Name_____

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MATH@TD

11U - U2: Intro to Functions - Practice Problems

Multiple Choice
*Identify the choice that best completes the statement or answers the question. Circle the letter of your choice **AND** write the leter beside the question number.*

1. The temperature fell at a rate of 0.65 °C/h. The temperature was recorded at 37 °C at 6 p.m. Which function can be used to represent this situation?
   a. $f(x) = 37 - 0.65x$
   b. $f(x) = 37x + 0.65$
   c. $f(x) = 0.65x + 37$
   d. $f(x) = 0.65x - 37$

2. Consider the functions $f(x) = -(x^2) + 6x$ and $g(x) = x^2 - 9x + 1$. Which of the following is true?
   a. $f(-3) > g(-3)$
   b. $f(0) = g(0)$
   c. $f(4) < g(4)$
   d. $f(-2) < g(-2)$

3. Evaluate $f(x) = -4x^2 + 7$ for $f(1) + f(-2)$.
   a. –6
   b. 3
   c. 26
   d. 94

4. Debra thought of a number. She squared the number and added the original number to the result. She then divided the sum by 4. Which function represents Debra's number?
   a. $f(x) = x^2 + \frac{x}{4}$
   b. $f(x) = \frac{2x + x}{4}$
   c. $f(x) = \frac{x^2 + x}{4}$
   d. $f(x) = \frac{2x}{4} + x$

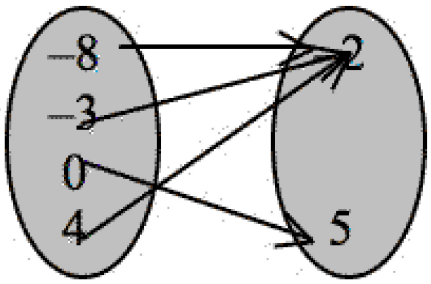
5. What are the domain and range of the function $f(x) = \sqrt{x - 5}$?
   a. Domain = $\{x \in \mathbf{R}\}$
      Range = $\{y \in \mathbf{R}\}$
   b. Domain = $\{x \in \mathbf{R} \mid x \geq 0\}$
      Range = $\{y \in \mathbf{R} \mid y \geq 0\}$
   c. Domain = $\{x \in \mathbf{R} \mid x \geq 25\}$
      Range = $\{y \in \mathbf{R} \mid y \geq 1\}$
   d. Domain = $\{x \in \mathbf{R} \mid x \geq 5\}$
      Range = $\{y \in \mathbf{R} \mid y \geq 0\}$

6. Which of the following is the inverse relation to the set of ordered pairs {(–10, 5), (–7, 9), (0, 6), (8, –12)}?
   a. {(5, –10), (9, –7), (6, 0), (–12, 8)}
   b. {(–10, –5), (–7, –9), (0, –6), (8, 12)}
   c. {(10, –5), (7, –9), (0, –6), (–8, 12)}
   d. {(–5, 10), (–9, 7), (–6, 0), (12, –8)}

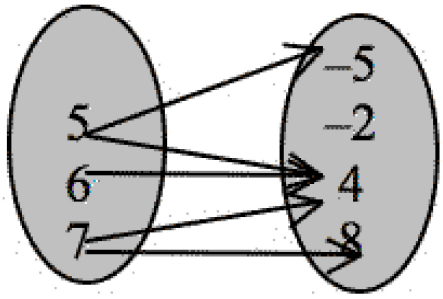
7. Which relation is a function?
   a. {(–3, –2), (–1, 3), (0, –2), (3, 4)}
   b. {(0, 1), (3, 2), (5, –3), (0, 2)}
   c. {(–7, –7), (–2, 5), (–1, 6), (–2, –5)}
   d. {(–4, –7), (–9, 5), (4, –2), (–9, 0)}

8. Which of the following relations is a function?

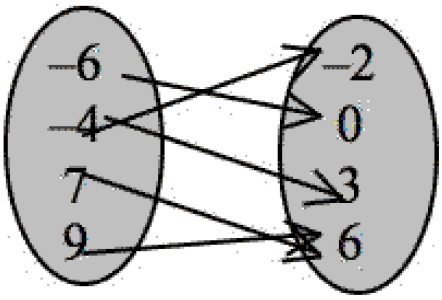
a.



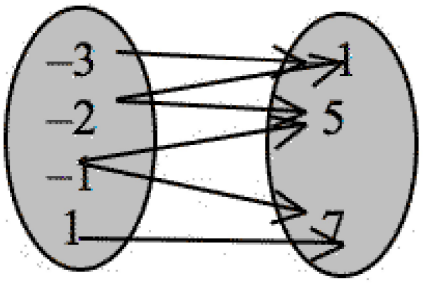
c.



b.

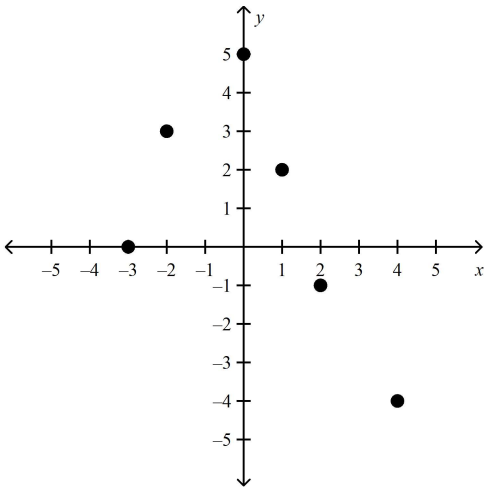


d.



