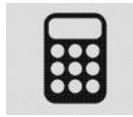


Date Completed: \_\_\_\_\_  
Mentor Initials: \_\_\_\_\_



A mentor can change everything.



## Calculator

*Note: Use a graphing calculator for ALL questions.*

### **Multiple Choice (Calculator)**

1. What is the  $y$ -coordinate of the  $y$ -intercept of the graph of  $y = 4^x + 7$  ?

A) 0  
B) 1  
C) 7  
D) 8

2. 
$$2x - \frac{3}{2}y = 1$$
$$4x - 3y = 1$$

How many solutions does the given system of equations have?

A) Zero  
B) Exactly one  
C) Exactly two  
D) Infinitely many

3. The graph of the line  $y = -\frac{3}{2}x + 5$  in the  $xy$ -plane is translated 2 units to the left. What is the  $y$ -intercept of the translated line?

A) (0, 2)  
B) (0, 3)  
C) (0, 5)  
D) (0, 7)



4.  $x^2 - 4x + d = 0$

In the given equation,  $d$  is a constant. If the equation has exactly one solution, what is the value of  $d$ ?

- A)  $-4$
- B)  $0$
- C)  $1$
- D)  $4$

5. Which of the following is equivalent to the expression  $x^4 - 18x^2 + 81$ ?

I.  $(x + 3)^2(x - 3)^2$

II.  $(x^2 + 9)^2$

- A) I only
- B) II only
- C) I and II
- D) Neither I nor II

6. The function  $y = f(x)$  is graphed in the  $xy$ -plane and touches the  $x$ -axis at 4 distinct points. Which of the following could define the function  $f$ ?

- A)  $f(x) = x^4$
- B)  $f(x) = (x - 4)^3$
- C)  $f(x) = (x - 3)^2(x - 4)(x + 4)$
- D)  $f(x) = x^2(x - 2)^2(x - 3)(x + 1)$

7. In the standard  $(x, y)$  coordinate plane, given Parabola  $A$  with equation  $y = 2x^2$ , Parabola  $B$  is the image of Parabola  $A$  after a shift of 6 coordinate units to the left and 5 coordinate units down. Parabola  $B$  has which of the following equations?

- A)  $y = 2(x + 5)^2 + 6$
- B)  $y = 2(x - 6)^2 - 5$
- C)  $y = 2(x - 6)^2 + 5$
- D)  $y = 2(x + 6)^2 - 5$



8. The statement  $4x - (x - 6) + 7 = 3x + 13$  is true for:

- A)  $x = 0$  only.
- B)  $x = 6$  only.
- C) no values of  $x$ .
- D) all values of  $x$ .

9. Which of the following expressions is a factor of

$$3x^2 - 17x + 10 ?$$

I.  $x - 5$

II.  $3x - 2$

- A) I only
- B) II only
- C) I and II
- D) Neither I nor II

10.  $x^2 + p = 0$

In the quadratic equation shown,  $p$  is a constant. For which of the following values of  $p$  will the equation have no real solutions?

- A)  $-3$
- B)  $-2$
- C)  $0$
- D)  $3$

**Grid-In (Calculator)**

11. In the  $xy$ -plane, the graph of  $y = (x + 6)^2 + 5$  is the image of the graph of  $y = (x - 4)^2 + 5$  after a translation of how many units to the left?
12. 
$$f(x) = 3x^2 - 4x + 5$$
  
For the function  $f$  shown, for what value of  $x$  does  $f(x)$  obtain its minimum value?
13. 
$$f(x) = x^2(x - 4)(x + 3)(x - 4)$$
  
In the  $xy$ -plane, at how many points does the graph of the given function  $f$  intersect the  $x$ -axis?
14. How many solutions does the equation  $|x - 3| = -6$  have?
15. 
$$y = -12x^2 + 60x + 72$$
  
The equation above gives the height of a ball above the ground,  $y$ , in feet,  $x$  seconds after it is thrown from a building. How many seconds after it is thrown does the ball reach the ground?