6th Grade Dependent and Independent Variables Chapter Questions

1. Explain the relationship between dependent and independent variables.
2. Identify examples of dependent and independent variables in the real world.
3. How can equations, tables, and graphs be used to represent real-life scenarios?
4. Why do we use equations, tables, and graphs to represent real-life scenarios?

Chapter Problems

Dependent and Independent Variables

Classwork

Identify the independent and the dependent variable in each scenario.

1) The older John gets, the taller he is.

2) The more gallons of milk I have, the more cups of milk I have.

3) In the United States House of representatives, the number of Representatives from a state is calculated based on its population.

4) The number of seats in a movie theater determines how many tickets can be sold.

5) As a plane descends, the more time that passes, the lower the plane's altitude is.

6) It costs $0.99 for a music download. The more music I download, the more money I spend.

Homework

Identify the independent and the dependent variable in each scenario.

7) The more tickets I sell, the more money I have.

8) Judah brings reusable shopping bags from home whenever he goes to the grocery store. The number of bags he brings is based on how many products are on his shopping list.

9) At a deli counter, the price of a customer's order is based on its weight.

10) Vera and Elizabeth are going hiking and are trying to figure out how many snacks they should bring with them on the hike. The longer they plan to hike, the more snacks they should bring.

11) Amelia is making mushroom tarts for a party. The number of tarts she can make will be determined by how many mushrooms are in the fridge.

12) Taylor's dad is building a case for his trophies. The number of trophies will determine how many shelves the case will have.

Equations and Tables

Classwork

13) The table shows the relationship between the age of a plant in weeks, *w,* and the height of the plant in cm, *h*. Write an equation to represent this relationship.

w	h
1	12
2	24
3	36
4	48

14) Predict the plant's height in cm when it is 8 weeks old.

15) The table shows the relationship between the number of cups, *c,* and the number of gallons, *g*. Write an equation to represent this relationship.

g	c
1	16
2	32
3	48
4	64

16) How many gallons will 128 cups make?

17) The following table represents the equation m = 3a. Fill in the missing values.

a	m
5	
7	
	24
	30

18) Hillary, *h*, is 15 years older than Gavin, *g.* Write an equation to represent this situation. Then complete the table.

g	h
15	
30	
	50
	60

Homework

19) The table shows the relationship between the pounds of dough prepared, *p*, and the number of hours worked, *h*. Write an equation to represent this relationship.

h	p
9	27
10	30
11	33
12	36

20) Predict how many pounds of dough will be prepared after 24 hours.

21) The table shows the relationship between the minutes Vanessa spends walking, *m*, and the number of laps around the track she completes, *c*. Write an equation to represent this relationship.

c	m
3	18
5	30
6	36
8	48

22) If she keeps walking at this rate, how many laps will she have completed after 72 minutes?

23) The following table represents the equation y = x - 4. Fill in the missing values.

| x	y
5	
7	
	24
	30

24) Ella's birthday party costs $3 for every guest she invites. Write an equation that shows the relationship between the guests, *g,* and the cost, *c*. Then complete the table.

| g	c
5	
10	
15	
20	

## Graphing Equations

Classwork

25) Stephanie's graduation picnic costs $7 for every attendee. Write an equation that shows the relationship between the attendees, *a,* and the cost, *c*. Complete the table to represent this scenario. Then graph the function. Be sure to label your table and graph.
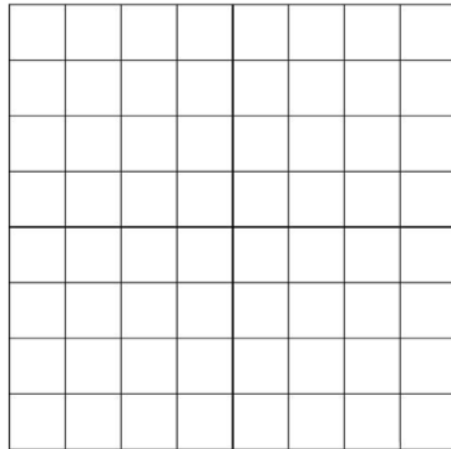
26) Yolanda reads 10 books each month as part of her book club. Write an equation that shows the relationship between the months, *m,* and the total books read, *b*. Complete the table to represent this scenario. Then graph the function. Be sure to label your table and graph.
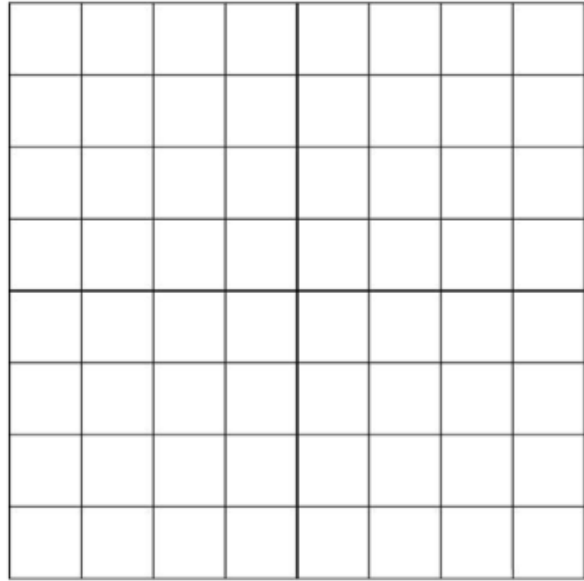

