Pre-Test

NAME _____ DATE _____

1. Carolee makes quilts to sell at an arts and crafts fair. She charges $75 per quilt.

a. Name the quantity that is constant.

b. Which quantity depends on the other?

c. Write an algebraic equation to represent this situation. Define your variables. Use your equation to determine how much Carolee will earn if she sells 15 quilts.

2. Meredith is having a deck built onto her house. The table shows the possible dimensions of her deck.

Width (in feet)	10	11	12	13	14	15	16
Length (in feet)	16.5	18.5	20.5	22.5	24.5	26.5	28.5

a. Let *l* represent the length of the deck. Write an equation that represents the length of the deck in terms of the width, *w*.

b. Calculate the length of the deck if the width is 20 feet.

c. If the length of a deck is 25 feet long, what is the width?

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d. Calculate the area of a deck that measures 15.5 feet wide.

3. Solve $8(3x - 4) = 4x - 2$.

4. One event in the winter Olympics is the 30-kilometer Nordic skiing event. In 2006, Katerina Neumannova of the Czech Republic won the event in 1 hour, 22 minutes, and 25.4 seconds.

a. How fast in meters per minute did Neumannova average? Explain.

b. Imagine you are watching the 2006 race and Neumannova is at the halfway mark. How many meters has she skied?

c. If Neumannova is skiing at the average speed you determined in part (a), how many meters will she travel in a quarter of an hour?

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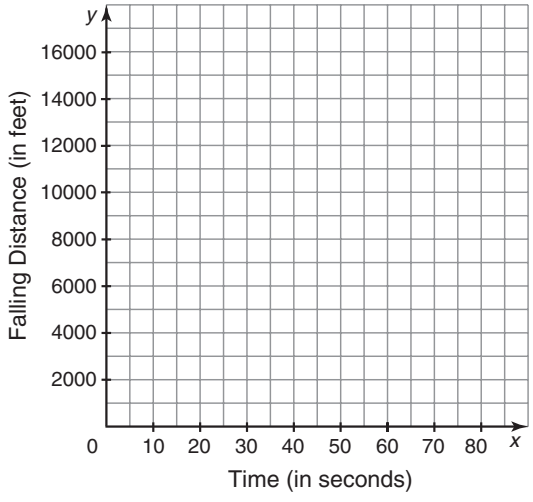
5. In a freefall skydive, a skydiver begins at an altitude of 13,000 feet. During the one-minute freefall, the skydiver drops towards Earth at a rate of 176 feet per second.

a. Identity the two quantities that are changing, identify the independent and dependent quantities, define variables for those quantities, and write an equation to represent a skydiver's falling distance.

b. In this problem, what is the unit rate of change?

c. Draw the graph to represent the problem situation.



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Post-Test

NAME _____ DATE _____

1. To earn some extra money, Ben mows lawns for people in his neighborhood. He earns $18 per lawn.

a. Name the quantity that is constant.

b. Which quantity depends on the other?

c. Write an algebraic equation to represent this situation. Define your variables. Use your equation to determine how much Ben will earn for 21 lawns.

2. Juan is designing a garden for his backyard. The table shows the possible dimensions of his garden.

Width (in feet)	4	5	6	7	8	9	10
Length (in feet)	7	8	9	10	11	12	13

a. Let *l* represent the length of the garden. Write an equation that represents the length of the garden in terms of the width, *w*.

b. Calculate the length of the garden if the width is 15 meters.

c. If the length of a garden is 20 meters long, what is the width?

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d. Calculate the area of a garden that measures 7.5 meters wide.

3. Solve $5(4x + 6) = 6x + 9$.

4. The winner of the 2008 Iditarod Trail Sled Dog Race was Lance Mackey. The course is 1112 miles long. His time was 9 days, 11 hours, 46 minutes, and 48 seconds.

a. What was Mackey's average speed in miles per hour? Explain.

b. Imagine you are watching the 2008 race and Mackey is at the one-quarter mark. How many miles has he traveled?

c. If Mackey is traveling at the average speed you determined in part (a), how many miles will he travel in half a day?

