

Quadratics: Final Exam Prep

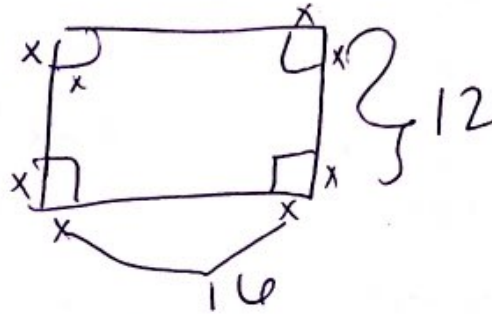
Math II

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Directions: The following questions are sample items similar to those found on the EOC Exam. Answer each to the best of your ability.

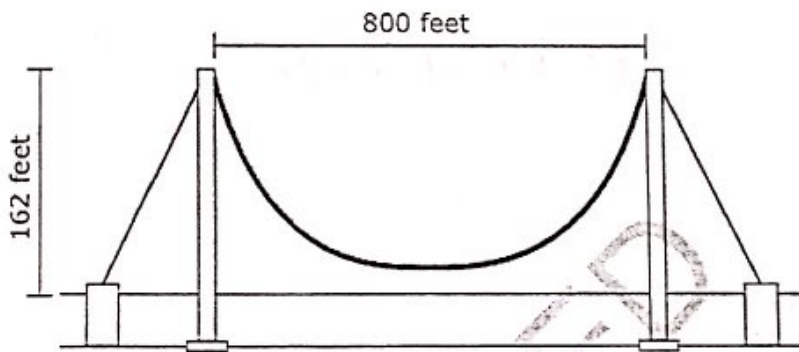
1. Congruent squares, with side lengths of x , are cut from the corners of a 12-inch-by-16-inch piece of cardboard to form an open box. Which equation models the surface area, y , of the open box after the corners are cut away?

- A $y = (16 - 2x)(12 - 2x)$
 B $y = (16 - 2x)(12 - 2x) + 4x^2$
 C $y = 192 - 16x^2$
 D $y = 192 - 4x^2$



$$A = 16(12) - 4x^2$$

2. The towers of a suspension bridge are 800 feet apart and rise 162 feet higher than the road. Suppose that the cable between the towers has the shape of a parabola and is 2 feet higher than the road at the point halfway between the towers.



What is the *approximate* height of the cable 120 feet from either tower?

- A 80 feet
 B 74 feet
 C 22 feet
 D 16 feet

$$y = a(x - 400)^2 + 2 \quad a = .01$$

$$y = (80, 4)$$

3. A system of equations is shown below.

$$y = x^2 + 2x + 8$$

$$y = -4x$$

What is the smallest value of y in the solution set of the system?

- A -4
 B -2
 C 8
 D 16

4. If t is an unknown constant, which binomial must be a factor of $7m^2 + 14m - tm - 2t$?

- A $7m + t$
- B $m - t$
- C $m + 2$
- D $m - 2$

$$(7m^2 + 14m)(-tm - 2t)$$
$$(7m - t)(m + 2)$$

5. The graph of $f(x) = x^2$ will be translated 5 units up and 2 units to the right. Which function describes the graph produced by the translation?

- A $g(x) = x^2 - 4x + 9$
- B $g(x) = x^2 + 4x - 1$
- C $g(x) = x^2 - 10x + 27$
- D $g(x) = x^2 + 10x + 23$

$$y = (x - 2)^2 + 5$$
$$y = x^2 - 4x + 4 + 5$$
$$y = x^2 - 4x + 9$$

6. The number of bacteria in a culture can be modeled by the function $N(t) = 28t^2 - 30t + 160$, where t is the temperature, in degrees Celsius, the culture is being kept. A scientist wants to have fewer than 200 bacteria in a culture in order to test a medicine effectively. What is the **approximate** domain of temperatures that will keep the number of bacteria under 200?

- A $-1.01^\circ\text{C} < t < 2.03^\circ\text{C}$
- B $-0.90^\circ\text{C} < t < 1.97^\circ\text{C}$
- C $-0.86^\circ\text{C} < t < 1.93^\circ\text{C}$
- D $-0.77^\circ\text{C} < t < 1.85^\circ\text{C}$

$$28t^2 - 30t + 160 = 200$$

7. Which equation has exactly one real solution?

- A $4x^2 - 12x - 9 = 0$
- B $4x^2 + 12x + 9 = 0$
- C $4x^2 - 6x - 9 = 0$
- D $4x^2 + 6x + 9 = 0$

A.C

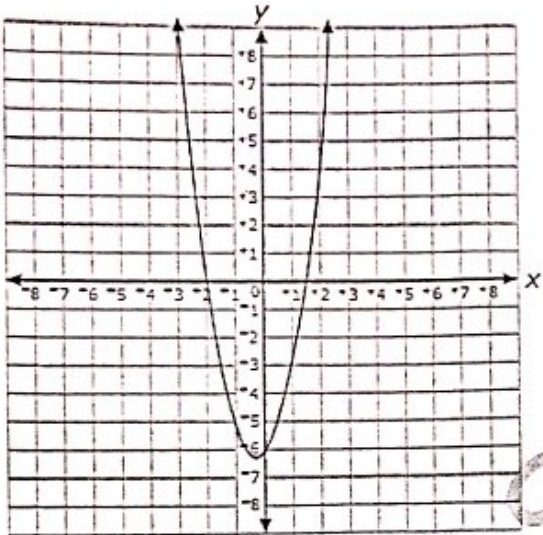
8. The sum of two numbers is 24. The sum of the squares of the two numbers is 306. What is the product of the two numbers?

