Unit 3 Test   Algebra 1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____   1. Dev has a monthly food budget of $182. He maps the amount of money, x, he spends each month to the
number of food items he buys. What are the constrains on the domain?
   a.   domain: $x \leq 182$
   b.   domain: $x \geq 0$
   c.   domain: $x \geq 182$
   d.   domain: $0 \leq x \leq 182$

_____   2. The function $j(x) = 39x$ represents the number of jumping jacks $j(x)$ you can do in x minutes. How many
jumping jacks can you do in 5 minutes?
   a.   195 jumping jacks   c.   144 jumping jacks
   b.   7 jumping jacks   d.   234 jumping jacks

_____   3. How are the functions $y = x$ and $y = x + 5$ related? How are their graphs related?
   a.   Each output for $y = x + 5$ is 5 less than the corresponding output for $y = x$.
        The graph of $y = x + 5$ is the graph of $y = x$ translated down 5 units.
   b.   Each output for $y = x + 5$ is 5 more than the corresponding output for $y = x$.
        The graph of $y = x + 5$ is the graph of $y = x$ translated up 5 units.
   c.   Each output for $y = x + 5$ is 5 more than the corresponding output for $y = x$.
        The graph of $y = x + 5$ is the graph of $y = x$ translated down 5 units.
   d.   Each output for $y = x + 5$ is 5 less than the corresponding output for $y = x$.
        The graph of $y = x + 5$ is the graph of $y = x$ translated up 5 units.

_____   4. Which function's graph is a translation of the graph of $f(x) = x$ shifted 7 units to the left?
   a. $g(x) = -7x$ c. $g(x) = 7x$
   b. $g(x) = x + 7$ d. $g(x) = x - 7$

**The function $f(x)$ is represented by the given table. What are the corresponding values of the given
$g(x)$?**

_____   5. Write an equation for the following transformation of $y = x$:
   a vertical stretch by a factor of 4

   a. $y = -4x$ c. $y = -\dfrac{1}{4}x$

   b. $y = 4x$ d. $y = \dfrac{1}{4}x$

Find the function rule for g(x).

_____ 6. The function $f(x) = -5x$. The graph of $g(x)$ is $f(x)$ vertically stretched by a factor of 2 and reflected in the y-axis. What is the function rule for $g(x)$?

    a. $g(x) = \frac{5}{2}x$ c. $g(x) = -\frac{5}{2}x$

    b. $g(x) = 10x$ d. $g(x) = -10x$

Write a function for the situation. Is the graph _continuous_ or _discrete_?

_____ 7. A movie store sells DVDs for $11 each. What is the cost, C, of n DVDs?

    a. $C = 11n$; continuous   c. $C = 11 + n$; continuous

    b. $C = 11 + n$; discrete   d. $C = 11n$; discrete

Describe a pattern in each sequence. What are the next two terms of each sequence?

_____ 8. 26, 21, 16, 11, . . .

    a. subtract 5 from the previous term; 6, 1

    b. add 5 to the previous term; 16, 21

    c. multiply the previous term by –5; –55, 275

    d. multiply the previous term by –5; 6, 275

Is the sequence arithmetic? If so, identify the common difference.

_____ 9. 14, 21, 42, 77, ...

    a. yes; 7   b. yes; –7   c. yes; 14   d. no

_____ 10. An arithmetic sequence is represented by the explicit formula $A(n) = 2 + 9(n - 1)$. What is the recursive formula?

    a. $A(n) = A(n - 1) + 2$ c. $A(n) = A(n - 1) - 9$

    b. $A(n) = A(n - 1) + 9$ d. $A(n) = A(n - 1) - 2$

_____ 11. Find the 101 term of the sequence 8, 16, 24, 32, ...

    a. 816   b. 808   c. 165   d. –792

_____ 12. Viola makes gift baskets for Valentine's Day. She has 13 baskets left over from last year, and she plans to make 12 more each day. If there are 15 work days until the day she begins to sell the baskets, how many baskets will she have to sell?

    a. 193 baskets   c. 205 baskets

    b. 156 baskets   d. 181 baskets

_____ 13. Write a recursive formula for the arithmetic sequence below. What is the value of the 8th term?

    1, 5, 9, 13, . . .