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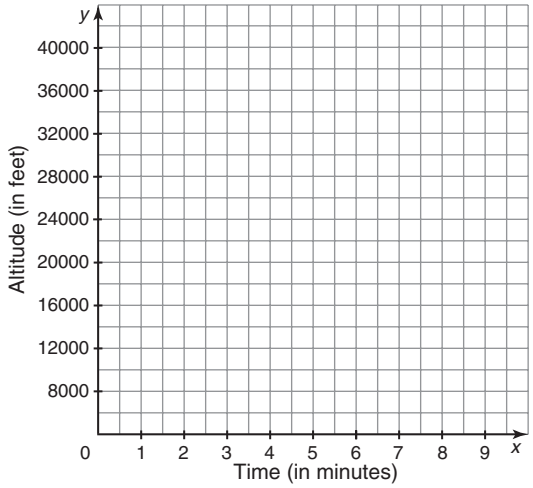
5. An airplane is descending from 35,600 feet at a rate of 3200 feet per minute.

a. In this problem situation, identify the two quantities that would change, identify the independent and dependent quantities, define variables for those quantities, and write an equation to represent the airplane's altitude.

b. In this problem, what is the unit rate of change?

c. Draw the graph to represent the problem situation.



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Mid-Chapter Test

NAME _____ DATE _____

1. Jerome is a photographer. He earns $125 per hour.

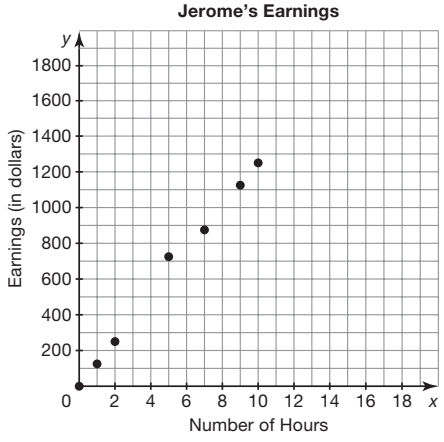
a. Name the quantity that is constant.

b. Which quantity depends on the other?

c. Complete the table that represents various numbers of hours worked.

Number of Hours	0	1		5	7		10
Earnings (in dollars)			250			1125	

d. Create a graph of the data from the table.



e. Write an algebraic equation to represent this situation. Define your variables.

f. Use your equation to determine how much Jerome will earn if he works 12 hours.

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Solve each equation. Verify your solution.

2. 2.5x + 3.7 = 4.2

3. $9x - 2 = 8$

4. A company stacks lampshades in packing boxes so that they can be shipped. The table shows the total stack heights of various numbers of medium and large lampshades.

a. Complete the table.

Number of Lampshades	Stack Height (in inches)	
	Medium	Large
1	8	9.5
2	10.5	11.5
3	13	13.5
4	15.5	15.5
5	18	17.5
6	20.5	19.5
7		
8		

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b. What quantity depends on the other?

c. What is the difference in heights between a stack of 4 medium lampshades and 3 medium lampshades? Between a stack of 6 medium lampshades and 5 medium lampshades? Between 7 medium lampshades and 6 medium lampshades?

d. What is the difference in heights between a stack of 3 large lampshades and 2 large lampshades? Between a stack of 6 large lampshades and 5 large lampshades? Between 8 large lampshades and 7 large lampshades?

e. Determine the height of a stack of 12 medium lampshades and the height of 12 large lampshades.

f. Let h represent the stack height. Write an equation that represents the height of a stack of medium lampshades in terms of the number of lampshades, s, in the stack.

g. Let h represent the stack height. Write an equation that represents the height of a stack of large lampshades in terms of the number of lampshades, t, in the stack.

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5. Pedro wants to join a health club. There are two clubs within biking distance of his home. At the Quick-Fit Club, a teen membership costs $26 a month, and there is a one-time entrance fee of $84 that new members must pay when they join the club. At the Join-Up Club, a teen membership costs $40 a month with no entrance fee.

a. Complete the table by writing an expression for the cost of joining Quick-Fit Club and Join-Up Club. Then, evaluate the expressions for the given number months Pedro would belong to the club.

Club membership (months)	Quick-Fit Club (dollars)	Join-Up Club (dollars)
m		
1		
3		
6		
10		

b. Write an equation that represents the cost for the two clubs being equal.

c. Describe the steps that you will use to solve this equation. Explain your reasoning.

d. Solve the equation.

e. Describe your solution in terms of the problem situation.

