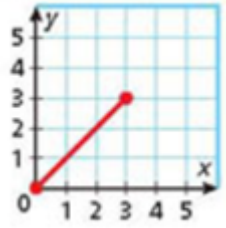
Chapter 3 Test review

1. Which situation would NOT be represented by a discrete graph?
   a. Amount of money earned based on the number of cereal bars sold
   b. Number of visitors to a grocery store per day for one week
   c. The total amount of iced tea in a pitcher at a restaurant during the lunch hour
   d. The total cost of buying 1,2, or 3 CDs at the music store
2. Which of the following relations is NOT a function?
   a. {(0,1),(1,2),(2,3),(3,4)}
   b. {(1,2),(2,2),(3,3),(4.3)}
   c. {(0,2),(2,4),(4,1),(1,3)}
   d. {(1,3),(4,2),(2,0),(3,4)}
   e. {(0,2),(1,3),(4,3),(1,2)}

Give the domain and range of each function.

3. {(-5,7), (0,0),(2,-8),(5,-20)}

4.



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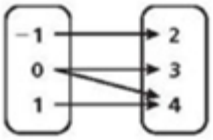
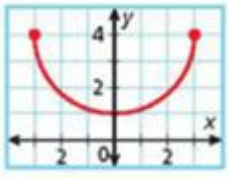


Give the domain and range for each relation. Tell whether the relation is a function. **Explain**.

6.

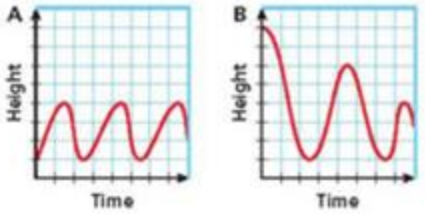
x	−2	1	0	1	3
y	3	2	1	0	−1

7.



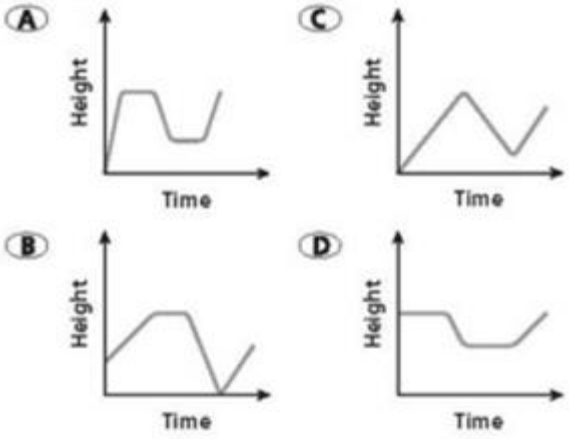
Choose the graph that best represents each situation.

8. A person bungee jumps from a high platform.
9. A person jumps on a trampoline in a steady motion.



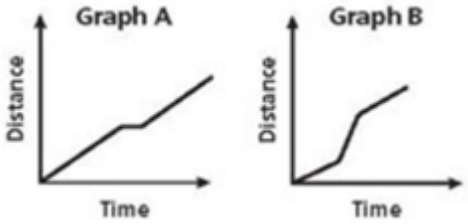
10. Does the graph of the function $f(x) = 3x - 7$ contain the point (-2,4) ?

11. A bird flies from the ground to the top of a tree, sits there and sings for a while, flies down to the top of a picnic table to eat crumbs, and then flies back to the top of the tree to sing some more. Which graph best represents this situation?



Choose the graph that best represents each situation.

12. A person walks leisurely, stops, and then continues walking.
13. A person jogs, then runs, and then jogs again.



Write an equation for the relationship below in function form.

14.

x	1	2	3	4
y	−6	−5	−4	−3

15.

x	1	2	3	4
y	−3	−6	−9	−12

16. A printer can print 8 pages per minute. Identify the dependent and independent variables for the situation. Write an equation in function form.
17. A photographer charges a sitting fee of $15 plus $3 for each pose. Write a function to describe the situation. Find a reasonable domain and range for up to 5 poses.
18. Identify the independent and dependent variables for the situation. Then write an equation in function form. "A baker spends $6 on ingredients for each cake he bakes."

Evaluate each function for the given input values.

19. For $f(x) = 3x - 1$, find $f(x)$ when $x = 2$.
20. For $g(x) = x^2 - x$, find $g(x)$ when $x = -2$.
21. For $h(x) = x^3 + 2x$, find $h(4)$.