    a. $A(n) = A(n - 1) - 4$; –27   c. $A(n) = A(n - 1) + 4$; 29

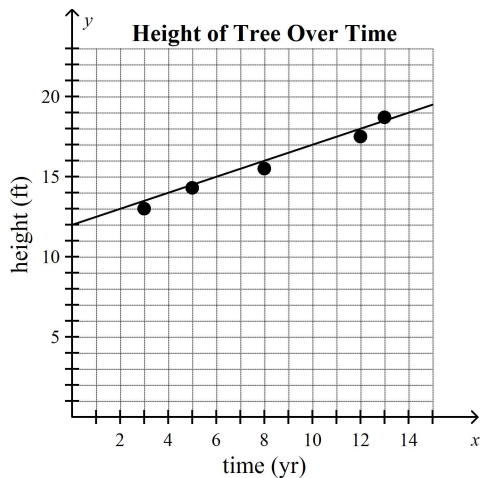   b. $A(n) = 4A(n - 1)$; 29   d. $A(n) = -4A(n - 1)$; –27

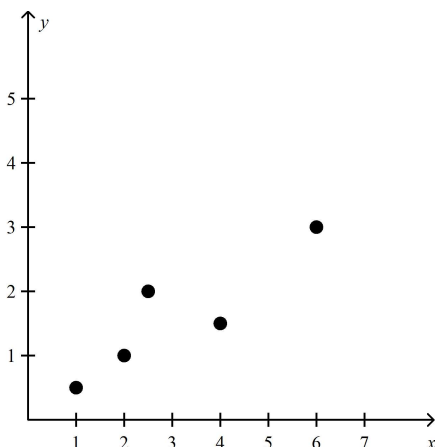**What type of relationship does the scatter plot show?**

_____ 14.
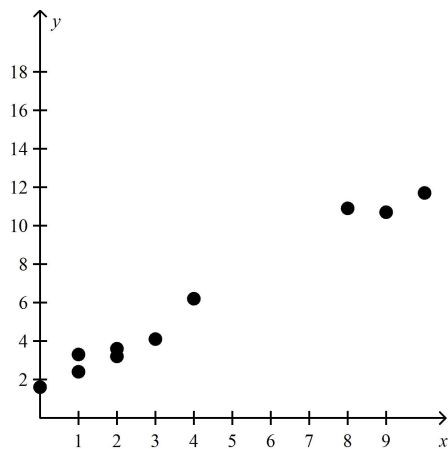
a. positive correlation
b. negative correlation
c. no correlation

_____ 15. The scatter plot below shows the height of a tree over time. What is the approximate height of the tree after 10 years?

a. 13 ft
b. 20 ft

c. 17 ft
d. 21 ft

_____ 16. Which line of best fit equation best represents the data shown in the plot?

a. $y = \dfrac{1}{2}x$ c. $y = 2x$

b. $y = -\dfrac{1}{2}x$ d. $y = -2x$

_____ 17. Corinne is trying to find the data set with the strongest negative correlation. The correlation coefficients for 4 data sets are listed. Which data set should Corinne choose?
a. −0.989   c. 0.417
b. −0.265   d. 0.993

In the following situations, is there likely to be a correlation? If so does the correlation reflect a causal relationship? Explain.

_____ 18. the average daily winter temperature and your heating bill
a. There is a positive correlation. The higher the average daily winter temperature the higher your heating bill.
b. There is a negative correlation and a causal correlation. The higher the average daily winter temperature the lower your heating bill.
c. There is no correlation.

Short Answer

19. Identify the domain and range of the relation.
$\left\{(-4, 2), (-9, -5), (-4, 12), (8, -8)\right\}$

Domain:_____

Range:_____

Determine whether the relation is a function.

