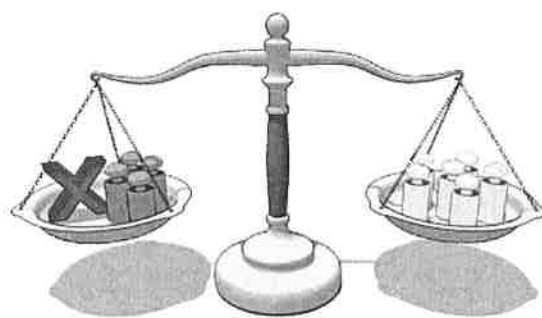
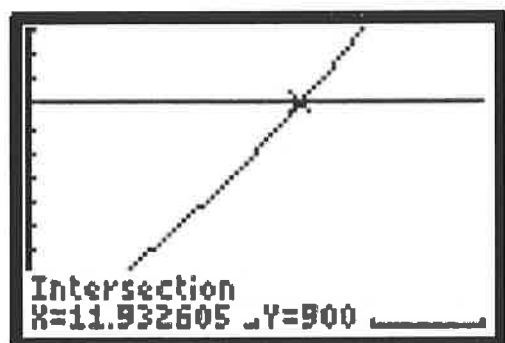


Foundations of Math 2

Unit 6: Solving Quadratic Equations by Graphing & Factoring



$$x + 4 = 6$$



If you can solve this,



thank a math teacher.



WAKE COUNTY
PUBLIC SCHOOL SYSTEM

➤ Multiply (Distribute):

1. $2(3x^2 - 4x + 6)$	2. $3x(x - 8)$
3. $-4x(2x^2 - 3x + 4)$	4. $2x^2y(3xy - 5x^2y^3 + x^4y)$

➤ Factor completely using the Greatest Common Factor (GCF)

1. $4x - 6y$	2. $3x^2 + 12x$
3. $24x^2y - 18xy^3$	4. $2x^3yz^3 - 7xy^5z^2$
5. $5x^2y - 20xy^2z + 35y^3z^2$	6. $2x^3y - x^2y + 5xy^2 + xy^3$
7. $9x^3y^5 - 15x^2y^3 - 12xy^4$	8. $8x^3 + 12x^2 - 2x$

Classwork Examples:

1. $5x + 15$

2. $x^2 + 3x$

3. $a^2b + 2ab$

4. $3x^6 - 5x^3 + 2x^2$

5. $25y^4 - 20y^3$

6. $6h^2 - 8h$

7. $18c^4 - 9c^2 + 27c$

8. $15x^3y^5 - 10x^2y^6 + 20x^5y^3$

Factor the GCF from each polynomial.

1. $3x^2 - 3x = 3x(\underline{\hspace{2cm}})$	2. $-5x^3 - 55x = -5x(\underline{\hspace{2cm}})$
3. $-15x^2 + 18x = \underline{\hspace{1cm}} (-5x + 6)$	4. $4x^3 - 28x = \underline{\hspace{1cm}} (x^2 - 7)$
5. $160x^3 + 100x^2 - 180x$	6. $36x^3 - 24x^2 + 8x$
7. $-6x^3 + 8x$	8. $35x^5 - 15x^3 + 10x$
9. $-14x^2 + 16x$	10. $-16x^4 - 32x^3 - 80x^2$
11. $14x^5 - 24x^4$	12. $x^3 + 3x$
13. $-6x^5 + 3x^3$	14. $33x^2 + 21x$
15. $2x^6 - 4x^5 + 20x^4$	16. $-10x^6 + 12x^5 - 4x^4$
17. $-5x^3 - 7x$	18. $4x^2 + 9x$
19. $-36x^3 + 44x^2 + 20x$	20. $-3x^6 + 15x^4$

➤ Multiply (Distribute):

1. $(x - 3)(x + 3)$	2. $(x + 7)(x - 7)$
3. $(2x + 5)(2x - 5)$	4. $(x^3 - 4)(x^3 + 4)$

✓ Factoring Difference of Squares → $a^2 - b^2 = (a - b)(a + b)$

✓ Perfect Squares:

1. $x^2 - 64$	2. $x^2 - 4$	3. $x^4 - 36$
4. $16x^2 - 1$	5. $x^{10} - 9y^2$	6. $81x^6 - y^2$

➤ Two – Step Factoring : Factor Completely *** Check for a GCF first!!

7. $2x^2 - 32$	8. $3x^3 - 12x$	9. $x^8y^5 - x^6y$
----------------	-----------------	--------------------

Classwork Examples:

1. $x^2 - 25$	2. $4x^2 - 49$
3. $16x^2 - 25y^2$	4. $8x^2 - 32$
5. $81 - z^2$	6. $9x^2 - 36$
7. $2x^2 - 242$	8. $x^4 - 144y^2$
9. $49 - x^2$	10. $x^4 - 16$

Determine each product. Notice the pattern.

1) $(4n + 1)(4n - 1)$

2) $(6k - 4)(6k + 4)$

3) $(n + 1)(n - 1)$

4) $(5a + 2)(5a - 2)$

5) $(4b - 7)(4b + 7)$

6) $(1 + 4n)(1 - 4n)$

7) $(x + 3)(x - 3)$

8) $(x + 8)(x - 8)$

Factor each completely.

9) $16k^2 - 9$

10) $25r^2 - 16$

11) $b^2 - 1$

12) $9n^2 - 1$

13) $25a^2 - 4$

14) $16p^2 - 25$

15) $25y^2 - 9x^2$

16) $16u^2 - 25v^2$

17) $x^2 - y^2$

18) $y^2 - 9x^2$

Factor Completely.

19. $4x^2 - 4$

20. $m^2 - 4$

21. $c^2 - 16$

22. $y^2 - 81$

23. $x^2 - 36$

24. $p^2 - 100$

25. $9 - a^2$

26. $49 - m^2$

27. $25p^2 - 81$

28. $4a^2 - 49$

29. $81 - 4d^2$

30. $x^2 - y^2$

31. $81x^2 - 144y^2$

32. $2y^2 - 18$

33. $12m^2 - 48$

34. $x^3 - 25x$

35. $32r - 2r^5$

➤ Multiply (Distribute):

1. $(x + 3)(x + 6)$	2. $(x - 4)(x - 5)$
3. $(x + 5)(x - 3)$	4. $(x - 2)(x + 4)$

➤ How to factor trinomials: $x^2 + bx + c$

- **STEP 1:** $(x \quad)(x \quad)$
- **STEP 2:** Find 2 numbers that **multiply** to = c
 that **add/subtract** to = b
- **STEP 3:** Put the PLUS / MINUS signs in correctly

➤ Factor Completely:

1. $x^2 + 6x + 8$	2. $x^2 + 7x + 12$	3. $x^2 + 10x + 21$
4. $x^2 - 5x + 6$	5. $x^2 - 7x + 10$	6. $x^2 - 8x + 7$
7. $x^2 + 2x - 15$	8. $x^2 + x - 20$	9. $x^2 + 6x - 16$
10. $x^2 - 3x - 10$	11. $x^2 - 10x - 24$	12. $x^2 - 8x - 9$

You try:

13. $x^2 - 4x - 21$

14. $x^2 + x - 72$

15. $x^2 + 3x + 2$

16. $2x^2 - 6x - 20$

17. $3x^2 + 18x + 24$

18. $5x^2 + 10x - 75$

Foundations of Math 2

Lesson 6: Factoring Trinomials (a = 1)

Factor.