Given $f(x) = 4x + 8,\ g(x) = 9x - 2,\ h(x) = \frac{1}{2}x + 1,$ and $j(x) = -2x - 9$ Find:

22. $f(x) - g(x)$
23. $h[g(-2)]$
24. $f(g(h(4)))$
25. The inverse each function.

Determine whether each sequence appears to be an arithmetic sequence. If so, find the common difference and the next three terms.

26. 11, 6, 1, -4,…
27. -4, -3, -1, 2…

Find each term in the arithmetic sequence.

28. 31st term: -15, -11, -7, -3…
29. 24th term $a_1 = 7; d = -3$
30. 17th term $a_1 = -20; d = 2.5$
31. Marie has $180 in a savings account in week 1. She plans to deposit $12 each following week. Assuming that she does not withdraw any money from her account, what will her balance be in week 20?
32. What is the seventh term of the arithmetic sequence -4, -1, 2…?
    a. 5
    b. 10
    c. 11
    d. 14
    e. 17
33. Evaluate $h(x) = \frac{1}{2}(5 - 6x) + 9x$ when $x = \frac{2}{3}$.
    a. 9/2
    b. 13/2
    c. 7
    d. 19/2
    e. 23/2
34. Find the value of x if the function $f(x) = \frac{1}{3}x + 5$ has a value of -15.

Write an arithmetic sequence for the function represented by the recursive formula.

35. $\begin{cases} a_1 = 5 \\ a_n = a_{n-1} - 6 \ for \ n \geq 2 \end{cases}$

Write a recursive rule for the arithmetic sequence

36. 7, 14, 21, 28

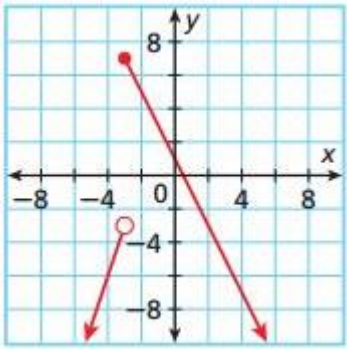
37. A scatter plot was made of our class data bubble project comparing the diameter of the bubble to the circumference indicated a positive correlation. Each class used the graphing calculator to find the line of best fit. Period 1 had a correlation coefficient of 0.83, Period 2 had a correlation coefficient of 0.73, Period 4 had a correlation coefficient of 0.43, Period 5 had a correlation coefficient of 0.79, and period 6 had a correlation coefficient of 0.921.

a. Which class had the best line of fit?
b. Which class had the worse line of fit?

38. Which of the following correlation coefficients indicate a strong line of fit?
    a. 0.583
    b. -0.917
    c. -0.65
    d. 0.851

39. Graph the piece-wise function represented by the function $f(x) = \begin{cases} 3x + 2 \; for \; x \leq 2 \\ 2x - 1 \; for \; x > 2 \end{cases}$

40.
    a. find $f(-3)$
    b. $find\ f(0)$
    c. find the domain
    d. find the range



Answers:

1. C.
2. E.
3. **D: {-5, 0, 2, 5} R: {-20, -8, 0, 7}**
4. **D: 0≤x≤3 R: 0≤y≤3**
5. **D: {-1,0,1} R: {2,3,4}**
6. **D: {-2,0,1,3} R: {-1,0,1,2,3}**
   This is NOT a function. The domain 1 is pair with 2 and 0.
7. **7. Domain: -3≤x≤3 Range: 1≤y≤4 This IS a function. Each input is pair with exactly 1 output. It passes the vertical line test.**
8. Graph B
9. Graph A
10. No. (work below)
11. Graph A
12. Graph A
13. Graph B
14. $\boldsymbol{f(x) = x - 7.}$
15. $\boldsymbol{f(x) = -3x}$.
16. **Independent: time**
    dependent: Number of pages
    $f(x) = \frac{1}{8}x$
17. $\boldsymbol{f(x) = 3x + 15}$

Domain: {0,1,2,3,4, …}

Range: {0,18, 21, 24, 27, 30, …}

18. $\boldsymbol{f(x) = 6x}$

    Independent: number of cakes

    Dependent: total cost

19. 5 (work below)
20. 6 (work below)
21. 72 (work below)
22. $\boldsymbol{h(x) = -5x + 12}$ (work below)
23. -9 (work below)
24. 108 (work below)
25. $\boldsymbol{k(x) = \frac{1}{4}x - 2}$; **(work below)**

