

Ansonia Public Schools in Ansonia, Connecticut
MATH Summer Practice for a Student Entering Algebra

Name: _____

Team: _____

Please complete your summer review packet in preparation for the next school year. Please show as much work as you can for each problem. Read the directions carefully because some pages do not require all questions be answered.

This packet was designed to help you retain important skills needed to move forward in math. Those students who **complete this packet** will start the year with a 100% quiz grade.

The i-ready online assignments are part of the mypath you have been working on all year. If you have an i-pad at home, there is an “i-Ready Connect for Students” app you can download for free. There are also 2 computers at the public library for use.

Helpful Websites:

Virtual Manipulatives: <https://mathigon.org/polypad>

Multiplication practice: <https://mathigon.org/multiply>

Resources videos: youtube or khan academy

Graphing Calculator: [desmos.com](https://www.desmos.com)

The packet or online activities need to be **completed by September 1st** to count for quiz grade.

Math Skills Covered in Packet

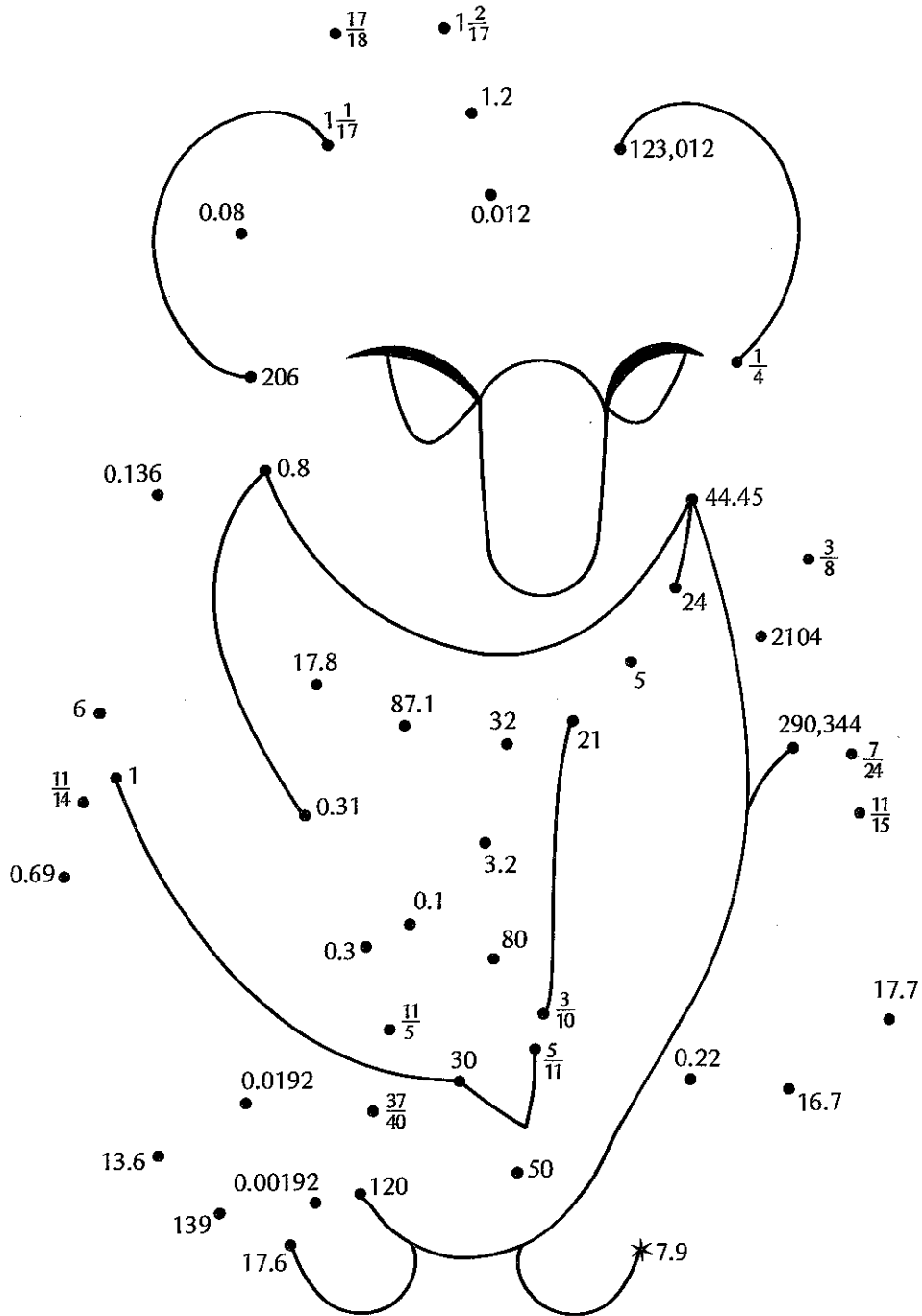
The Number System	<ul style="list-style-type: none">• Adding, Subtracting, Multiplying, & Dividing Real Number• Using Distributive Property- Factoring, Multiplying, Collecting Like Terms• Solving Equations• The Distributive Property- Factoring, Evaluating Expressions
Ratios and Percent	<ul style="list-style-type: none">• Solving problems Involving a Single Percent• Solving Multi-Step Ratio Problems• Recognizing Graphs of Proportional Relationships
Linear Equations	<ul style="list-style-type: none">• Finding Slope of a Line• Deriving $y=mx + b$• Graphing Linear Equations
Functions	<ul style="list-style-type: none">• Comparing Functions• Interpreting a Linear Function• Sketching Functions• Using Graph to Describe Functions