1. $y^2 - 4y + 3$

2. $d^2 + 17d + 72$

3. $b^2 + 44b - 45$

4. $y^2 - 69y - 70$

5. $g^2 - 12g + 35$

6. $c^2 + 5c - 6$

7. $d^2 - 6d - 40$

Name _____

Per/Sec. _____ Date _____

8. $y^2 + 7y + 10$

9. $t^2 - 3t - 10$

10. $z^2 - 12z + 20$

11. $7b^2 - 7b - 14$

12. $y^2 + y - 20$

13. $p^2 + 10p + 21$

14. $p^2 - 6p + 5$

15. $z^2 + 15z + 14$

16. $x^2 - 3x - 4$

17. $w^2 + 7w + 6$

18. $2x^2 - 26x + 24$

19. $h^2 - 2h - 8$

20. $3a^2 + 9a + 6$

21. $k^2 + 11k + 24$

22. $5w^2 + 10w - 15$

23. $k^2 + 4k - 5$

24. $r^2 - 5r + 6$

25. $a^2 + 6a - 27$

26. $a^2 - 5a - 14$

27. $x^2 - 15x + 56$

28. $p^2 - 19p + 88$

29. $g^2 + 12g + 35$

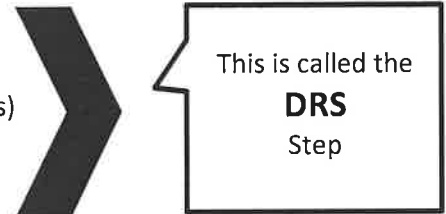
30. $x^2 - 13x + 40$

➤ Multiply (Distribute):

1. $(2x + 3)(x + 4)$	2. $(3x - 1)(x - 2)$
3. $(4x + 5)(2x - 3)$	4. $(5x - 2)(3x + 4)$

➤ How to factor trinomials: $ax^2 + bx + c$

- **STEP 1:** Multiply a to c and rewrite the problem
- **STEP 2:** Factor x^2 into $(x \quad)(x \quad)$
- **STEP 3:** Find 2 numbers that **multiply** to = c
 that **add/subtract** to = b
- **STEP 4:** Put the PLUS / MINUS signs in correctly
- **STEP 5: DIVIDE** both numbers by the original a
- **STEP 6: REDUCE** ALL fractions at this time (NO Decimals)
- **STEP 7: SLIDE** any denominators back in front of x .



➤ Examples: Factor completely

1. $3x^2 + 8x + 4$	2. $2x^2 + 7x + 6$	3. $6x^2 + 11x + 4$
--------------------	--------------------	---------------------

4. $3x^2 + 5x + 2$

5. $5x^2 - 17x + 14$

6. $2x^2 - 9x + 4$

7. $2x^2 + 5x - 12$

8. $8x^2 + 18x - 5$

9. $6x^2 - 17x - 14$

10. $6x^2 + 6x - 21$

Factor.

1. $10m^2 - 7m + 1$

2. $4c^2 - 24c + 11$

3. $10p^2 - 27p + 5$

4. $3w^2 - 10w + 8$

5. $8x^2 + x - 7$

6. $5w^2 + w - 4$

7. $7d^2 + 36d + 5$

8. $10y^2 + 11y - 6$

9. $6d^2 - 7d - 10$

10. $5m^2 + 6m + 1$

11. $3x^2 - 10x + 7$

12. $15y^2 - y - 2$

13. $10c^2 - 65c + 105$

14. $5y^2 - 4y - 1$

15. $5a^2 + 12a + 4$

16. $28k^2 - k - 2$

17. $12x^2 + 4x - 1$

18. $7y^2 - 9y + 2$

➤ Solve each equation:

1. $x + 5 = 8$	2. $x - 6 = -9$	3. $2x + 4 = 10$	4. $5x - 1 = 9$
$x =$ _____	$x =$ _____	$x =$ _____	$x =$ _____

➤ Solve each set of equations:

5. $(x - 5)(x + 3) = 0$	6. $(2x + 1)(x + 6) = 0$	7. $(2x - 1)(5x + 3) = 0$
$x =$ _____	$x =$ _____	$x =$ _____

➤ Factor and Solve each equation:

8. $x^2 + 7x + 12 = 0$	9. $x^2 - 6x + 8 = 0$	10. $x^2 + 2x - 24 = 0$
$x =$ _____	$x =$ _____	$x =$ _____

$$11. 2x^2 + 5x - 12 = 0$$

$$x = \underline{\hspace{2cm}}$$

$$12. 6x^2 + 11x - 7 = 0$$

$$x = \underline{\hspace{2cm}}$$

$$13. 9x^2 - 9x + 2 = 0$$

$$x = \underline{\hspace{2cm}}$$

$$14. x^2 - 25 = 0$$

$$x = \underline{\hspace{2cm}}$$

$$15. 9x^2 - 4 = 0$$

$$x = \underline{\hspace{2cm}}$$

$$16. 3x^2 + 12x = 0$$

$$x = \underline{\hspace{2cm}}$$

Foundations of Math 2
Unit 6 - Solving and Graphing Quadratic Equations
Lesson 8 → Solving Equations by Factoring **HOMEWORK**

Name: _____
Date: _____ Pd: _____

Solve:

1. $x(x + 3) = 0$ $x =$ _____	2. $4x(x - 6) = 0$ $x =$ _____
3. $3x(x + 5) = 0$ $x =$ _____	4. $6x(x - 2) = 0$ $x =$ _____
5. $(x + 4)(x + 5) = 0$ $x =$ _____	6. $(x - 2)(x + 3) = 0$ $x =$ _____
7. $(x + 5)(x - 6) = 0$ $x =$ _____	8. $(3x + 2)(x - 1) = 0$ $x =$ _____
9. $(2x - 1)(x + 1) = 0$ $x =$ _____	10. $(x - 3)(3x + 6) = 0$ $x =$ _____
11. $(x + 4)(2x - 8) = 0$ $x =$ _____	12. $(4x + 3)(x - 7) = 0$ $x =$ _____