27) A membership to the art museum costs $6.50 Write an equation that shows the relationship between the number of memberships purchased, *m,* and the total cost, *c*. Complete the table to represent this scenario. Then graph the function. Be sure to label your table and graph.
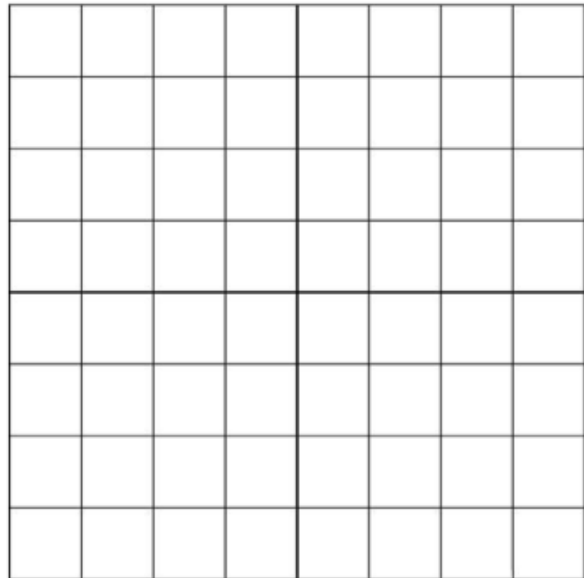

Homework

28) Harry rides his bike at an average rate of 15 miles per hour. Write an equation that shows the relationship between the distance, *d,* that Harry rides and the number of hours, *h*, that he rides. Complete the table to represent this scenario. Then graph the function. Be sure to label your table and graph.
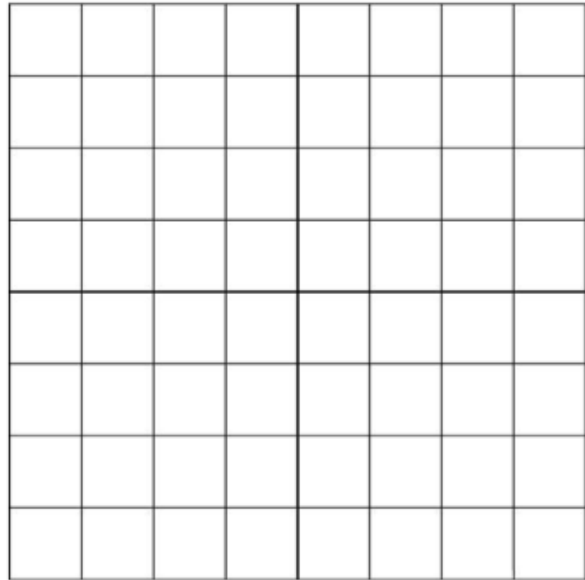
29) The town parking meters charge $0.50 for every hour of parking. Write an equation that shows the relationship between the cost of parking, *c,* and the number of hours paid for, *h*. Complete the table to represent this scenario. Then graph the function. Be sure to label your table and graph.
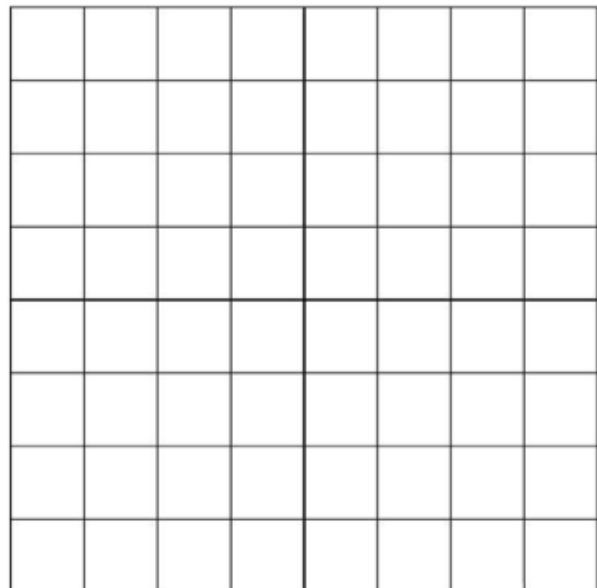
30) Each bag contains 20 lollipops. Write an equation that shows the relationship between the number of bags, *b,* and the number of lollipops, *n*. Complete the table to represent this scenario. Then graph the function. Be sure to label your table and graph.