DOT-TO-DOT PUZZLE

1. Work each exercise.
2. Find the dot by each answer and connect the dots in order.

Exercises

1. $0.06 + 7.84 = 7.9$
2. $21 - 4.3$
3. $\frac{1}{3} + \frac{2}{5}$
4. $\frac{5}{8} - \frac{1}{3}$
5. $286,136 + 4208$
6. $5001 - 2897$
7. 12.7×3.5
8. $\frac{7}{8} \times \frac{4}{14}$
9. 402×306
10. $2.916 \div 2.43$
11. $\frac{15}{17} \div \frac{5}{6}$
12. $8446 \div 41$
13. $3.68 \div 4.6$
14. 0.03×200
15. $\frac{7}{8} \times \frac{16}{14}$
16. $\frac{3}{14} \times \frac{11}{3}$
17. $0.9 - 0.21$
18. $8 + 4.7 + 0.9$
19. $47 + 9 + 83$
20. 2.75×6.4
21. 0.0064×0.3
22. $14.4 \div 0.12$
23. $\frac{3}{8} + \frac{1}{5} + \frac{7}{20}$
24. $16\frac{2}{3} \times 1\frac{4}{5}$
25. $\frac{35}{44} \div \frac{7}{4}$
26. $\frac{1}{2} - \frac{3}{15}$
27. $48.15 + 31.85$
28. $70 \div 700$
29. $0.9 - 0.6$
30. $15.5 \div 50$
31. $99 - 11.9$
32. $\frac{14.88}{4.65}$
33. $\sqrt{81} + \sqrt{144}$
34. $\sqrt{100} - \sqrt{25}$
35. $\sqrt{121} + \sqrt{169}$



Using the Distributive Law—Factoring, Multiplying, Collecting Like Terms

HIDDEN MESSAGE

1. Work each exercise.
2. Shade in the block that contains the answer.
3. Read the message in the unshaded blocks.

Exercises

Factor.

1. $3x + 12 = 3(x + 4)$
2. $5x + 15$
3. $24 + 8x$
4. $9x + 27y$
5. $3y + 21$
6. $24x + 42y$
7. $8x + 28$
8. $100 + 30x$
9. $18x + 60y$
10. $14x + 21w$
11. $11a + 55c$
12. $24a + 36c$
13. $9 + 18a + 36c$
14. $10 + 15w + 25x$
15. $21 + 14R + 35T$
16. $8x + 24y + 72w$
17. $4x + 16w + 64$
18. $7m + 14p + 21k$

Multiply.

19. $2(x + 3)$
20. $3(x + 7)$
21. $7(2x + 5)$
22. $6(3x + 4)$
23. $3(2t + 5)$
24. $8(5t + 7m)$
25. $2(9m + 8)$
26. $3(2x + 5y)$
27. $3(4x + 2y + w)$
28. $5(8x + y + 8w)$
29. $7(7m + 7)$
30. $3(x + 10)$
31. $2(2x + 12y + 3w)$
32. $4(3x + 7y + 5)$
33. $6(9x + 2y + 1)$
34. $8(5x + 2y + 1)$

Collect like terms.

35. $3x + 8x$
36. $7y + 13y$
37. $x + 11x$
38. $2a + 5c + 3a$
39. $4x + 9y + 7x$
40. $x + 3y + 4x$
41. $7x + 8y + 2x + 3y$
42. $4a + 3b + b$

C $3(x - 4)$	L $3(x + 4)$	A $7(m + 2p + 3k)$	S $5(2 + 3w + 5x)$	S $6(4x + 7y)$	F $5x + 3y$	U $8(3 + x)$	N $12x$
P $14x + 35$	L $40x + 5y + 8w$	E $12x + 6y + 3w$	A $12(2a + 3c)$	S $20y$	A $6t + 15$	V $40x + 5y + 40w$	E $3x + 21$
M $9(1 + 2a + 4c)$	T $6(3x + 10y)$	E $9(2a + 4c)$	N $4(2x + 7)$	I $2x + 6$	C $5(x + 3)$	E $10(10 + 3x)$	O $4(x + 4w + 16)$
A $9(x + 3y)$	O $3x + 30$	L $8(x + 3y + 9w)$	V $7(21 + 2R + 5T)$	S $40t + 56m$	T $7(3 + 2R + 5T)$	O $5a + 5c$	P $18m + 16$
T $9x + 11y$	A $6x + 15y$	L $4x + 24y + 6w$	G $18x + 24$	E $4a + b$	R $7(2x + 3w)$	R $4a + 4b$	A $11x$
H $12x + 28y + 20$	A $11(a + 5c)$	S $54x + 12y + 6$	M $3(y + 7)$	O $49m + 49$	R $49m + 7$	E $11x + 9y$	Y $40x + 16y + 8$

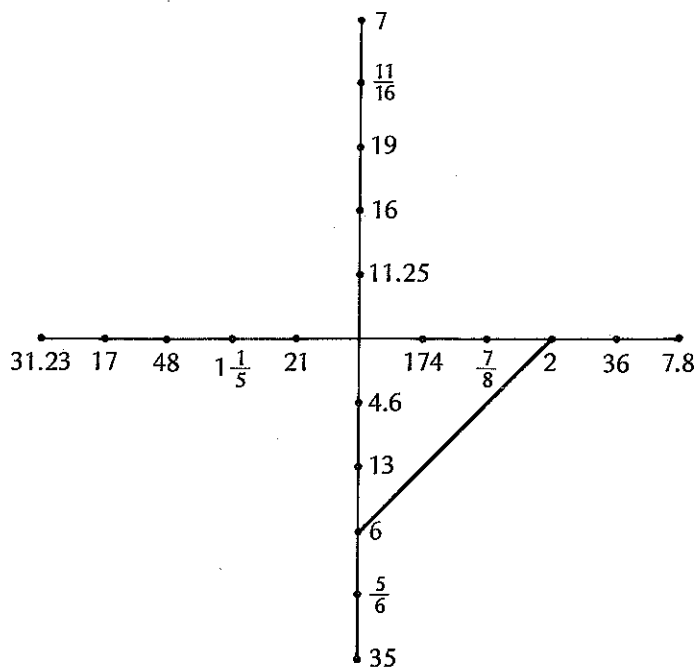
Solving Equations by Using Related Sentences

DIAGRAM PUZZLE

1. Work Exercise A1 and Exercise B1.
2. Draw a straight line segment connecting these two answers.
3. Continue with Exercise A2 and Exercise B2, and so on.