13. $x^2 + 3x - 10 = 0$

$x =$ _____

14. $x^2 + 11x + 30 = 0$

$x =$ _____

15. $x^2 + 4x = 21$

$x =$ _____

16. $x^2 - 5x = 0$

$x =$ _____

17. $2x^2 = 6x$

$x =$ _____

18. $3x^2 - 7x - 6 = 0$

$x =$ _____

19. $5x^2 - x - 4 = 0$

$x =$ _____

20. $4x^2 + 7x = 2$

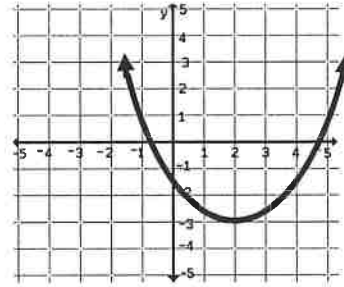
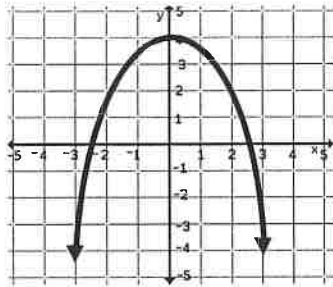
$x =$ _____

I. Definitions:

A) Quadratic Equation: $y =$ _____ OR $y =$ _____

B) The _____ of a quadratic function is called a _____.

C) The _____ of a parabola is the _____ or _____ point of the parabola.



D. The _____ of _____ is an imaginary vertical line that runs through the vertex and divides the parabola into two equal parts. It is always written as $x =$ _____

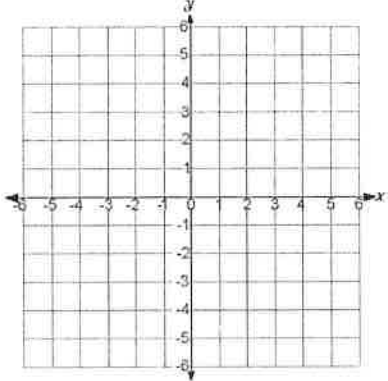
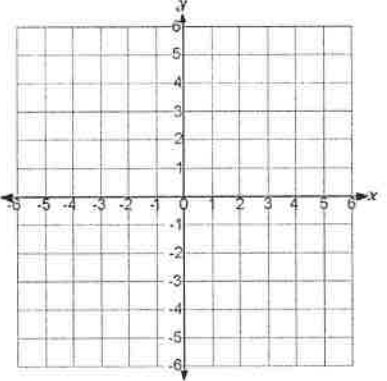
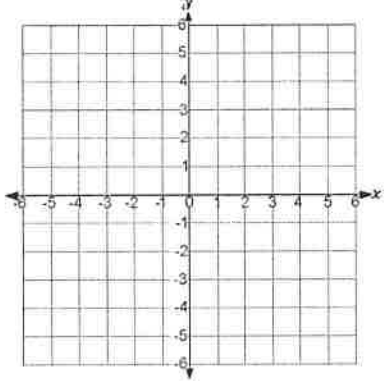
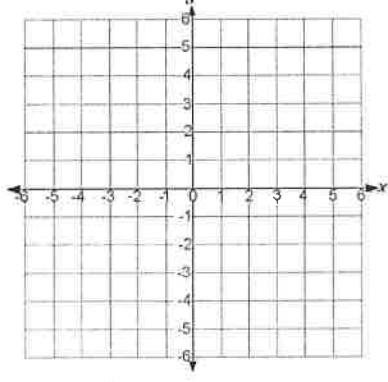
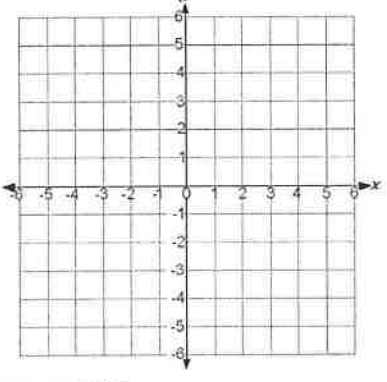
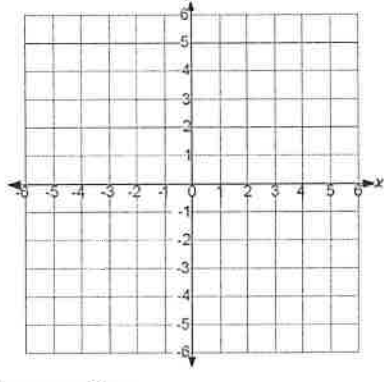
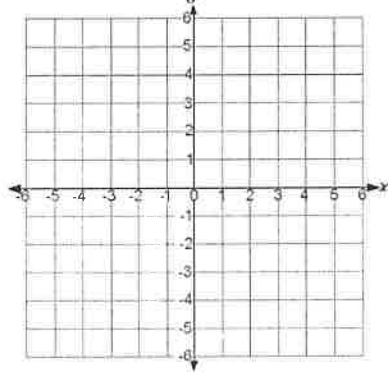
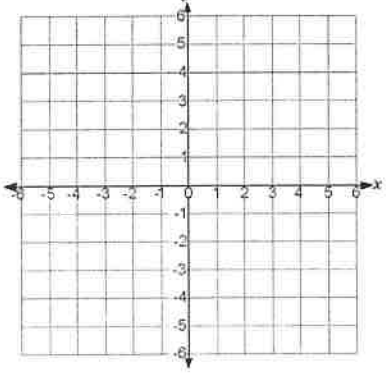
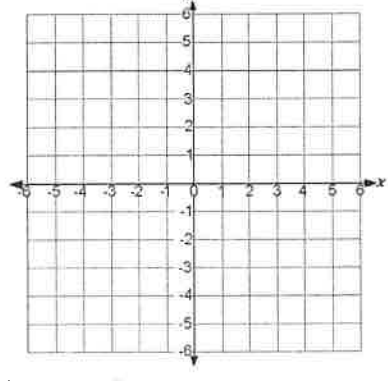
E. The _____ of the graph are the points where the graph crosses or touches the $x - axis$.

II. Finding the vertex, axis of symmetry and the direction of a parabola:

1. $y = x^2$ Vertex: _____ Axis of Symmetry: _____ Direction: _____ x-intercepts: _____	2. $y = -x^2$ Vertex: _____ Axis of Symmetry: _____ Direction: _____ x-intercepts: _____	3. $y = x^2 - 6$ Vertex: _____ Axis of Symmetry: _____ Direction: _____ x-intercepts: _____	4. $y = -x^2 + 4$ Vertex: _____ Axis of Symmetry: _____ Direction: _____ x-intercepts: _____
5. $y = (x - 3)^2$ Vertex: _____ Axis of Symmetry: _____ Direction: _____ x-intercepts: _____	6. $y = -(x + 5)^2$ Vertex: _____ Axis of Symmetry: _____ Direction: _____ x-intercepts: _____	7. $y = -(x + 6)^2 + 7$ Vertex: _____ Axis of Symmetry: _____ Direction: _____ x-intercepts: _____	8. $y = (x - 1)^2 - 3$ Vertex: _____ Axis of Symmetry: _____ Direction: _____ x-intercepts: _____

III. Graphing Quadratic Functions:

- Name the **vertex (V)**, **axis of symmetry (AoS)**, **direction (D)** of each equation and **x-intercepts**.
- **Graph** each equation as a parabola.