    $\boldsymbol{l(x) = \frac{1}{9}x + \frac{2}{9}}$

    $\boldsymbol{m(x) = 2x - 2}$

    $n(x) = -\frac{1}{2}x - \frac{9}{2}$

26. **Yes; d=-5; -9, -14, -19**
27. No
28. 105 (work below)
29. -62 (work below)
30. 20 (work below)
31. She will have $408 in her account on week 20. (work below)
32. D (work below)
33. B (work below)
34. {-60} (work below)
35. 5, -1, -7, -13, …

36. $\boldsymbol{a_n = 7 + (n - 1)(7)}$

37.
    a. Period 6
    b. Period 4

38. B and d
39. See below
40.
    a. 7
    b. 1
    c. {all real numbers}
    d. $\{y|y \leq 7\}$

Work:

10. $f(x) = 3x - 7$

$4 = 3(-2) - 7$

$-6 - 7$

$4 \neq -13$

NO.

19. $f(x) = 3x - 1$

$f(2) = 3(2) - 1$

$6 - 1$

$f(2) = 5$

20. $g(x) = x^2 - x$

$g(-2) = (-2)^2 - (-2)$

$4 + 2$

$g(-2) = 6$

21. $h(x) = x^3 + 2x$

$h(4) = 4^3 + 2(4)$

$64 + 8$

$h(4) = 72$

22. $f(x) - g(x)$

$f(x) = 4x + 8$

$g(x) = 9x - 2$

$(4x+8) - (9x-2)$

$4x + 8 - 9x + 2$

$h(x) = -5x + 10$

* be sure to name it something other than $f(x)$ or $g(x)$

23. $h[g(-2)]$

First find $g(-2)$

$g(-2) = 9(-2) - 2$

$g(-2) = -18 - 2$

-20

Next substitute into $h(x)$ function

$h(-20)$

$h(-20) = \frac{1}{2}(-20) + 1$

$-10 + 1$

-9

24. $f(g(h(4)))$

* work inside-out

$h(4) = \frac{1}{2}(4) + 1$

$h(4) = 2 + 1$

$h(4) = 3$

$g(3) = 9(3) - 2$

$27 - 2$

$g(3) = 25$

$f(25) = 4(25) + 8$

$100 + 8$

$f(25) = 108$

25. $f(x) = 4x + 8$

$y = 4x + 8$

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

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

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

$k(x) = \frac{x-8}{4}$

-or-

$k(x) = \frac{1}{4}x - 2$

$g(x) = 9x - 2$

$y = 9x - 2$

$y + 2 = 9x$

$\frac{y+2}{9} = x$

$\frac{x+2}{9} = y$

$m(x) = \frac{1}{9}x + \frac{2}{9}$

$h(x) = \frac{1}{2}x + 1$

$y = \frac{1}{2}x + 1$

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

$2(y-1) = x$

$2y - 2 = x$

$2x - 2 = y$

$l(x) = 2x - 2$

$j(x) = -2x - 9$

$y = -2x - 9$

$y + 9 = -2x$

$\frac{y+9}{-2} = x$

$\frac{x+9}{-2} = y$

$n(x) = -\frac{1}{2}x - \frac{9}{2}$

*remember to name it something new

$a_n = a_1 + (n-1)(d)$

28. $a_{31} = -15 + (31-1)(4)$
$-15 + (30)(4)$
$-15 + 120$
$a_{31} = 105$

29. $a_{24} = 7 + (24-1)(-3)$
$a_{24} = 7 + 23(-3)$
$7 - 69$
$a_{24} = -62$

30. $a_{17} = -20 + (17-1)(2.5)$
$-20 + (16)(2.5)$
$-20 + 40$
$a_{17} = 20$

31. $a_{20} = 180 + (20-1)(12)$
$180 + 19(12)$
$\$408$
She will have $408 in her account in week 20.

32. $a_7 = -4 + (7-1)(3)$

$-4 + (6)(3)$

14

33. $h(x) = \frac{1}{2}(5-6x) + 9x$

$h(\frac{2}{3}) = \frac{1}{2}(5-6\cdot\frac{2}{3}) + 9(\frac{2}{3})$

$h(\frac{2}{3}) = \frac{1}{2}(5-4) + 6$

$\frac{1}{2}(1) + 6$

$\frac{1}{2} + 6$

$6\frac{1}{2}$

$h(\frac{2}{3}) = 6\frac{1}{2}$

34. $-15 = \frac{1}{3}x + 5$

$-20 = \frac{1}{3}x$

$-60 = x$

$x = \{-60\}$

39