Exercises A

- | | | |
|-------------------------|------------------------|--------------------------------------|
| 1. $x + 8 = 10$ $x = 2$ | 8. $4(x + 3) = 76$ | 15. $3.4y = 38.25$ |
| 2. $27 - x = 11$ | 9. $7(x + 2) = 105$ | 16. $\frac{3}{8} = x - \frac{5}{16}$ |
| 3. $x - 5 = 8$ | 10. $180 = 2(x - 84)$ | 17. $\frac{3}{5}x = \frac{18}{25}$ |
| 4. $x + 34 = 55$ | 11. $10(x + 32) = 380$ | 18. $x + 18.77 = 50$ |
| 5. $x - 89 = 85$ | 12. $5x = 6$ | 19. $\frac{x}{2} = \frac{21}{16}$ |
| 6. $3x = 105$ | 13. $100y = 3123$ | 20. $\frac{x}{0.25} = 8$ |
| 7. $5x = 240$ | 14. $5x = 23$ | |



Exercises B

- | | | |
|-------------------------|----------------------|-------------------------------------|
| 1. $x + 9 = 15$ $x = 6$ | 8. $2(x + 4) = 80$ | 15. $2.5x = 19.5$ |
| 2. $32 - x = 15$ | 9. $3(x + 3) = 60$ | 16. $x + \frac{1}{4} = \frac{9}{8}$ |
| 3. $y - 17 = 19$ | 10. $3(x - 22) = 39$ | 17. $\frac{5}{4}x = \frac{25}{24}$ |
| 4. $37 + y = 44$ | 11. $4(x - 37) = 44$ | 18. $x - 2.18 = 2.42$ |
| 5. $y - 7 = 0$ | 12. $16x = 11$ | 19. $\frac{x}{1} = \frac{5}{2}$ |
| 6. $4y = 84$ | 13. $4x = 45$ | 20. $\frac{39.9}{x} = 2.1$ |
| 7. $2y = 38$ | 14. $1.2y = 9.36$ | |

The Distributive Law—Factoring, Evaluating Expressions

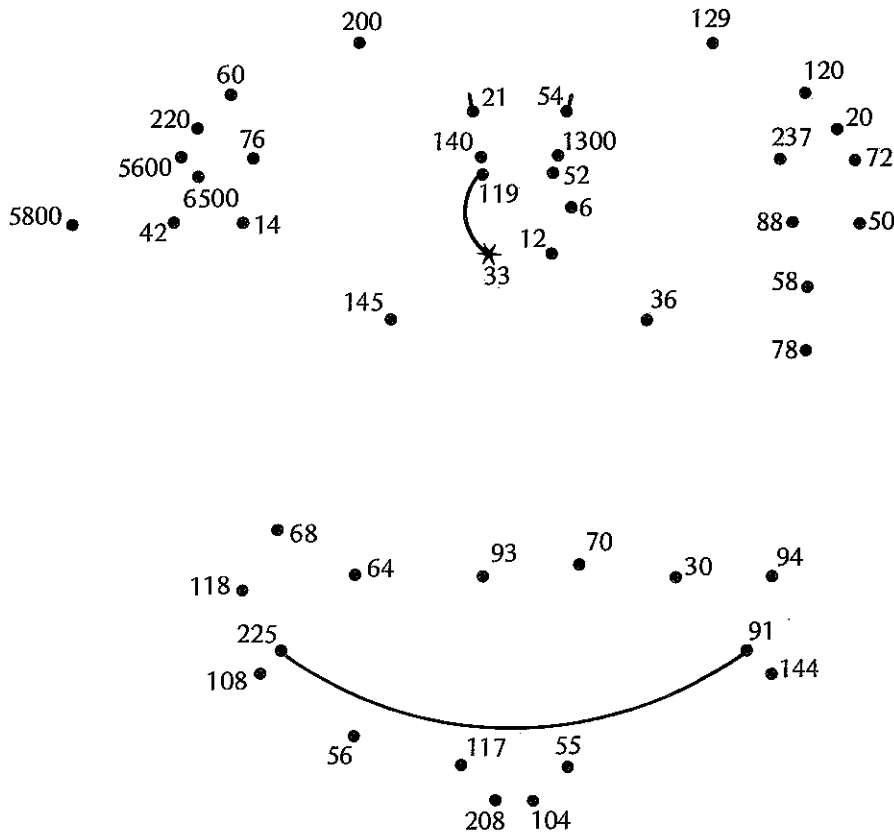
DOT-TO-DOT PUZZLE

1. Work each exercise.
2. Find the dot by each answer and connect the dots in order.

Exercises

Factor each expression. Evaluate the factored expression for $a = 3$, $b = 5$, $c = 8$, $p = 1$, $q = 2$, and $w = 0$. Check by evaluating the original expression.