20. $\{(3,0),(2,-1),(-1,4),(1,-2)\}$

Is it a function?_____

21. Draw a mapping diagram that represents the relation and determine whether the relation is a function.
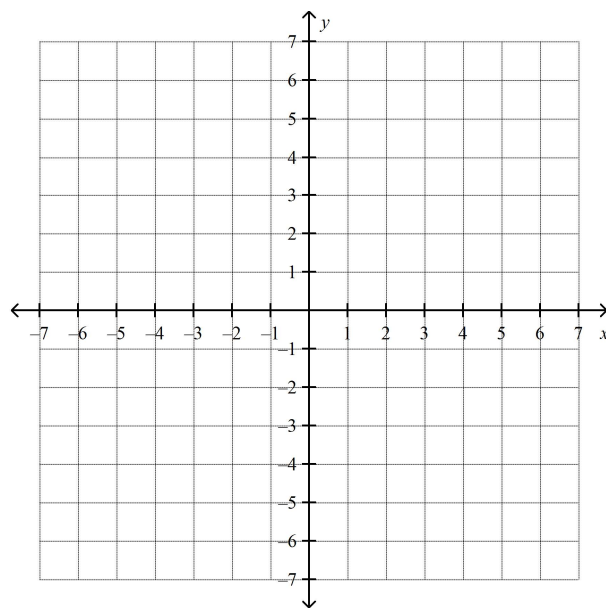$\{(-8,-6),(-5,2),(-8,1),(7,3)\}$

Mapping:

Is it a function?   Yes   or   No

22. Find the range of $f(x) = -3x + 4$ for the domain $\{-2, 2, 4, 6\}$.

_____

23. The function $g(t) = 9t$ represents the number of guitar lessons, $g(t)$, you can complete in t months. How many guitar lessons can you complete in 10 months?
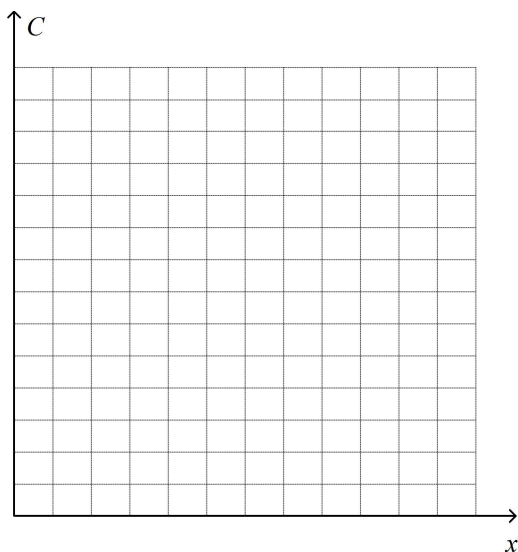
_____

What is the graph of the function rule?

24. $y = -4x + 3$

25. Elaine has a business repairing home computers. She charges a base fee of $30 for each visit and $35 per hour for her labor. The total cost C for a home visit and x hours of labor is modeled by the function rule $C = 35x + 30$. Use the function rule to make a table of values and a graph.

x	C
0	
1	
2	
3	

Is the sequence arithmetic? If so, identify the common difference.

26. 13, 20, 27, 34, ...

Is the sequence arithmetic?_____

If so, what is the common difference:?_____

27. An arithmetic sequence is represented by the recursive formula $A(n) = A(n-1) - 10$. If the first term in the sequence is 6, write the explicit formula.

Explicit Formula:_____

28. Find the 2nd and 3rd term of the sequence –6, ___, ___, –33, –42, ...

_____, _____

29. Marta's starting annual salary is $25,900. At the beginning of each new year, she receives a $2260 raise. Write a recursive formula to find Marta's salary $f(n)$ after n years. What will Marta's salary be after 5 yr?

Recursive Formula:_____

Salary after given number of years:_____

30. Consider the graph of f(x) = 2x +3. Describe how the graph of each function compares to f(x).

a. g(x) = f(x -8)   _____

b. g(x) = f(x) + 4   _____

c. g(x) = -3f(x)   _____

31. f(x) = -2x - 5

Find f(-1).

_____

Unit 3 Test   Algebra 1
Answer Section

MULTIPLE CHOICE

  1. ANS: D   PTS: 1   REF: 3-1 Relations and Functions
  2. ANS: A   PTS: 1   REF: 3-2 Linear Functions
  3. ANS: B   PTS: 1   REF: 3-3 Transforming Linear Functions
  4. ANS: B   PTS: 1   REF: 3-3 Transforming Linear Functions
  5. ANS: B   PTS: 1   REF: 3-3 Transforming Linear Functions
  6. ANS: B   PTS: 1   REF: 3-3 Transforming Linear Functions
  7. ANS: D   PTS: 1   REF: 3-4 Arithmetic Sequences
  8. ANS: A   PTS: 1   REF: 3-4 Arithmetic Sequences
  9. ANS: D   PTS: 1   REF: 3-4 Arithmetic Sequences
10. ANS: B   PTS: 1   REF: 3-4 Arithmetic Sequences
11. ANS: B   PTS: 1   REF: 3-4 Arithmetic Sequences
12. ANS: A   PTS: 1   REF: 3-4 Arithmetic Sequences
13. ANS: C   PTS: 1   REF: 3-4 Arithmetic Sequences
14. ANS: A   PTS: 1   REF: 3-5 Scatter Plots and Lines of Fit
15. ANS: C   PTS: 1   REF: 3-5 Scatter Plots and Lines of Fit
16. ANS: A   PTS: 1   REF: 3-5 Scatter Plots and Lines of Fit
17. ANS: A   PTS: 1   REF: 3-6 Analyzing Lines of Fit
18. ANS: B   PTS: 1   REF: 3-6 Analyzing Lines of Fit