<p>1. $y = x^2$</p> <p>V: _____ D: _____</p> <p>Axis of Symmetry: _____</p>  <p>x-intercepts: _____</p>	<p>2. $y = -x^2$</p> <p>V: _____ D: _____</p> <p>Axis of Symmetry: _____</p>  <p>x-intercepts: _____</p>	<p>3. $y = x^2 + 2$</p> <p>V: _____ D: _____</p> <p>Axis of Symmetry: _____</p>  <p>x-intercepts: _____</p>
<p>4. $y = -(x - 4)^2$</p> <p>V: _____ D: _____</p> <p>Axis of Symmetry: _____</p>  <p>x-intercepts: _____</p>	<p>5. $y = (x + 1)^2 - 3$</p> <p>V: _____ D: _____</p> <p>Axis of Symmetry: _____</p>  <p>x-intercepts: _____</p>	<p>6. $y = -(x - 4)^2 + 5$</p> <p>V: _____ D: _____</p> <p>Axis of Symmetry: _____</p>  <p>x-intercepts: _____</p>
<p>7. $y = 2(x - 1)^2 - 4$</p> <p>V: _____ D: _____</p> <p>Axis of Symmetry: _____</p>  <p>x-intercepts: _____</p>	<p>8. $y = -2(x + 2)^2 + 4$</p> <p>V: _____ D: _____</p> <p>Axis of Symmetry: _____</p>  <p>x-intercepts: _____</p>	<p>9. $y = 3x^2 - 6$</p> <p>V: _____ D: _____</p> <p>Axis of Symmetry: _____</p>  <p>x-intercepts: _____</p>

Foundations of Math 2
Unit 6 - Solving and Graphing Quadratic Equations
Lesson 1 → Graphing Quadratic Functions **HOMEWORK**

Name: _____

Date: _____ Pd: _____

Graph each function.