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End of Chapter Test

NAME _____ DATE _____

1. Sadiq makes tables with a mosaic top. He earns $125 per table sold.

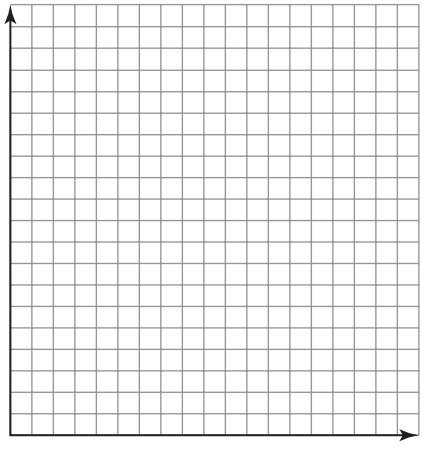
a. Name the quantity that is constant.

b. Which quantity depends on the other?

c. Complete the table that represents various numbers of tables that Sadiq has sold.

Number of Tables	0	1		5			13
Earnings (in dollars)			250		875	1250	

d. Create a graph of the data from the table.



e. Write an algebraic equation to represent this situation. Define your variables. Use your equation to determine how much Sadiq will earn if he sells 22 tables.

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2. The Daily Diner stacks serving bowls. The table shows various heights of stacks of different numbers of bowls.

Number of Bowls	Stack Height (in inches)
1	3
2	4.5
3	6
4	7.5
5	9
6	10.5

a. Write an equation that represents the height, h, of a stack of bowls in terms of the number of bowls, b, in the stack.

b. Calculate the stack height of one dozen bowls. Show your work.

Solve each equation.

3. $-9x - 7 = 29$

4. $3(2x - 5) + 31 = 14$

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NAME _____ DATE _____

5. The 2008 winner of the Tour de France was Carlos Sastre. He biked the 2212-mile race in 87 hours, 52 minutes, and 52 seconds.

a. What was Sastre's average speed in miles per hour? Explain.

b. Sara traveled to Europe to watch the Tour de France in 2008. Her plane was delayed, so she arrived late to the race. Carlos Sastre was at the one-quarter mark when Sara arrived. How many miles had he biked?

c. If Sastre is biking at the average speed you determined in part (a), how many miles will he travel in half an hour?

d. Consider the situation after Sara arrived and the distance that Sastre traveled. What are the two quantities that are changing? Which quantity depends on the other? Define and identify the independent and dependent variables for these quantities with their units of measure.

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e. Complete the table for the given values.

Quantity	Time After Sara Arrives	Distance
Unit of Measure	Hours	Miles
Variable	*t*	*d*
	0	
	2	
	10	
	50	
	55	
	60	
	65	
	66	

f. Write an equation or rule for calculating the value of the dependent variable when the value of the independent variable is given.

6. Gene is landing his glider. He is at 10,450 feet and beginning his descent. He descends at a rate of 950 feet per minute.

a. Identify the two quantities that are changing, identify the independent and dependent quantities, define variables for those quantities, and write an equation to represent the glider's altitude.

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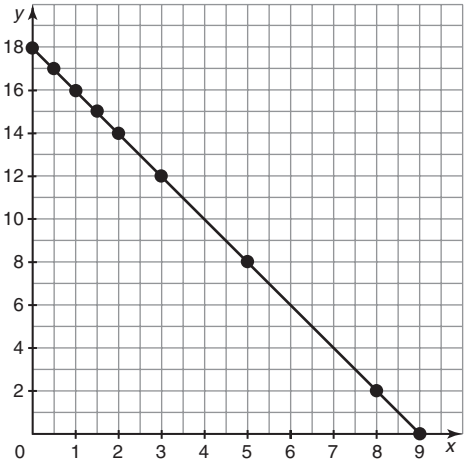
b. In this problem, what is the unit rate of change?

c. What would the altitude of the glider be after $4\frac{1}{2}$ minutes? 45 seconds?

d. At what time would the glider be at an altitude of 5000 feet?

7. The graph shows the relationship between two quantities.



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End of Chapter Test

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a. Complete the table using the points shown in the graph.

x	*y*

b. What is the unit rate of change? Explain.

c. Write an equation for this relationship.

d. Write a problem situation that fits the equation.