SHORT ANSWER

19. ANS:
The domain is {–9, –4, 8}.
The range is {–8, –5, 2, 12}.

PTS: 1   REF: 3-1 Relations and Functions
20. ANS:
The relation is a function.

PTS: 1   REF: 3-1 Relations and Functions

21. ANS:
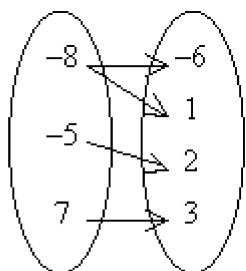
The relation is not a function.

PTS: 1 REF: 3-1 Relations and Functions
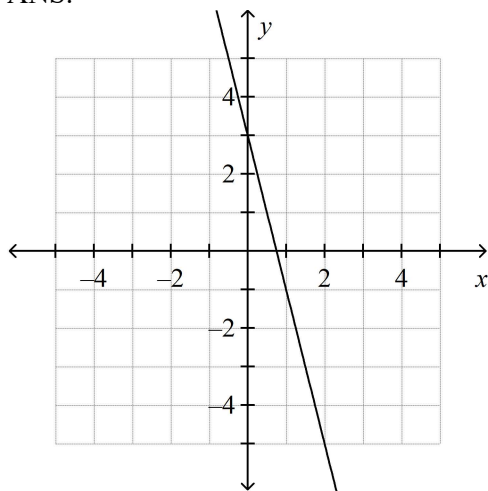
22. ANS:
{10, –2, –8, –14}

PTS: 1 REF: 3-2 Linear Functions

23. ANS:
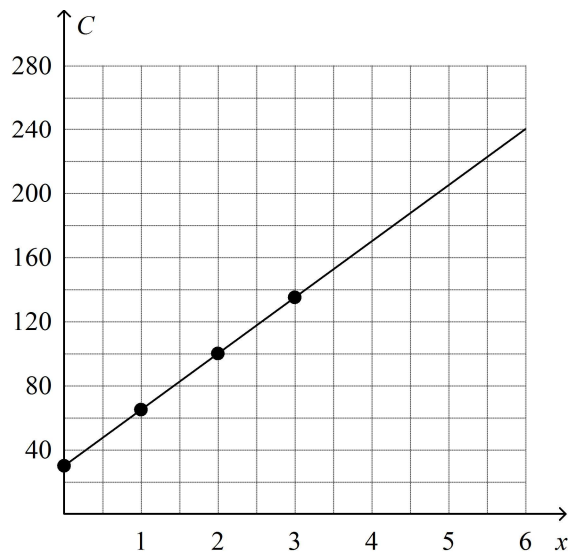You can complete 90 guitar lessons in 10 months.

PTS: 1 REF: 3-2 Linear Functions

24. ANS:

PTS: 1 REF: 3-2 Linear Functions

25. ANS:

x	C
0	30
1	65
2	100
3	135

    PTS: 1   REF: 3-2 Linear Functions

26. ANS:
yes; 7

    PTS: 1   REF: 3-4 Arithmetic Sequences

27. ANS:
$A(n) = 6 - 10(n - 1)$

    PTS: 1   REF: 3-4 Arithmetic Sequences

28. ANS:
–15, –24

    PTS: 1   REF: 3-4 Arithmetic Sequences

29. ANS:
$f(n) = f(n - 1) + 2260$; \$34,940

    PTS: 1   REF: 3-4 Arithmetic Sequences

30. ANS:
    a. right 8 units
    b. up 4 units
    c. reflect across x-axis and vertical stretch by a factor of 3

    PTS: 1
31. ANS:
    -3

    PTS: 1