- | | | |
|------------------------------|-------------------|-------------------|
| 1. $3a + 3c = 3(a + c) = 33$ | 13. $10p + 10q$ | 25. $12q + 12a$ |
| 2. $5b + 15c$ | 14. $12q + 12p$ | 26. $55p + 55a$ |
| 3. $8b + 8a$ | 15. $12p + 12w$ | 27. $700b + 700a$ |
| 4. $75q + 75p$ | 16. $2q + 2p$ | 28. $14w + 14a$ |
| 5. $36p + 36q$ | 17. $4b + 4c$ | 29. $7q + 7w$ |
| 6. $7a + 7b$ | 18. $100c + 100b$ | 30. $19a + 19p$ |
| 7. $9c + 9b$ | 19. $79q + 79p$ | 31. $35a + 35p$ |
| 8. $16c + 16b$ | 20. $11a + 11b$ | 32. $17b + 17q$ |
| 9. $13a + 13b$ | 21. $5c + 5q$ | 33. $9p + 9b$ |
| 10. $5c + 5a$ | 22. $9w + 9c$ | 34. $13a + 13p$ |
| 11. $18a + 18b$ | 23. $4a + 4q$ | 35. $3b + 3q$ |
| 12. $7b + 7c$ | 24. $15a + 15b$ | |





Solving Problems Involving a Single Percent

► **Solve the problems.**

- 1 Jason has 120 pieces of art. He puts 5% of them in an art show. How many pieces of art does Jason put in the art show?
- 2 Mary buys a laptop that originally costs \$1,340. It is on sale for 15% off. What is the final price?
- 3 Libby takes a test that has a total possible score of 800. Each question is worth the same number of points. If she misses 3% of the questions, what is her score?
- 4 Jeremy bought a collectible model airplane for \$575. One year later, the value increases by 112%. What is the new value of the airplane?
- 5 Eric runs a coffee shop and bought 5,480 cups at the beginning of the week. At the end of the week, he had 20% of the cups left. How many cups does Eric have left?
- 6 Alison had 310 rocks in her rock collection. After three months, her collection increases by 40%. How many rocks does Alison have now?



Solving Problems Involving a Single Percent *continued*

- 7 Morgan had \$1,679 in her savings account. After one year, her balance increases by 2%. How much does Morgan have in her account now?
- 8 At Mason's factory, one part that the factory manufactures takes 824 seconds to make. Mason bought new technology that decreases that time by 25%. How long does it take to make the part now?
- 9 There were 780 fish in a small lake. After a year, the population increases by 23%. How many fish are in the lake? Round to the nearest whole number.
- 10 Owen finds a rock that has some gold in it. The rock has a mass of 125 grams. He removes the gold, which is 18% of the mass of the rock. How much gold does he have?
- 11 Describe how estimating would help you check if your answer is reasonable for problem 4.



Solving Multi-Step Ratio Problems

► **Solve each problem.**

- 1 At The Green House of Salad, you get a \$1 coupon for every 3 salads you buy. What is the least number of salads you could buy to get \$10 in coupons?
-

- 2 Kim orders catering from Midtown Diner for \$35. She spends \$5 on a large order of potato salad and the rest on turkey sandwiches. Each sandwich is \$2.50. How many sandwiches does Kim buy?
-

- 3 Molly and Liza are exercising. Molly does 10 push-ups at the same time as Liza does 15 push-ups. When Molly does 40 push-ups, how many push-ups does Liza do?
-

- 4 A shark swims at a speed of 25 miles per hour. The shark rests after 40 miles. How long, in minutes, does the shark swim before resting?
-

- 5 Ali and Janet are selling gifts at a local craft show. For every bar of soap that Ali sells, she earns \$5. For every mug that Janet sells, she earns twice as much as Ali. Ali sells 5 bars of soap, and Janet sells 7 mugs. How much money did they make altogether?
-

- 6 Ted is making trail mix for a party. He mixes $1\frac{1}{2}$ cups of nuts, $\frac{1}{4}$ cup of raisins, and $\frac{1}{4}$ cup of pretzels. How many cups of pretzels does Ted need to make 15 cups of trail mix?
-

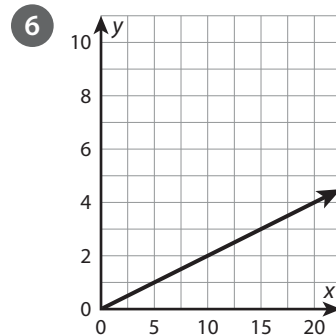
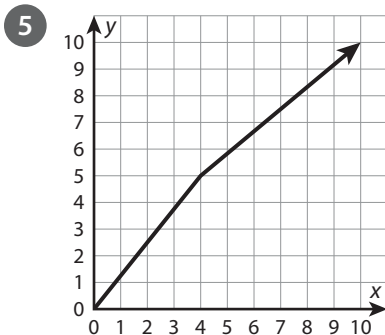
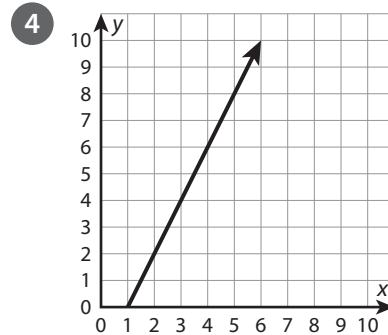
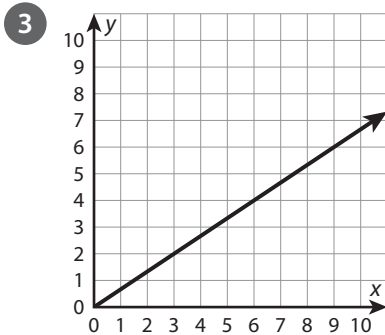
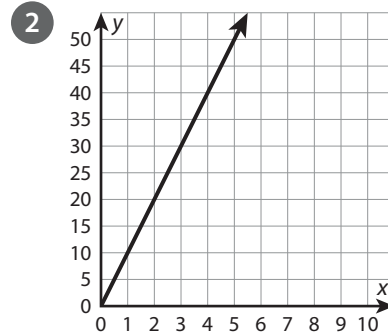
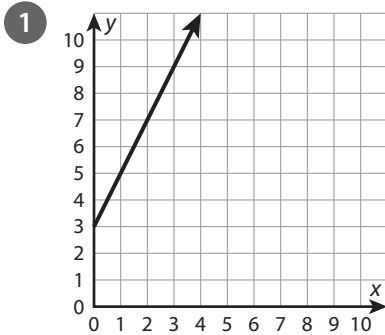
- 7 The ratio of chaperones to students on a field trip is 2 : 7. There are 14 chaperones on the field trip. In all, how many chaperones and students are there?
-