9. Which relation is not a function?
   a. {(–13, –10), (–15, –12), (–11, –8), (–16, 4)}
   b. {(8, 17), (5, 5), (8, –3), (4, –1)}
   c. {(–14, –2), (–10, 6), (–1, 3), (10, 6)}
   d. {(0, –2), (–4, 6), (4, 15), (12, 6)}

10. What is the domain of the relation shown?



   a. {–3, –2, 0, 1, 2, 4}
   b. {–3 ≤ x ≤ 4}
   c. {x ∈ **I**}
   d. {–4, –1, 0, 2, 3, 5}

11. Which of the following is the inverse to the function $f(x) = 3x - 6$?

a. $f^{-1}(x) = \frac{1}{3x} - \frac{1}{6}$

b. $f^{-1}(x) = -\frac{x}{3} + 2$

c. $f^{-1}(x) = -3x + 6$

d. $f^{-1}(x) = \frac{x}{3} + 2$

12. Which of the following is the inverse to the function "Divide by 2, then add 21"?

a. Add 21, then divide by 2

b. Subtract 21, then multiply by 2

c. Divide by 21, then add 2

d. Multiply by 2, then subtract 21

13. Which of the following is NOT a transformation that can be used to graph the function $f(x) = -6(x-4)^2 + 2$ from the parent function?

a. Vertical translation 2 units up

b. Horizontal stretch by a factor of $\frac{1}{6}$

c. Reflection in the x-axis

d. Horizontal translation 4 units to the right

Written Solutions

Provide solutions clearly showing your work.

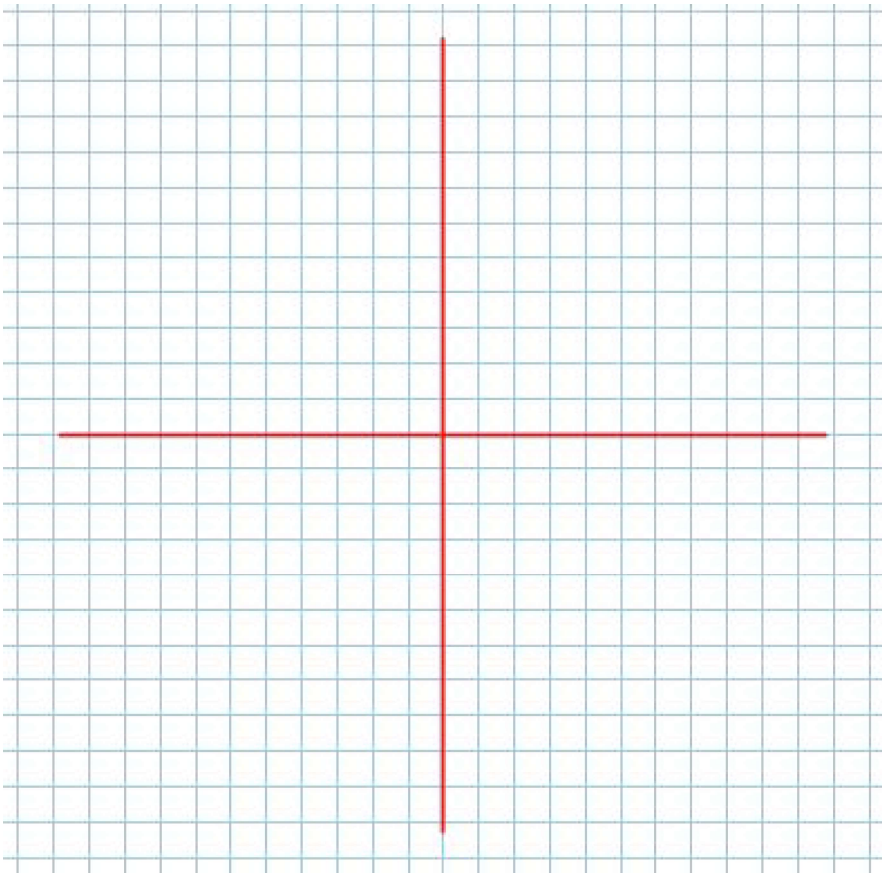
14. What are the domain and range of the graph? Is the graph a function? Why or why not?

15. Consider the function $f(x) = 3x - 8$. Determine

a) $f(3k)$.

b) x, if $f(x) = 4$

16. Given the function $f(x) = -2(x+4)^2 + 3$:
    a) State the parent function, and call it $g(x)$
    b) State all transformations applied to the parent function
    c) Sketch the graph of the parent function and $f(x)$ on the same set of axes.



17. Given the function $f(x) = \sqrt{x}$, write the **equation** for a transformed function, $g(x)$, after the following transformations: (No sketch required - just the equation)
    horizontal stretch by the factor 2,
    vertical stretch by the factor 3
    Reflection around the x-axis
    Shift 3 units left and 5 units up

18. Consider the function $f(x) = 6 + 5x - 2x^2$. Determine the range of $f(x)$ if the domain is given by $D_f = \{-2,-1,0,3\}$.

19. Determine the inverse functions $f^{-1}(x)$ and $g^{-1}(x)$ given $f(x) = \frac{1}{2}\sqrt{3x-6} + 5$ and $g(x) = -3(x+2)^2 - 1$. Use the method of your choice (brute force or transformations).