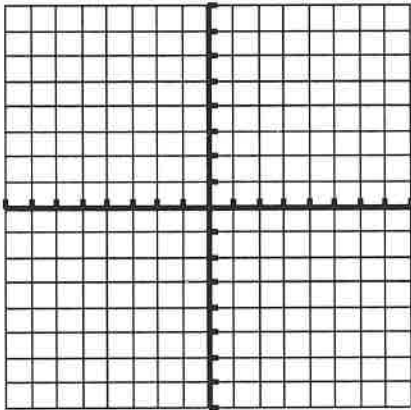
1. $y = (x - 1)^2 + 2$

Vertex: _____

A.O.S.: _____

Direction: _____

x-intercepts: _____



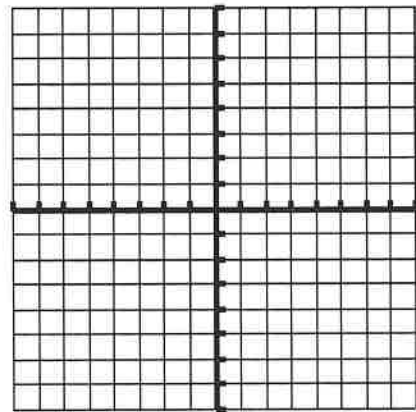
2. $y = -2(x + 2)^2 + 5$

Vertex: _____

A.O.S.: _____

Direction: _____

x-intercepts: _____



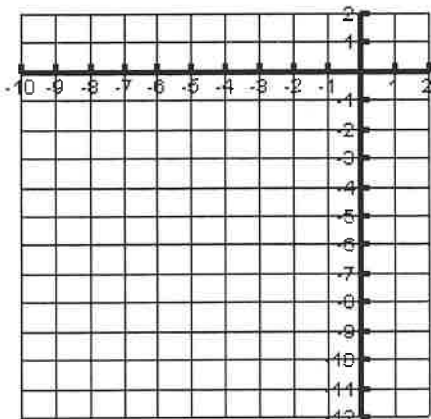
3. $y = 3(x + 7)^2 - 12$

Vertex: _____

A.O.S.: _____

Direction: _____

x-intercepts: _____



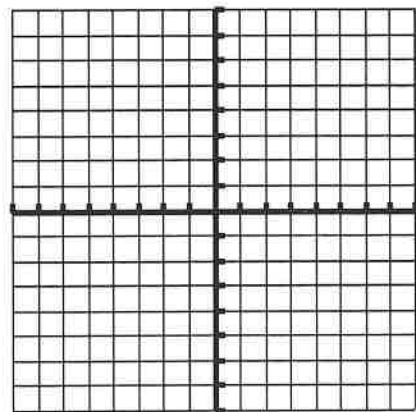
4. $y = (x - 5)^2 - 3$

Vertex: _____

A.O.S.: _____

Direction: _____

x-intercepts: _____



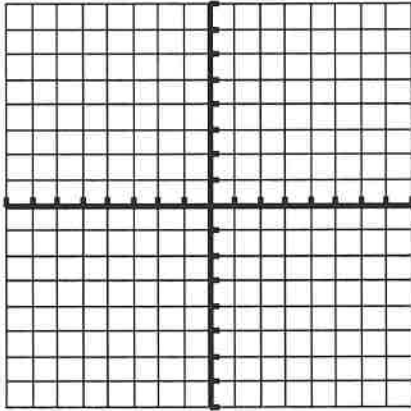
5. $y = -(x - 1)^2 + 4$

Vertex: _____

A.O.S.: _____

Direction: _____

x-intercepts: _____



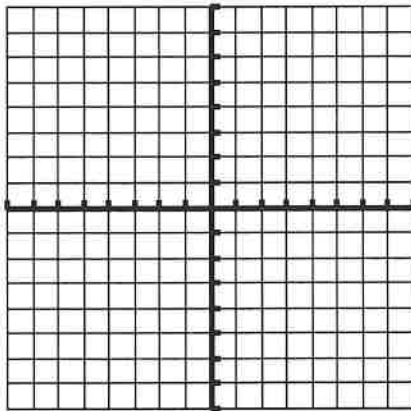
7. $y = x^2 - 4$

Vertex: _____

A.O.S.: _____

Direction: _____

x-intercepts: _____



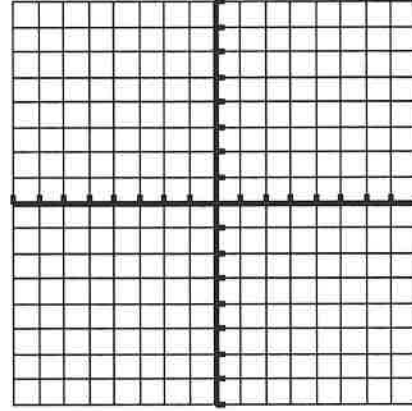
6. $y = 2(x + 1)^2$

Vertex: _____

A.O.S.: _____

Direction: _____

x-intercepts: _____



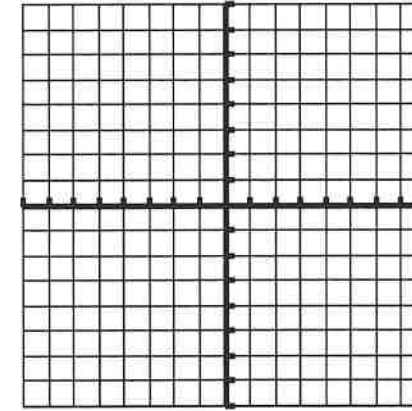
8. $y = -2(x - 1)^2 + 3$

Vertex: _____

A.O.S.: _____

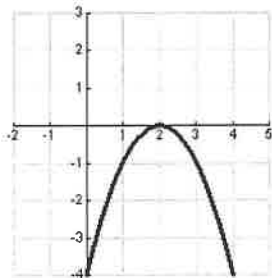
Direction: _____

x-intercepts: _____

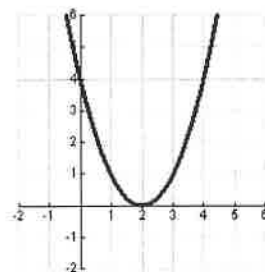


Write the equation of each parabola in vertex form.

9. _____



10. _____



❖ **Vertex Form** Quadratic Equation: $y = a(x - h)^2 + k$

❖ **Standard Form** Quadratic Equation: $y = ax^2 + bx + c$

➤ **Vertex Form Equations:** Name the **Vertex** and **Direction** of each Quadratic Equation.

1. $y = (x + 3)^2 - 6$	2. $y = -(x - 1)^2 + 4$	3. $y = x^2 - 2$	4. $y = 2(x + 5)^2$
Vertex: _____	Vertex: _____	Vertex: _____	Vertex: _____
Direction: _____	Direction: _____	Direction: _____	Direction: _____

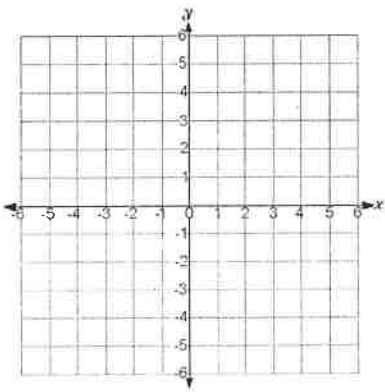
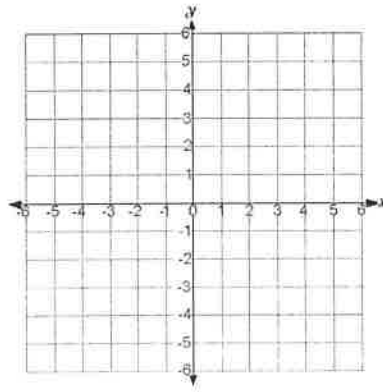
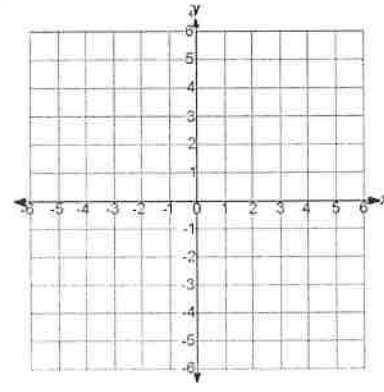
➤ **Standard Form Equations:** Name the **Vertex** and **Direction** of each Quadratic Equation.

5. $y = x^2 + 6x + 10$	6. $y = -x^2 + 4x - 3$	7. $y = 2x^2 - 20x + 44$	8. $y = -2x^2 + 20x - 50$
Vertex: _____	Vertex: _____	Vertex: _____	Vertex: _____
Direction: _____	Direction: _____	Direction: _____	Direction: _____

➤ Write each of the above **standard form** equations in **vertex form**.

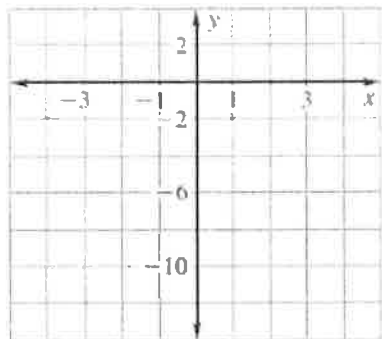
5. Vertex form equation: _____	6. Vertex form equation: _____	7. Vertex form equation: _____	8. Vertex form equation: _____
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➤ **Graph #'s 5, 6, & 7** from above.

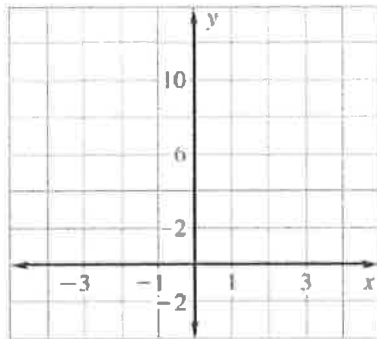
5. 	6. 	7. 
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Graph the function. Label the vertex and axis of symmetry.