- 8 Dayren is driving to visit family. She drives at an average of 65 miles per hour. She drives 227.5 miles before lunch and then 97.5 miles after lunch. How many hours did she spend driving?
-



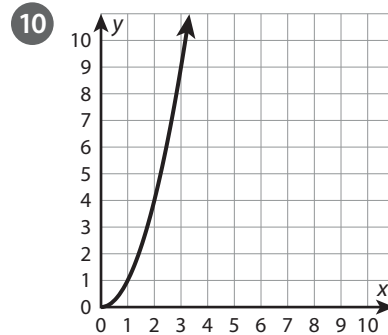
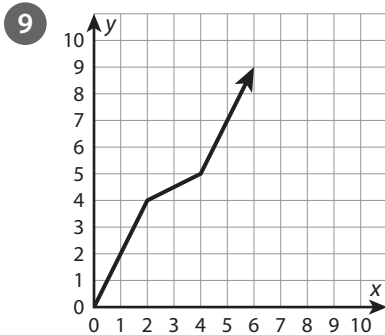
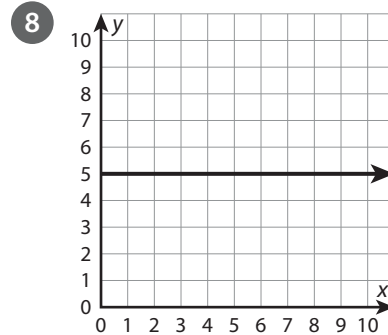
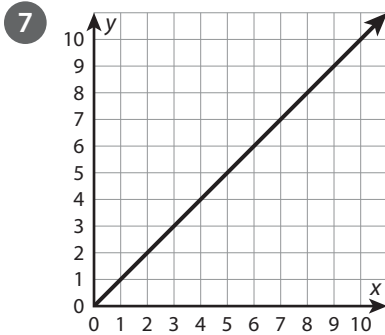
Recognizing Graphs of Proportional Relationships

- Circle all the problems with graphs that do NOT represent a proportional relationship. For the problems that are circled, explain why the graphs do not represent a proportional relationship.





Recognizing Graphs of Proportional Relationships *continued*



- 11 Without analyzing specific points on a graph, explain how you know whether a graph shows a proportional relationship.



Finding the Slope of a Line

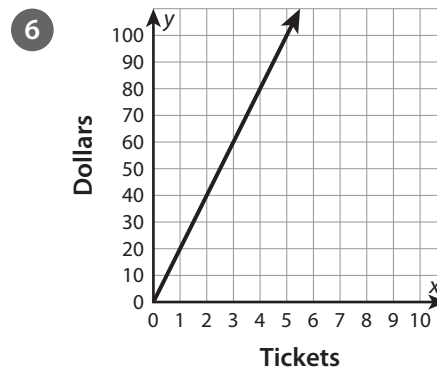
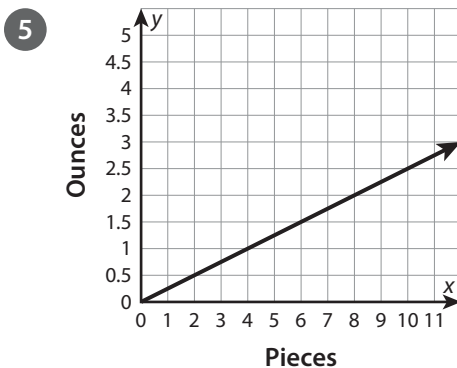
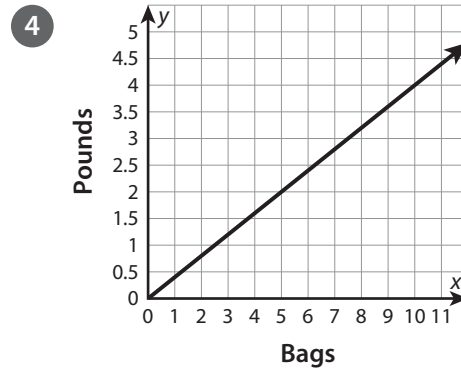
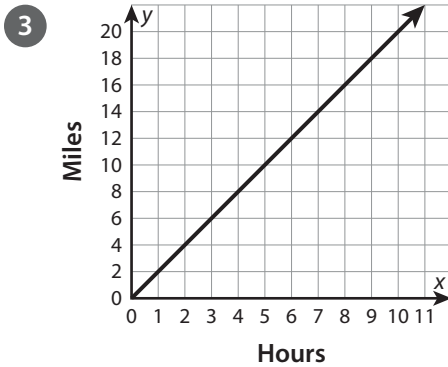
- Use the information provided to find the slope of each line. State what the slope represents.