- A 119
- B 128
- C 135
- D 144

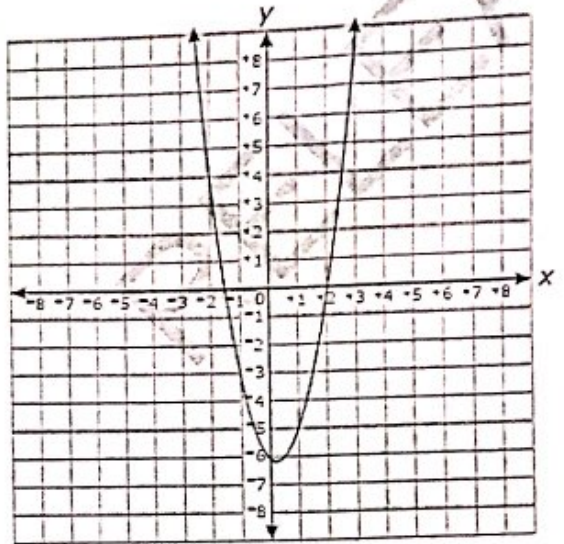
$$x + y = 24 \quad x^2 + y^2 = 306$$

9. Which graph displays the function $f(x) = (2x + 3)(x - 2)$?

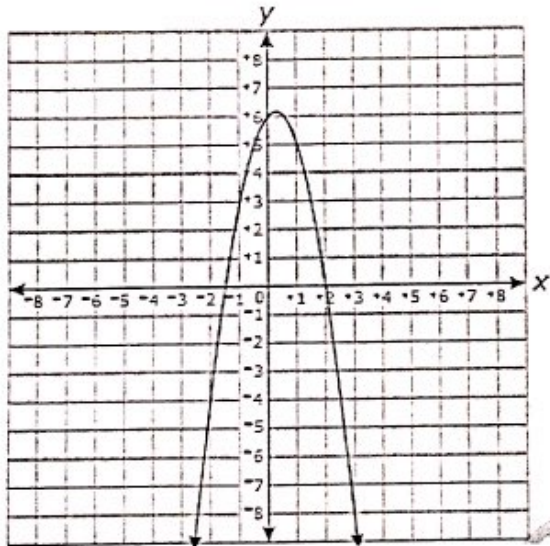
A



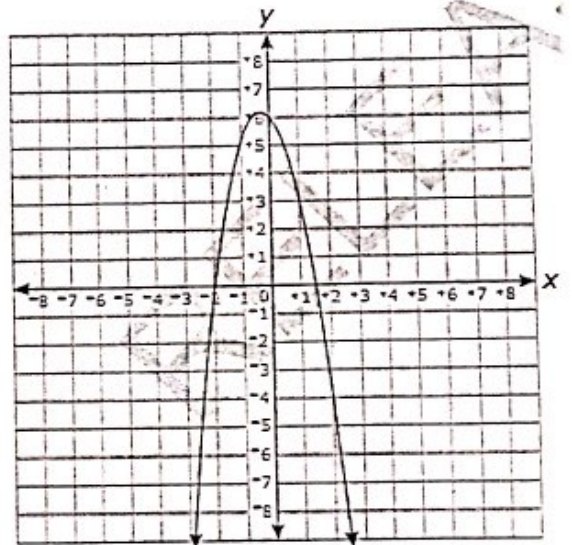
B



C



D



10. A rectangular rug is placed on a rectangular floor. The width of the floor is 4 feet greater than the length, x , of the floor. The width of the rug is 2 feet less than the width of the floor. The length of the rug is 4 feet less than the width of the rug. Which function, $R(x)$, represents the area of the floor **not** covered by the rug?

A $R(x) = x^2 - x + 4$

B $R(x) = 2x^2 + 4x - 4$

C $R(x) = 12x - 4$

D $R(x) = 4x + 4$

$\frac{\text{Floor}}{L} = x$

$W = x + 4$

$\frac{\text{Rug}}{L}$

$W = x + 2$

$L = x - 2$

$A_{\text{shaded}} = A_{\text{Floor}} - A_{\text{Rug}}$

11. The heights of two different projectiles after they are launched are modeled by $f(x)$ and $g(x)$. The function $f(x)$ is defined as $f(x) = -16x^2 + 42x + 12$. The table contains the values for the quadratic function g .

x	$g(x)$
0	9
1	33
2	25

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What is the **approximate** difference in the maximum heights achieved by the two projectiles?

- A 0.2 feet
 B 3.0 feet
 C 5.4 feet
 D 5.6 feet

$$f(x)_{\max} = 39.56$$

$$g(x)_{\max} = \frac{34}{5.56}$$

12. Farmer Brown built a rectangular pen for his chickens using 12 meters of fence.

- He used part of one side of his barn as one length of the rectangular pen.
- He maximized the area using the 12 meters of fence.

Farmer Johnson built a rectangular pen for her chickens using 16 meters of fence.

- She used part of one side of her barn as one length of the rectangular pen.
- The length of her pen was 2 meters more than the length of Farmer Brown's pen.
- The width of her pen was 1 meter more than the width of Farmer Brown's pen.

How much larger is Farmer Johnson's rectangular pen than Farmer Brown's?

- A 24 square meters
 B 18 square meters
 C 16 square meters
 D 14 square meters