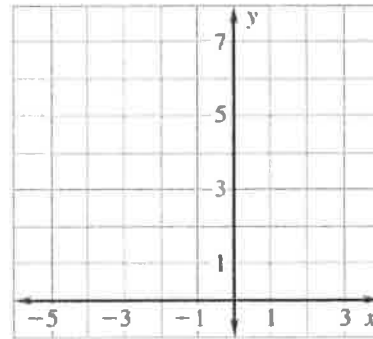
1. $y = -x^2 - 6$



2. $y = x^2 + 7$



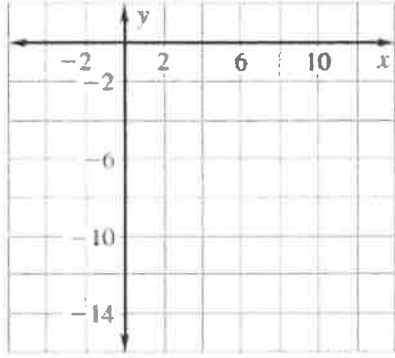
3. $y = x^2 + 2x + 5$



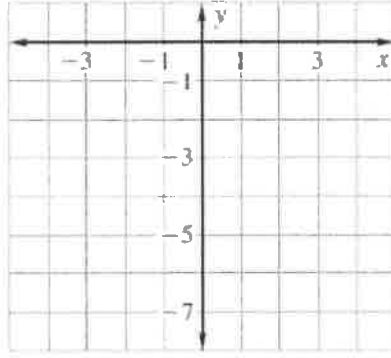
<p>a _____, b _____, c _____</p> <p>x coord. of vertex: _____</p> <p>y coord. of vertex: _____</p> <p>vertex: _____</p> <p>axis of symmetry: _____</p> <p>y - intercept: _____</p> <p>direction: _____</p> <p>vertex form: _____</p>	<p>a _____, b _____, c _____</p> <p>x coord. of vertex: _____</p> <p>y coord. of vertex: _____</p> <p>vertex: _____</p> <p>axis of symmetry: _____</p> <p>y - intercept: _____</p> <p>direction: _____</p> <p>vertex form: _____</p>	<p>a _____, b _____, c _____</p> <p>x coord. of vertex: _____</p> <p>y coord. of vertex: _____</p> <p>vertex: _____</p> <p>axis of symmetry: _____</p> <p>y - intercept: _____</p> <p>direction: _____</p> <p>vertex form: _____</p>
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Equation	Vertex	Axis of Symmetry	Direction	Vertex Form
1.				
2.				
3.				

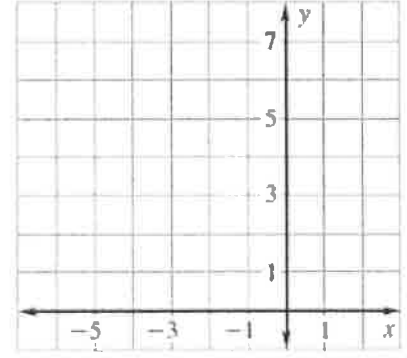
4. $y = x^2 - 8x + 1$



5. $y = -2x^2 + 4x - 3$



6. $y = -x^2 - 4x + 3$



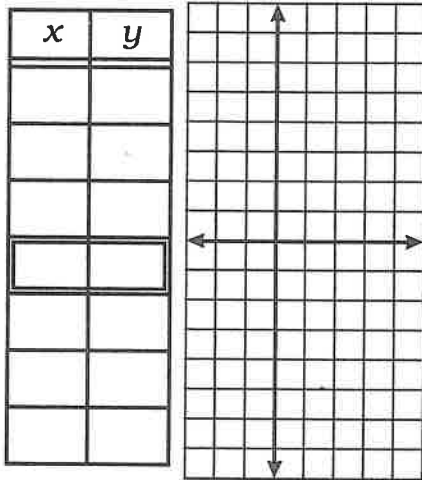
a _____, b _____, c _____ x coord. of vertex: _____ y coord. of vertex: _____ vertex: _____ axis of symmetry: _____ y - intercept: _____ direction: _____ vertex form: _____	a _____, b _____, c _____ x coord. of vertex: _____ y coord. of vertex: _____ vertex: _____ axis of symmetry: _____ y - intercept: _____ direction: _____ vertex form: _____	a _____, b _____, c _____ x coord. of vertex: _____ y coord. of vertex: _____ vertex: _____ axis of symmetry: _____ y - intercept: _____ direction: _____ vertex form: _____
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Equation	Vertex	Axis of Symmetry	Direction	Vertex Form
4.				
5.				
6.				

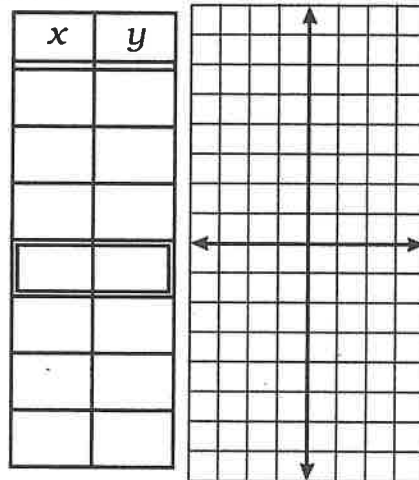
Quadratic graFUN

Find the vertex of the graph of the function and write its coordinates in the outlined cells of the table. Then find points on each side of the vertex. Plot the points and draw the graph.