1

Seconds	0	5	10
Feet	0	30	60

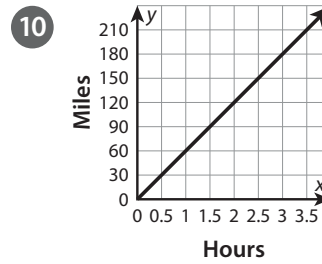
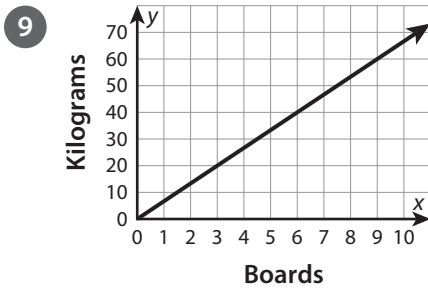
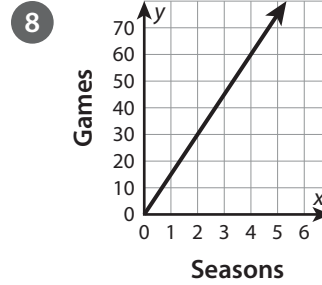
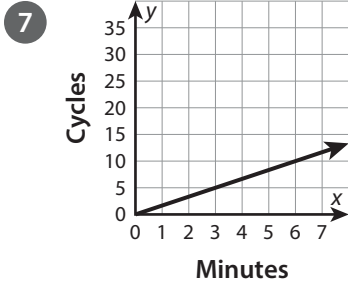
2

Hours	0	2	5
Dollars	0	18	45





Finding the Slope of a Line *continued*



- 11 Compare finding the slope using a table and using a graph.



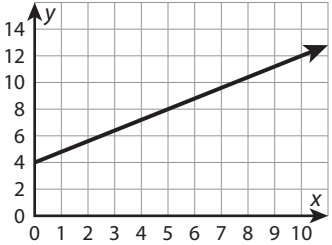
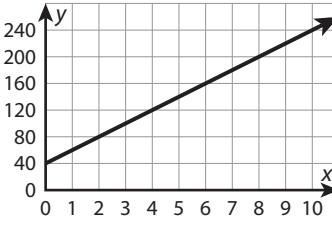
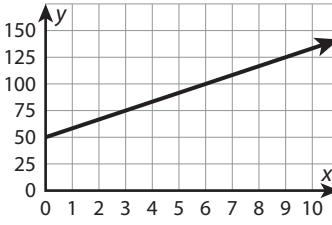
Deriving $y = mx + b$

- Check the equation in slope-intercept form to make sure it represents the graph. If it does not, cross out the answer and write the correct equation.

Graphs	Student Answers
<p>1</p>	<p>$y = 3x + 5$ slope: $m = \frac{8-5}{5-0} = \frac{3}{5}$ $y = \frac{3}{5}x + 5$ y-intercept: 5</p>
<p>2</p>	<p>$y = 2x + 4$</p>
<p>3</p>	<p>$y = 2x + \frac{1}{3}$</p>
<p>4</p>	<p>$y = \frac{3}{2}x + 1$</p>



Deriving $y = mx + b$ *continued*

Graphs	Student Answers
<p>5</p> 	$y = 4x + 5$
<p>6</p> 	$y = 40x + 20$
<p>7</p> 	$y = 25x + 50$

- 8 Explain one way you could know that the equation of a line is wrong without performing calculations.

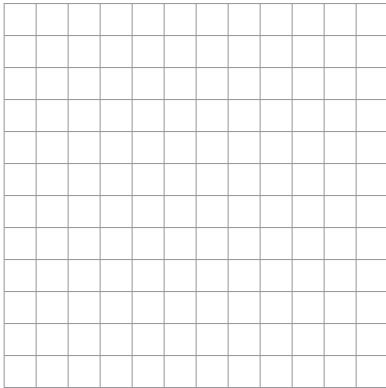


LESSON 9

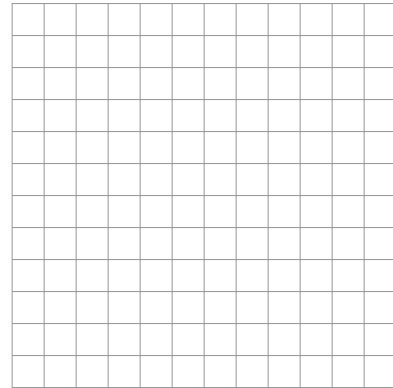
Graphing a Linear Equation of the Form $y = mx + b$

- Graph each linear equation on the grid provided. Be sure to label the units on the x- and y-axes.

