

Math 2 NCFE Practice: Transformations, Graphs, and Probability

_____ 1. The graph of $y = x^2$ is shifted up 3 units and right 5 units. Which equation represents the resulting graph?

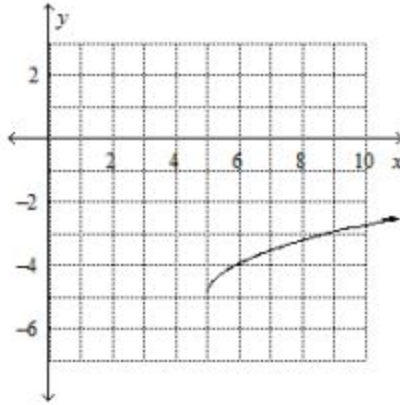
A. $y = (x - 5)^2 + 3$

C. $y = (x - 3)^2 + 5$

B. $y = (x + 5)^2 + 3$

D. $y = (x + 3)^2 + 5$

_____ 2. Which function matches the graph?



A. $y = \sqrt{x + 5} + 5$

C. $y = \sqrt{x + 5} - 5$

B. $y = \sqrt{x - 5} - 5$

D. $y = \sqrt{x - 5} + 5$

_____ 3. Which of the following algebraic rules describes an *isometric* transformation?

I. $(x, y) \rightarrow (3x, 3y - 1)$

II. $(x, y) \rightarrow (-x - 6, -y + 1/4)$

III. $(x, y) \rightarrow (-y, x + 1)$

A. I and II

B. II and III

C. I and III

D. None on the above

_____ 4. Convert the equation, $y = x^2 + 4x + 13$ to vertex form.

A. $y = (x + 2)^2$

B. $y = (x + 2)^2 + 9$

C. $y = (x + 4) - 3$

D. $y = (x + 4)^2$

_____ 5. Which of the following is true for a quadratic function with an imaginary root?

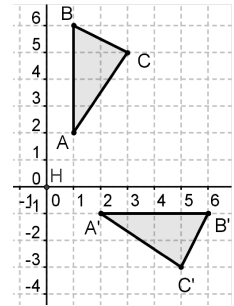
A. A quadratic has an imaginary solution if it is not factorable.

B. A quadratic has an imaginary root if the parabola is upside down.

C. A quadratic has an imaginary root if the parabola “bounces” off of the x -axis.D. A quadratic has an imaginary root if the parabola does not touch the x -axis.

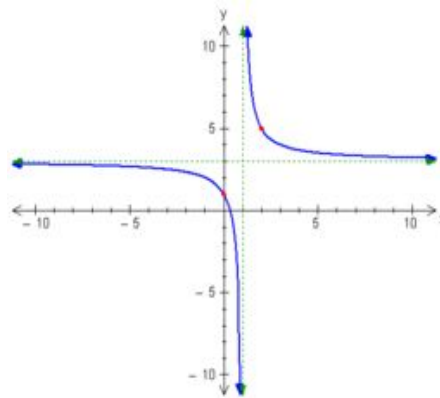
_____ 6. Which of the following correctly describes the transformation of triangle ABC?

- A. $(x,y) \rightarrow (x, -y)$ B. $(x,y) \rightarrow (y,x)$
 C. $(x,y) \rightarrow (-x,y)$ D. $(x,y) \rightarrow (y,-x)$



_____ 7. Which equation correctly models the graph shown?

- A. $y = \sqrt{x-1} + 3$
 B. $y = \frac{1}{x-3} + 1$
 C. $y = (x-1)^2 + 3$
 D. $y = \frac{1}{x-1} + 3$

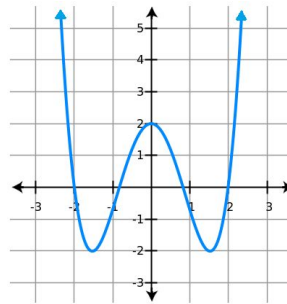


_____ 8. Which of the following functions has asymptotes at $x = 5$ and $y = 1$?

- A. $y = -\frac{1}{x+5} + 1$ B. $y = -\frac{1}{x-5} + 1$ C. $y = \frac{1}{x+5} + 1$ D. $y = \frac{1}{x-5} - 1$

_____ 9. What is the range of the graph on the right?

- A. $-\infty \leq y \leq \infty$
 B. $-2 \leq y \leq \infty$
 C. $-2 \leq y \leq 2$
 D. $-2.5 \leq y \leq 2.5$



_____ 10. Twenty-one students at a school have an allergy to peanuts, shellfish, or both.

- Fourteen students at the school are allergic to peanuts.
- Twelve students at the school are allergic to shellfish.