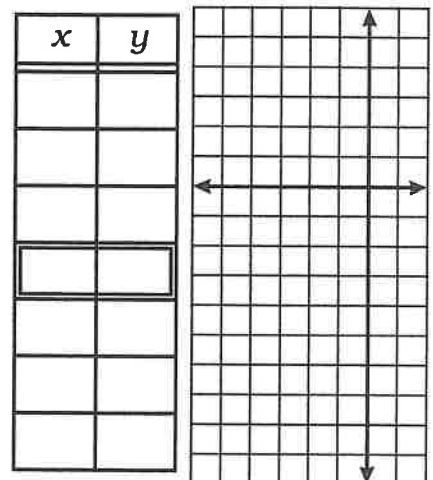
① $y = x^2 - 4x + 1$



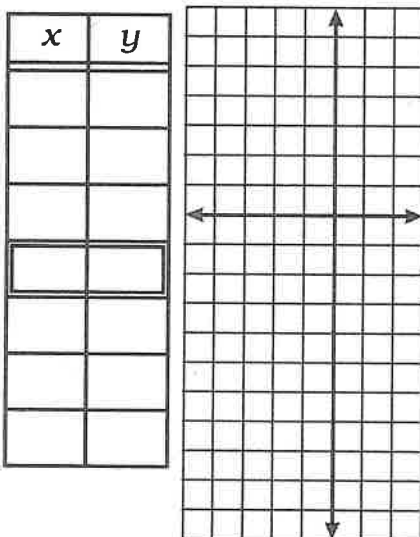
② $y = -x^2 + 2x + 5$



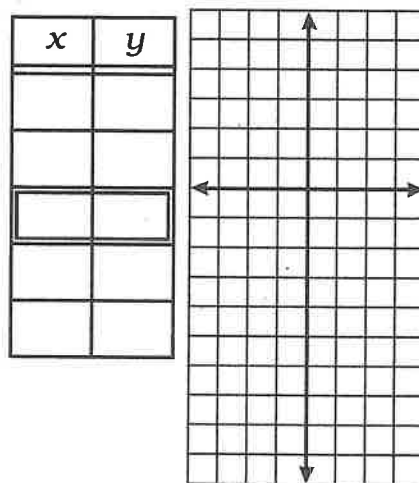
③ $y = x^2 + 6x$



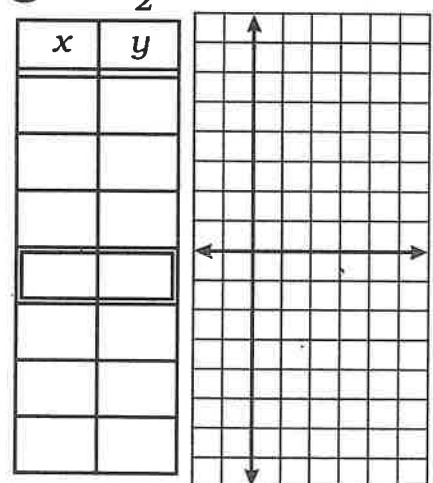
④ $y = 2x^2 + 8x - 3$



⑤ $y = -3x^2 + 6x - 1$



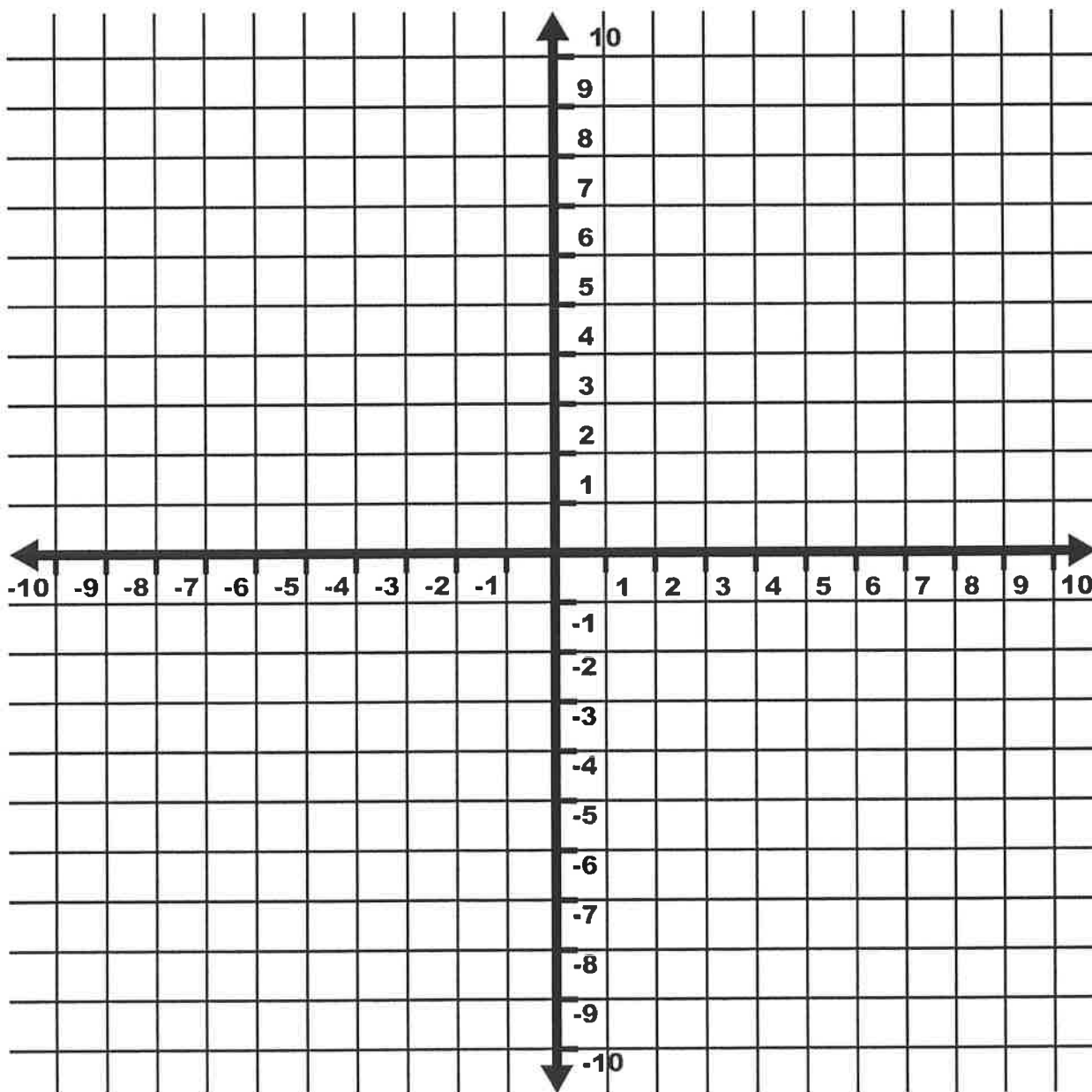
⑥ $y = \frac{1}{2}x^2 - 3x + 2$



Equation	Vertex	Axis of Symmetry	Direction	Vertex Form
1.				
2.				
3.				
4.				
5.				
6.				

Graph each parabola in the given color.

$y = x^2$	$y = (x + 2)^2$	$y = x^2 + 2$	$y = (x - 3)^2 + 1$	$y = -2(x + 3)^2 + 5$
BLACK	RED	GREEN	DARK BLUE	ORANGE
$y = -(x + 4)^2 + 3$	$y = (x + 5)^2 - 6$	$y = -(x - 3)^2 - 4$	$y = 2(x - 8)^2 - 10$	$y = -2(x - 1)^2 - 2$
PURPLE	YELLOW	BROWN	LIGHT BLUE	PINK



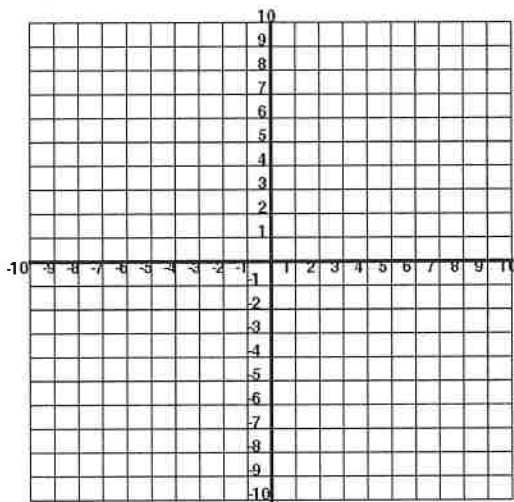
Definition: A **quadratic equation** is an equation that can be written in the standard form _____, where a , b , and c are real numbers and $a \neq 0$. The solutions of a quadratic equation are called its **roots** or **zeros**.

The need for finding the roots of a quadratic equation may occur in different situations:

- finding the **roots** of an equation.
- finding the **x-intercepts** of the graph.
- finding the **zeros** of the function.
- finding the **points of intersection of the graph and the x-axis**.