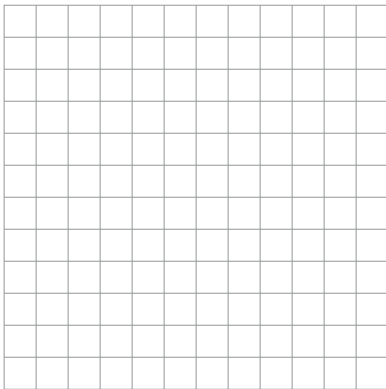
1 $y = -2x + 1$



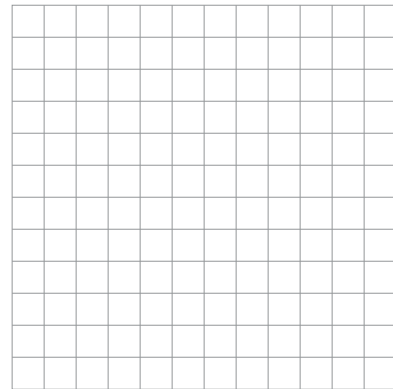
2 $y = 40x - 20$



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



4 $y = -120x + 600$



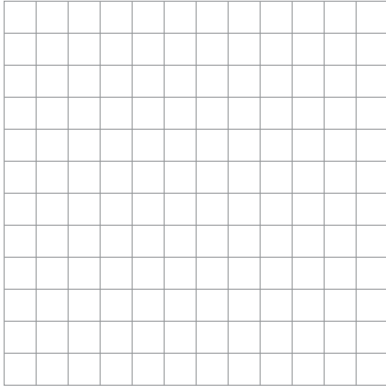


LESSON 9

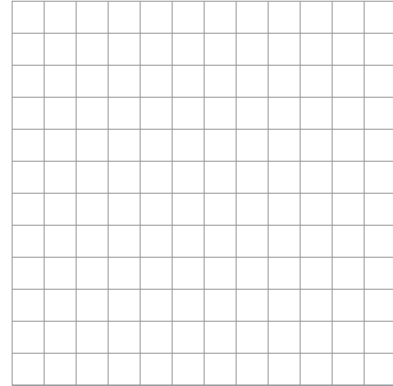
Graphing a Linear Equation of the Form

$$y = mx + b \text{ continued}$$

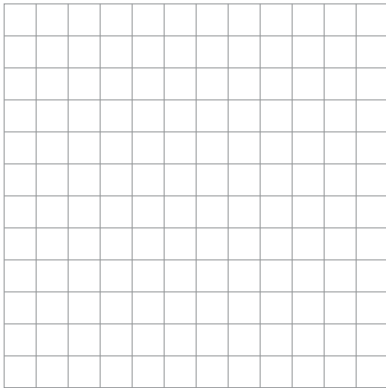
5 $y = \frac{10}{3}x - 5$



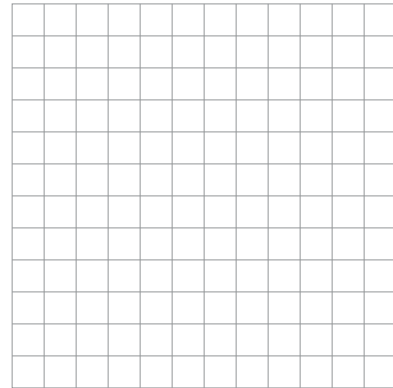
6 $y = -\frac{3}{4}x + 2$



7 $y = 50x - 100$



8 $y = -\frac{5}{4}x - 2$



9 How did you determine how to label the axes?



Comparing Functions at Different Values

► Compare the functions to solve the problems. Show your work.

1 Function 1:

x	0	2	5
y	0	90	225

Function 2: $y = 40x + 10$

a. Which function changes at a greater rate? Explain.

b. What is the value of each function at $x = 1$?

c. At what value of x will each function equal 90?

2 Kade and Danae are siblings with part-time jobs. Kade's bank account had a starting balance of \$0. She deposits \$290 into the account every 2 weeks. The table shows Danae's account balance after weekly deposits from work.

Weeks passed	0	1	2	3
Danae's account balance	60	180	300	420

a. What equation represents the amount of money in Kade's account as a function of weeks passed?

b. At what rate is Danae's account changing? What does the value represent?

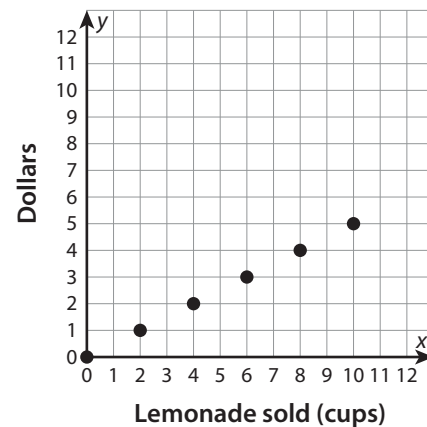
c. What is the balance in each account at week 0?



Comparing Functions at Different Values *continued*

- d. What is the combined total of both bank accounts after 2 weeks?
- e. The siblings need to save \$1,150. At what week will they have enough between both accounts?

- 3 At their neighborhood pool, Talia is selling popcorn and Gigi is selling lemonade. Talia's sales from her popcorn stand can be represented by the equation $y = 1.25x$. Gigi's sales from her lemonade stand are represented in the graph.



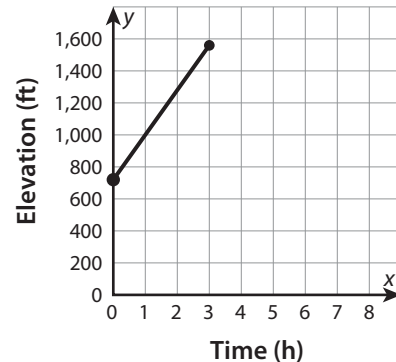
- a. How much is Gigi charging for a cup of lemonade?
- b. Who is earning faster? How much more per item is she earning?
- c. When Talia sells 4 bags of popcorn, how many cups of lemonade will Gigi have to sell to earn the same amount?
- d. What is the difference in their earnings when each girl has sold 5 items?
- e. At the end of the day, Talia sold two dozen bags of popcorn and Gigi sold 60 cups of lemonade. Who earned more? How much did they each earn?



Interpreting a Linear Function

► Interpret the linear function to solve the problems. Show your work.

- 1 A group of volunteers is spending a week cleaning up the trails in the Hudson Highlands. On day 2 the volunteers begin at the point on the trail where they ended the day before. The graph shows their elevation, in feet, as a function of the number of hours they work to clean the trails.



- a. What does the ordered pair (1, 1000) on the graph represent?
- b. The graph begins at 720 on the y-axis. What does this value represent? Is this the rate of change or the initial value?
- c. By how many feet does the elevation increase for one hour of work? What does this value represent, rate of change or initial value?
- d. What is the equation that represents this function?

- 2 The table shows number of people as a function of time in hours. Write an equation for the function and describe a situation that it could represent. Include the initial value, rate of change, and what each quantity represents in the situation.

Hours	Number of People
1	150
3	250
5	350



Interpreting a Linear Function *continued*

- 3** Amber plans to cook a turkey and macaroni and cheese for a special dinner. Since she will need to use the oven for both dishes, and they won't both fit in the oven at the same time, she has to determine how much time all the cooking will take. The macaroni and cheese will take a set amount of time, while the turkey takes a certain number of minutes per pound that the turkey weighs.

