

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

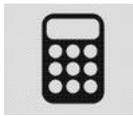
- A) I only
- B) II only
- C) I and II
- D) Neither I nor II

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?