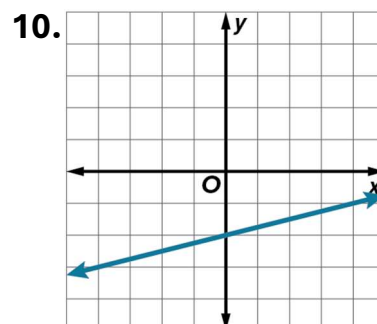
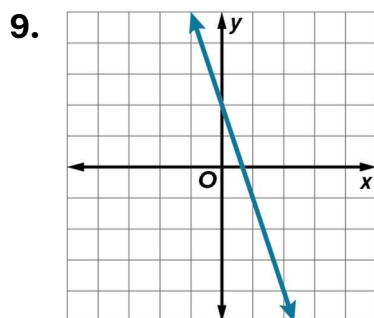
5. slope = -4 , y-intercept = 4

6. slope = 3 , y-intercept = 12

7. slope = $-\frac{5}{8}$, y-intercept = 6

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

Write an equation in slope-intercept form for the graphs shown.



11. At 1:40 PM, the temperature is 99°F . For the rest of the evening, the temperature drops an average of 4°F per hour. Write an equation in slope-intercept form to represent the temperature y after x hours.

12. Membership for a robotics club is \$15 per month plus a one-time registration fee of \$35. Write an equation in slope-intercept form to represent the total cost y after any number of months x .

13. The table shows Austin's plan for saving money. Write an equation in slope-intercept form that represents the data in the table.

Number of Weeks	Amount Saved
0	45
1	72
2	99
3	126
4	153

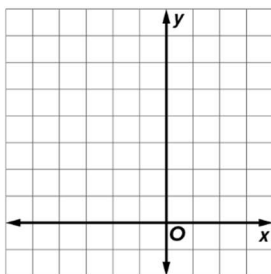
14. The relationship between the data in the table is linear. Write an equation in slope-intercept form that represents the data in the table.

x	y
-2	18
-1	10
0	2
1	-6
2	-14

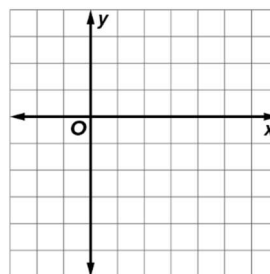
4.6 Graph Linear Equations

Graph each equation using the slope and y-intercept.

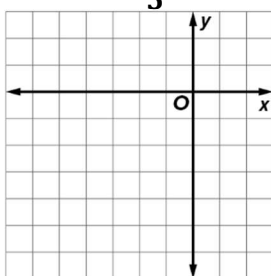
1. $y = -6x - 1$



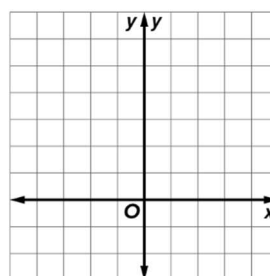
2. $y = \frac{3}{4}x - 4$



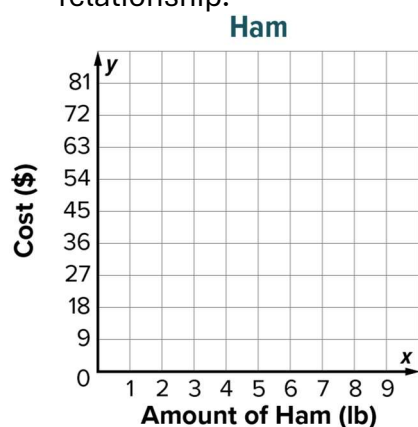
3. $y = -\frac{2}{5}x - 5$



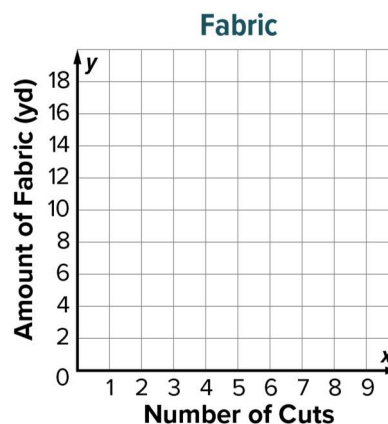
4. $y = \frac{5}{2}x + 5$



5. The cost in y dollars of x pounds of ham can be represented by the equation $y = 6x + 18$. Graph this relationship.

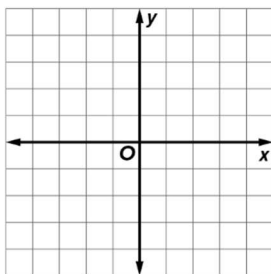


6. The equation $y = -\frac{3}{5}x + 15$ represents y yards of fabric remaining on a bolt after x cuts are made. Graph this equation.

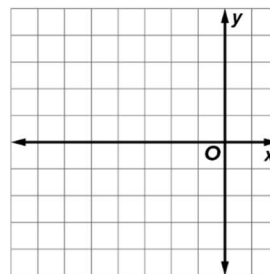


Graph each equation.

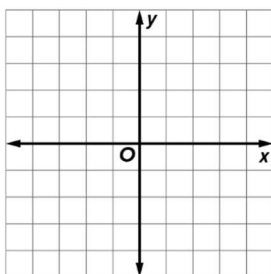
7. $y = -1$



8. $x = -5$



9. $x = 3$



10. $y = 4$