How many of the students are allergic to both peanuts and shellfish?

- A. 12
 B. 7
 C. 5
 D. 2

___ 11. Suppose that James can choose to get home from work by taxi or bus.

- When he chooses to get home by taxi, he arrives home after 6 p.m. 8 percent of the time.
- When he chooses to get home by bus, he arrives home after 6 p.m. 15 percent of the time.
- Because the bus is cheaper, he uses the bus 60 percent of the time.

What is the *approximate* probability that James chose to get home from work by bus, given that he arrived home after 6 p.m.?

- A. 0.09
- B. 0.14
- C. 0.60
- D. 0.74

___ 12. For a carnival game, a jar contains 20 blue marbles and 80 red marbles.

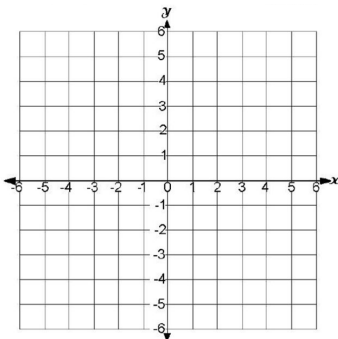
- Children take turns randomly selecting a marble from the jar.
- If the blue marble is chosen, the child wins a prize.
- After each turn, the marble is replaced.
- Casey has drawn six red marbles in a row.

Which statement is true?

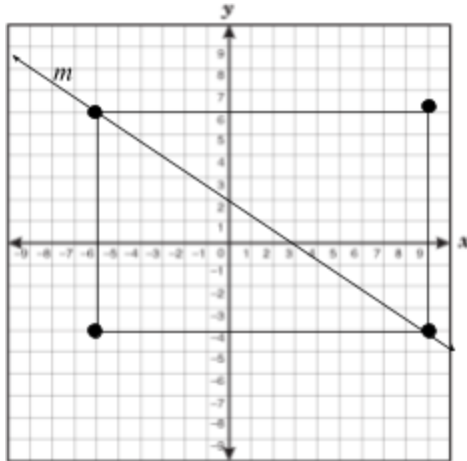
- A. If Casey selects another red marble, then 2 of her next 3 picks will be blue marbles because 2 blue marbles are selected for every 8 red marbles selected.
- B. The probability that Casey selects a blue marble on the next turn is higher than it was on her last turn because she has chosen so many red marbles in a row.
- C. The probability that Casey selects a blue marble on her next turn is the same as it was on the last turn because selections are independent of each other.
- D. If Casey draws 4 more times, she will select 2 blue marbles because the probability that a blue marble will be selected is 2 out of every 10 turns.

___ 13. The function $f(x)$ is defined as $f(x) = x^2 + 2x - 4$. The function $g(x)$ is defined as $g(x) = -3f(x) + 2$.

- Graph $g(x)$ for $-2 \leq x \leq 2$.
- Describe the transformations that take the function $f(x)$ onto $g(x)$.
- Write a new function, $h(x)$, that transforms $g(x)$ back onto $f(x)$.

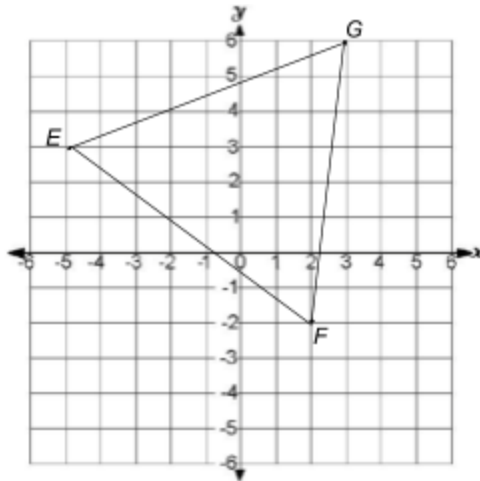


___ 14. Which transformation will carry the rectangle shown below onto itself?



- A. a reflection over line m
- B. a reflection over line $y = 1$
- C. a rotation 90° counterclockwise about the origin
- D. a rotation 270° counterclockwise about the origin

___ 15. Triangle EGF is graphed below.



Triangle EGF will be rotated 90° counterclockwise around the origin and will then be reflected across the y -axis, producing an image triangle. Which additional transformation will map the image triangle back onto the original triangle?

- A. rotation 270° counterclockwise around the origin
- B. rotation 180° counterclockwise around the origin
- C. reflection across the line $y = -x$
- D. reflection across the line $y = x$