Unit Review

Dependent and Independent Variables Multiple Choice Questions

1. On your bike, you can travel 6 miles per hour. Which variable is independent?
   a. distance traveled
   b. speed of the bike
   c. number of hours you ride

2. At the salad bar, the grocery store charges $5.99 for each half pound you buy. Which variable is dependent?
   a. weight of the salad
   b. total cost of the salad
   c. cost of the salad per half pound

3. The more time that I spend reading, the more pages I have read. Which variable is independent?
   a. number of pages read
   b. time spent reading
   c. number of pages I have to read

4. Mason makes $20 for each lawn he mows. Which equation represents the money he makes, *d*, in dollars that Mason makes after he mows *n* lawns?
   a. d = 20n
   b. n = 20d
   c. d = 20 ÷ n
   d. n = 20 + d

5. A boat travels at the rate of 25 miles, *m*, per hour, *h*. Which equation represents this scenario?
   a. m = 25h
   b. m = 12 + h
   c. m = 12 – h
   d. m = h ÷ 12

6. Which table represents the scenario in the previous problem?
   a.

h	2	4	6	8
m	50	100	125	200

   c.

m	25	50	60	105
h	1	2	3	4

   b.

h	1	2	3	4
m	25	50	75	100

   d.

m	1	2	3	4
h	25	50	75	100

7. Which table represents the equation *g* = 30*f* ?
   a.

g	2	4	6	8
f	60	120	180	240

   c.

g	1	2	3	4
f	30	60	90	120

   b.

f	2	4	6	8
g	60	120	180	320

   d.

| f	1	2	3	4
g	30	60	90	120

8. It takes Ryan 6.5 minutes to run a mile. Let *m* represent the number of minutes and *d* represent the number miles ran. What is the missing value in the table?

m	6.5	13		26
d	1	2	3	4

   a. 3
   b. 15.5
   c. 15
   d. 19.5

9. Which equation represents the function shown in the table?

x	8	10	12	14
y	12	14	16	18

   a. y = 2x
   b. y = x ÷ 2
   c. y = x - 4
   d. y = x + 4

10. Which scenario does the graph represent?

   a. Miranda earns $30 per hour
   b. The temperature increased by 20° per hour
   c. Amy ran a mile every 15 minutes
   d. Rob folds 10 napkin every minute
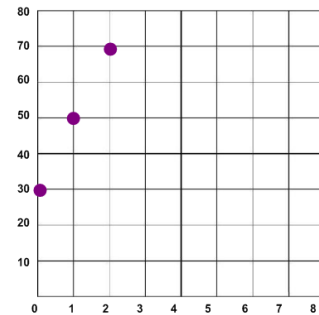
11. Sarah wants to graph the function represented by the table. Which ordered pair is a point on the graph of the function?

x	3	6	9	12
y	4	8	12	16

   a. (3, 4)
   b. (3, 6)
   c. (12, 9)
   d. (16, 12)

12. A movie theater charges $8 for all large containers of popcorn. Jeffrey graphs the function that gives the total cost, *y*, in dollars to buy *x* containers of popcorn. Which ordered pair is a point on the graph of the function?

   a. (2, 10)

   b. (16, 2)

   c. (4, 32)

   d. (8,1)

13. At the farm, each fenced pen holds 5 cows. What variable could be used to calculate the total number of cows on the farm?

   a. *c*, the number of cows

   b. *p*, the number of pens

   c. *v*, the number of visitors at the farm

   d. *b*, the bales of hay to feed the cows

14. A cell phone provider charges $0.15 for each text message sent and received. Which variable could be used to calculate the total amount you will be charged for your text messages?

   a. *s*, the number of messages sent

   b. *a*, the number of messages sent and received

   c. *r*, the number of messages received

   d. *m,* the number of minutes used

15. Adrien earns $9.25 per hour working at a shoe store. If Adrien earned $74 last week, which equation would be used to determine *h*, the number of hours she worked last week?