The equation models the total cooking time Amber will need to prepare her dishes.

$$y = 15x + 40$$

- a.** What do variables x and y represent? Use the phrase *is a function of* to describe how the two quantities relate to each other.
- b.** What does the value 40 represent?
- c.** What does the rate of change represent?
- d.** What is the total cooking time for just the turkey if it weighs 12 pounds? How do you know?



Sketching Graphs of Functions from Qualitative Descriptions

► Sketch a graph of a function that matches each description.

- 1 increasing slowly at a constant rate and then decreasing quickly at a varying rate



- 2 decreasing slowly at a varying rate and then gradually increasing at a varying rate



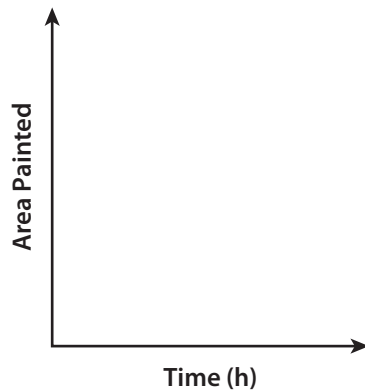
- 3 decreasing slowly at a varying rate first and then more quickly; then remaining steady for some time before quickly increasing at a varying rate





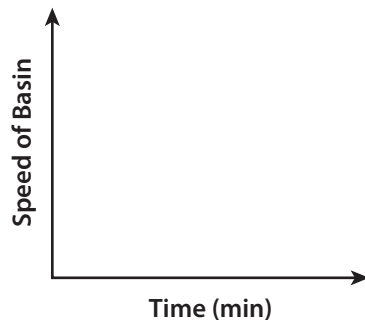
Sketching Graphs of Functions from Qualitative Descriptions *continued*

- 4 Sam's volunteer group is repainting old buildings in the community square. The group members all began painting together, slowly at first. As they figured out what to do, they began painting at a faster, varied rate. They moved quickly until lunchtime. After taking a lunch break, the students continued painting at a slower rate because some students went home. Sketch a graph that shows the area the students painted as a function of time.



- 5 Brandon observed the speeds of a washing machine basin as he washed his laundry. He noticed that as the washer filled with water, the basin was stopped; once the wash began, it gradually got faster and then gradually slowed to a stop as the basin emptied the water. Then the basin quickly got very fast for the spin cycle before slowing to a stop again.

Sketch a graph that shows the speed of the basin as a function of time.

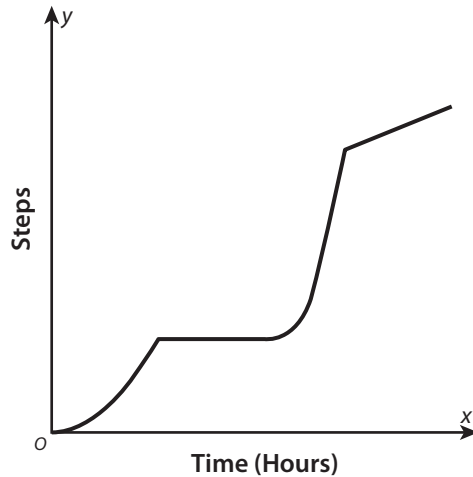




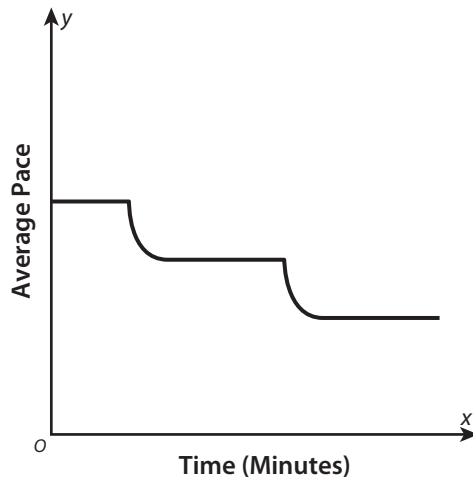
Using Graphs to Describe Functions Qualitatively

► Tell a story that could be represented by the graph shown.

- 1 The graph represents steps taken as a function of time.



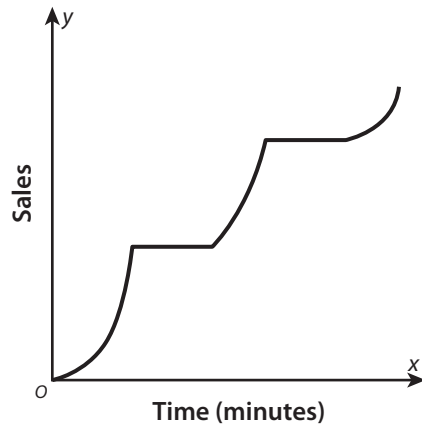
- 2 The graph represents average pace as a function of time.



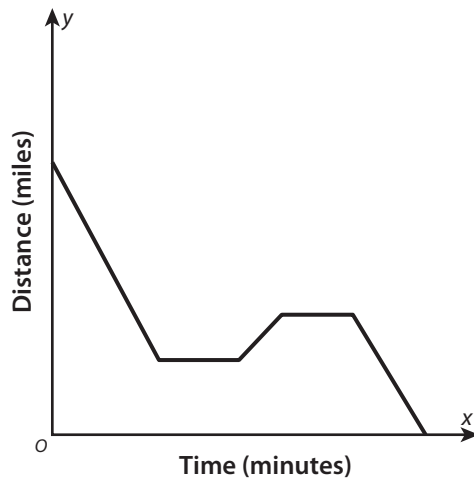


Using Graphs to Describe Functions Qualitatively *continued*

- 3 The graph shows sales as a function of time.



- 4 The graph shows distance as a function of time.



- 5 For an interval on a graph that shows that a change is happening, explain how the shape of the graph on that interval tells you whether the change is happening gradually or quickly.