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Standardized Test Practice

NAME _____ DATE _____

1. Cynthia and Amy are customer service representatives. Cynthia earns $13 per hour and Amy earns $1.50 more per hour than Cynthia. Amy worked 43.5 hours in the last two weeks. Which equation could she use to find the amount of money she should receive?

   a. $m = 13(43.5 + 1.5)$

   b. $m = 13(43.5 - 1.5)$

   c. $m = 43.5(13 + 1.5)$

   d. $m = 43.5(13 - 1.5)$

2. Which is a solution of the equation $40 = -\frac{2}{5}x + 22$?

   a. $x = -155$

   b. $x = -7.2$

   c. $x = 20.5$

   d. $x = -45$

3. Dena is running in the Boston Marathon. She wants to finish with a time of 4 hours and 30 minutes. The marathon is 26.2 miles long. In order to reach her goal, what average speed in feet per minute does Dena have to run? There are 5280 feet in one mile.

   a. 0.097

   b. 5.82

   c. 270

   d. 512.36

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4. Dillon is fencing a rectangular pasture. The length and width of the pasture are related according to a specific formula. He developed this table to see how many total feet of fencing he will need for pastures with different dimensions. Which equation could Dillon use to find the total number of feet of fencing, t, in terms of different pasture widths, w?

Width (in feet)	15	16	17	18	20	24
Length (in feet)	23	25	27	29	33	41
Total Fencing Needed (in feet)	76	82	88	94	106	130

a. $t = 2(w + w + 8)$

b. $t = w + 2w - 7$

c. $t = 2w + 2w - 7$

d. $t = 2(w + 2w - 7)$

5. Caroline is sky diving. With her parachute open, she descends from 12,000 feet at a rate of 13 feet per second. What is the unit rate of change for this problem situation?

a. $-12{,}000$

b. -923.08

c. -13

d. 12,000

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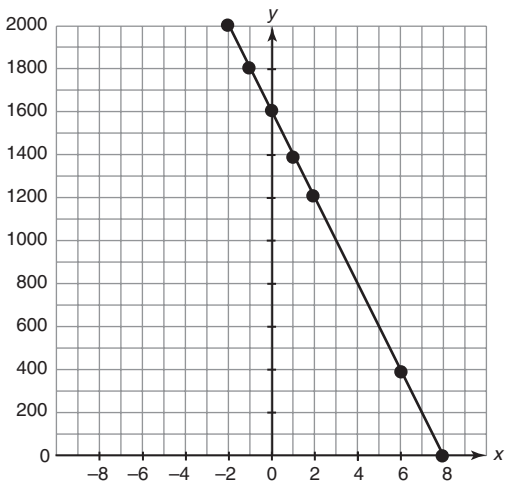
6. The graph shows a relationship between two quantities.



Which equation best represents the relationship between the variables?

a. $y = 200 - 1600x$

b. $y = 100 - 2000x$

c. $y = 2000 - 200x$

d. $y = 1600 - 200x$

7. Corinne is taking a train into the city. The train travels at a rate of 45 miles per hour. Which quantity depends on the other?

a. The distance traveled depends on the number of hours traveled.

b. The number of hours traveled depends on the speed of the train.

c. The speed of the train depends on the distance traveled.

d. The speed of the train depends on the number of hours traveled.

8. Which operation can you use to solve the equation $\frac{5}{7}x = 45$?

a. Subtract 45 from each side.

b. Add $-\frac{5}{7}$ to each side.

c. Divide both sides by $\frac{7}{5}$.

d. Multiply both sides by $\frac{7}{5}$.

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9. Jim is an electrician. He charges a $150 home-visit fee and $45 per hour, with the first two hours free. Which equation could Elyse use to calculate the cost, c, to have Jim work at her house for 5 hours?

a. $c = 150 + 45(5)$

b. $c = 150 + 45(5 + 2)$

c. $c = 150 + 45(5 - 2)$

d. $c = (150 + 45)(5 - 2)$

10. A laser printer has 300 sheets of paper and is printing at a rate of 12 pages per minute. How many sheets of paper will be left in the printer in two and one half minutes, if the printer is continuously printing?