   a. 9.25 = 74 - h

   b. *74 = 9.25 + h*

   c. 9.25 = 74 + h

   d. 74 = 9.25h

16. The table below represents the number of chocolate chips, *c*, to make *m*, muffins. If the pattern is continued what would be the equation for how many chocolate chips, *c*, she needs to make *m*, muffins?

m	5	9	13	17
c	20	24	28	32

    a. m = 4c

    b. m = c ÷ 4

    c. c = 4m

    d. c = m + 15

Short Constructed Response – Write the correct answer for each question.

17. Identify the dependent and independent variables in the following scenario:
The amount of money you earn and the number of hours you spend working.

        Dependent   Independent

18. Write an equation to represent the scenario displayed in the graph below.
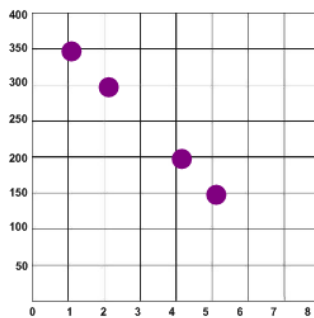
19. Cory is buying hamburgers for his barbeque. Each package contains eight hamburgers. Write an equation to represent this scenario.

20. The Eagles scored 7 more points than the Giants. If the Giants scored 27 points, write an equation that could be used to solve for the number of points, p, that the Eagles scored.

21. Complete the table to represent the equation $y = 3.4x$.

22. Graph the function from the previous problem.
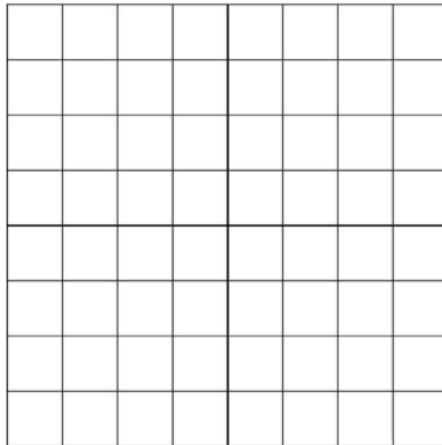
23. Write the equation represented by the table.

x	9	11	13	15
y	5.75	7.75	9.75	11.75

**Extended Constructed Response** - Solve the problem, showing all work.

24. Madison wants to pay off her credit card bill. She can only afford to pay $85 per month.
   a. Write an equation to represent this scenario if Madison's credit card balance is $579.
   b. Determine whether Madison can pay off her bill in 5 months. Explain.
   c. Graph the equation showing her balance starting at $579.
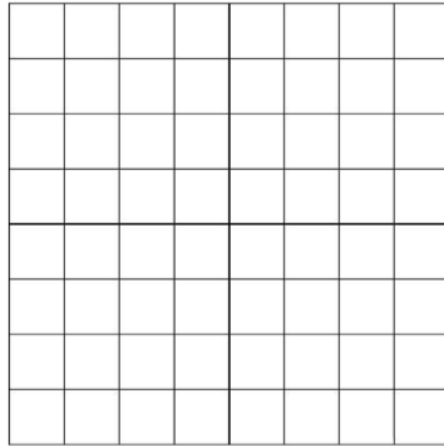
25. Mason has joined the Century Club at school and sets a goal to walk 100 miles. He plans to walk 3.5 miles each day.
   a. Write an equation to represent this scenario.
   b. Graph the equation.
   c. Determine how many days it will take for Mason to walk 100 miles.
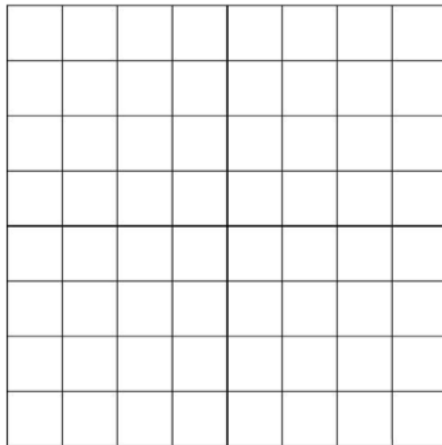
26. The manger of a department store increased the original price on each video game by $2.65.
    a. Write an equation to represent the scenario.
    b. Complete the table below to represent the scenario.
    c. Write an ordered pair that would be a point on the graph of the function.

x	$25.89	$34.99	$58.99	$85.98
y				

27. The average resting heart rate for a 6th grade student is 80 beats per minute.
    a. Write an equation to represent the scenario.
    b. Create a table to represent the scenario.
    c. How long would it take for your heart to beat 1,200 times? Explain.

x				
y				

Answer Key

1) Dependent: height

   Independent: age

2) Dependent: cups

   Independent: gallons

3) Dependent: number of representatives

   Independent: population

4) Dependent: tickets sold

   Independent: number of seats

5) Dependent: altitude

   Independent: time

6) Dependent: money spent

   Independent: number of downloads

7) Dependent: money I have

   Independent: tickets I sell

8) Dependent: number of bags

   Independent: number of items on shopping list

9) Dependent: price

   Independent: weight

10) Dependent: number of snacks

   Independent: time spent hiking

11) Dependent: number of tarts

   Independent: amount of mushrooms

12) Dependent: number of shelves

   Independent: number of trophies

13) h = 12w
14) 96cm
15) c = 16g
16) 8 gallons

17)

a	m
5	15
7	21
8	24
10	30

18)

g	h
15	30
30	45
35	50
45	60

h = g + 15

19) p = 3h
20) 72 lbs
21) m = 6c
22) 12 laps

23)

x	y
5	1
7	3
28	24
34	30

24)

g	c
5	15
10	30
15	45
20	60

c = 3g

*For numbers 25-30, the function tables and graphs will vary, depending on the values for the variables chosen.

25) c = 7a
26) b = 10m
27) c = 6.50m
28) d = 15h
29) c = 0.5h
30) n = 20b

Unit Review Answers

1) C
2) B
3) B
4) A
5) A
6) B
7) D
8) D
9) D
10) B
11) A
12) C
13) B
14) B
15) D
16) D
17) Independent: number of hours spent working
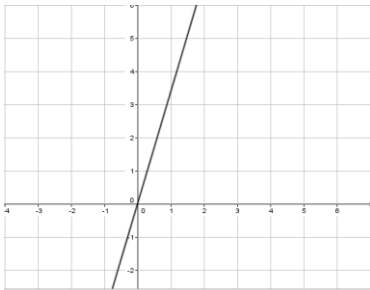   Dependent: amount of money you earn
18) y = 400 – 50x
19) y = 8x
20) 27 = p – 7
21) Answers may vary.

x	1	2	3	4
y	3.4	6.8	10.2	13.6

22)

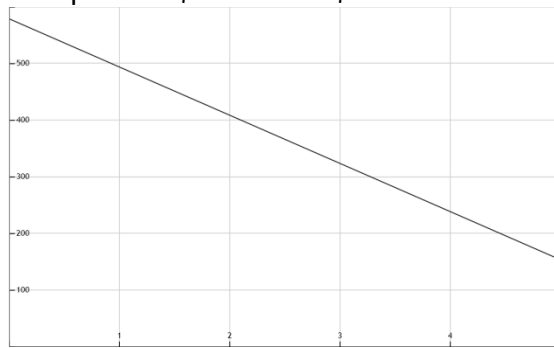

23) y = x − 3.25

24)

    a. y = 579 − 85x

    b. 85 x 5 = $425

       No, she will not pay off the bill in 5 months because after 5 months, she will only have paid off $425 of the $579. She still needs to pay $154 on the bill.
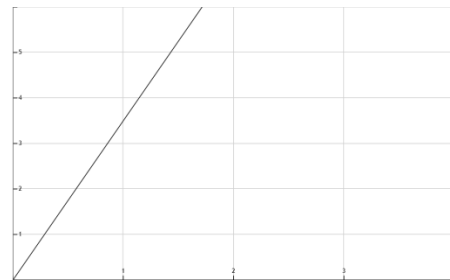

    c.

25)

    a. y = 3.5x

    b.

    c. 100 = 3.5x

$$\frac{100}{3.5} = \frac{3.5x}{3.5}$$

       28.571… = x

       29 days = x

26)

    a. y = x + 2.65

    b.

x	$25.89	$34.99	$58.99	$85.98
y	$28.54	$37.64	$61.64	$88.63

    c. Answers may vary. (25.89, 28.54)

27)

    a. y = 80x

    b. Answers may vary.

x	1	2	3	4
y	80	160	240	320

    c. 1200 = 80x

$$\frac{1200}{80} = \frac{80x}{80}$$

15 minutes = x

I plugged in 1200 for the y value in the equation and solved for the x value by dividing both sides of the equation by 80 to receive 15.