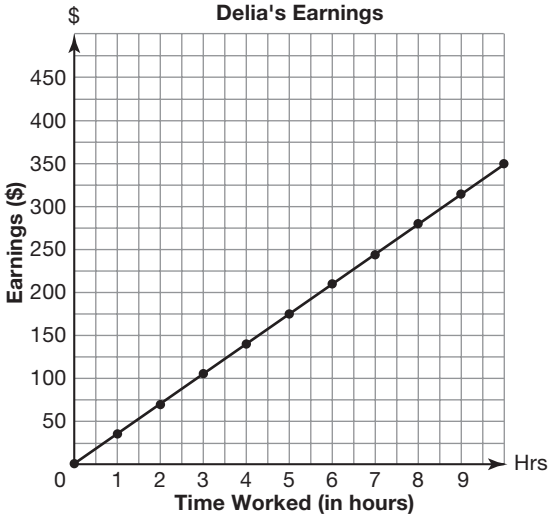
a. 0

b. 30

c. 270

d. 300

11. Delia is a graphic designer who charges an hourly rate. She made the graph to show her total earnings for various numbers of hours worked. Approximately how many hours would it take Delia to earn $250?



a. 6 hours

b. 7 hours

c. 8 hours

d. 9 hours

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12. Roy is hiking down a mountain at a rate of 3 miles per hour. He started at the top of the mountain on a 12.5-mile trail to his tent camp. Which is the dependent variable in this problem situation?

a. time

b. distance

c. altitude

d. speed

13. George found this table in a stack of papers. What is the unit rate of change?

Time in hours	Total Cost in dollars
0	50
1	75
2	100
3	125
5	175

a. $25

b. $50

c. $75

d. $100

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14. Deirdre is buying plastic mugs to send to her cousin. She made a table of the various heights of stacks of different numbers of mugs.

Number of Plastic Mugs	Stack Height (in inches)
1	6
2	6.75
3	7.5
4	8.25
5	9
6	9.75

Which equation represents the height, h, of a stack of mugs in terms of the number of mugs, t, in the stack?

a. $h = 6 + 0.75(t - 1)$

b. $h = 6 + 0.75t$

c. $h = 0.75 + t(t - 1)$

d. $h = 0.75t - 6$

15. What steps could you use to solve the equation $5(3x - 2) = 9x + 8$?

a. Subtract $3x$ from each side. Then, add 2 to each side. Finally, divide both sides by 6.

b. Use the Distributive Property to remove parentheses on the left. Then, subtract $9x$ from each side. Then, subtract 8 from each side. Finally, divide both sides by 3.

c. Use the Distributive Property to remove parentheses on the left. Then, subtract $9x$ from each side. Then, add 10 to each side. Finally, divide both sides by 6.

d. Use the Distributive Property to remove parentheses on the left. Then, subtract $9x$ from each side. Then, add 2 to each side. Finally, divide both sides by 3.

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16. Jerry repairs computers. He charges $65 per hour. If t represents his total earnings and h represents the number of hours spent on a repair, which equation represents this situation?

a. $t = 65 + h$

b. $t = 65 - h$

c. $t = 65h$

d. $t = \frac{65}{\text{h}}$

17. A submersible can dive to a depth of 2000 feet below sea level at a rate of 245 feet per minute. How deep would the submersible be in 45 seconds?

a. 110.25 feet below sea level

b. 122.5 feet below sea level

c. 183.75 feet below sea level

d. 208.25 feet below sea level

18. Analee is a sales associate. She earns a weekly wage of $300 plus a 5% commission on every item she sells. If Analee earned $675 last week, what were her total sales for the week?

a. $750

b. $1950

c. $7500

d. $13,500

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19. Ira used the following table to record the height of an airplane that is landing.

Independent Quantity	Dependent Quantity
Time (in minutes)	Altitude (in feet)
0	28,000
1	24,500
2	21,000
3	17,500
4	14,000
5	10,500
6	7000
7	3500
8	0

Which equation best represents the relationship between the variables for time, t, and altitude, a?

a. $a = 3{,}500 + 28{,}000t$

b. $a = 3{,}500 - 28{,}000t$

c. $a = 28{,}000 + 3500t$

d. $a = 28{,}000 - 3500t$

20. Jules is halfway through a 350-mile bike trip. She is averaging 18 miles per hour on the trip. Which equation could you use to determine how much farther Jules has left to bike for any number of hours?

a. $d = 350 - 18t$

b. $d = 350 + 18t$

c. $d = 175 - 18t$

d. $d = 175 + 18t$

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