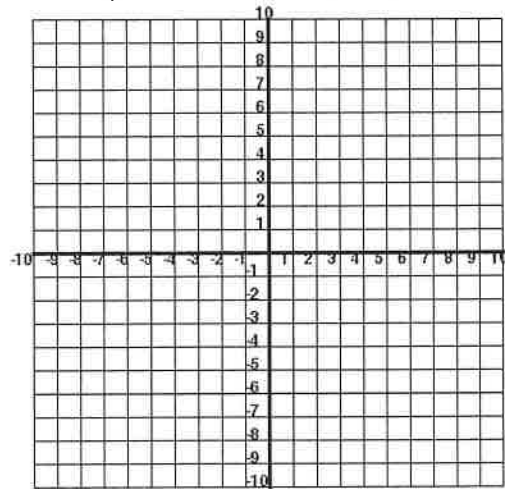
1. Solve by graphing a related function. (Sketch the graph and label the solutions.)

a) $x^2 - 3x - 4 = 0$



$x =$ _____

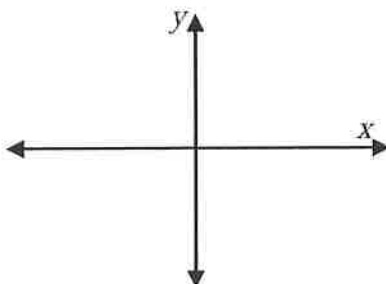
b) $x^2 + 4x - 5 = 0$



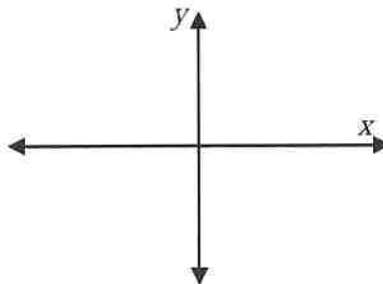
$x =$ _____

2. Using the accompanying grids, sketch graphs of functions that satisfy the given criteria.

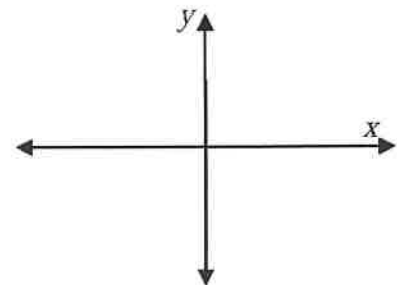
a) $ax^2 + bx + c = 0$
 2 Real Roots



(b) $ax^2 + bx + c = 0$
 1 Real Root



(c) $ax^2 + bx + c = 0$
 0 Real Roots



Fact: A quadratic equation can have _____, _____, or _____ real solutions

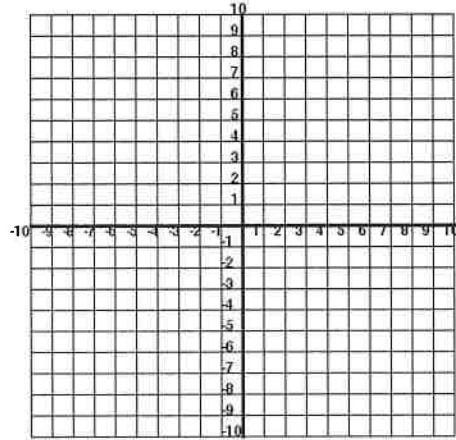
3. Sketch the following related functions and find the zeros of the functions.

a) $x^2 + x - 6 = 0$

State the roots of the equation.

$x =$ _____

How many REAL roots are there to the equation?

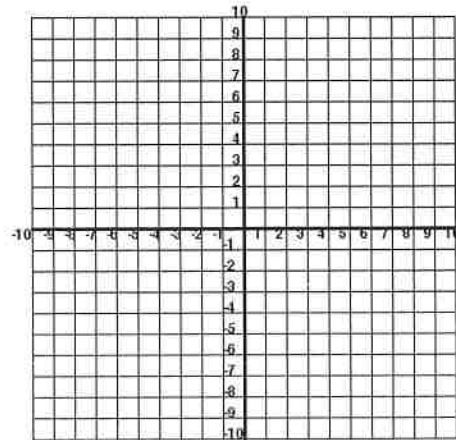


b) $x^2 - 2x + 1 = 0$

State the roots of the equation.

$x =$ _____

How many REAL roots are there to the equation?

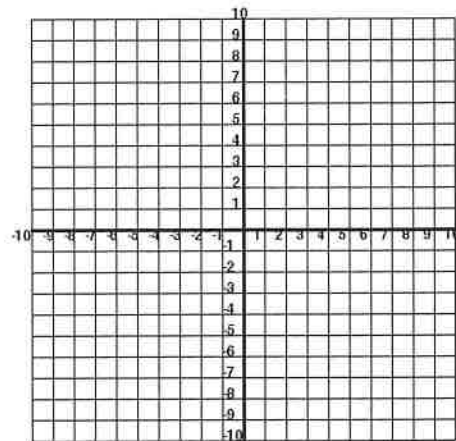


c) $x^2 + 10x + 26 = 0$

State the roots of the equation.

$x =$ _____

How many REAL roots are there to the equation?

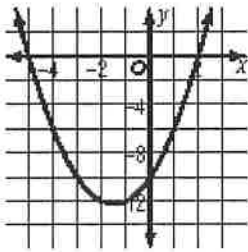


What conclusions can you make about the number of roots of a quadratic equation?

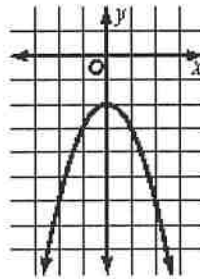
4. A cannon ball is fired from ground level on an arc described by $h(t) = -t^2 + 9$, where h is the height in meters and t is the time in seconds. How many seconds after firing will the cannon ball land?

State the real roots of each quadratic equation whose related function is graphed below.

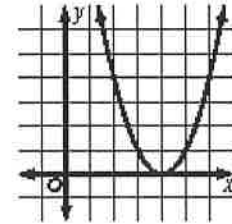
1.



2.



3.



4. The real roots of a quadratic equation correspond to the ___?___ of the graph of the related function.

A. x-intercepts

B. y-intercepts

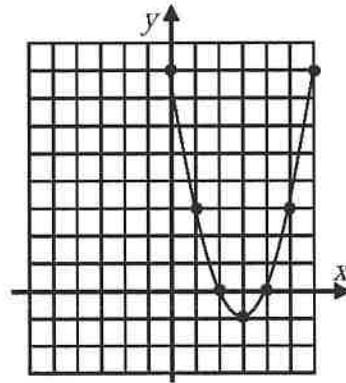
C. vertex

D. maximum

5. The graph of $y = x^2 - 6x + 8$ is shown.

The roots of the equation $x^2 - 6x + 8 = 0$

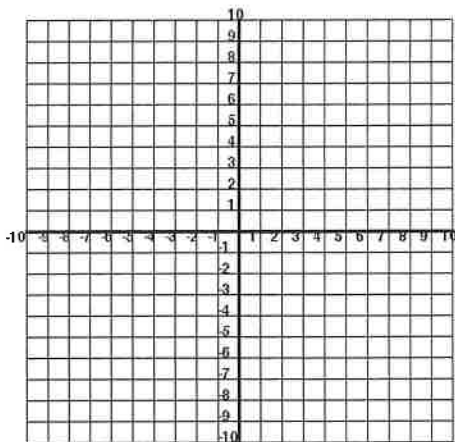
are $x =$ _____.



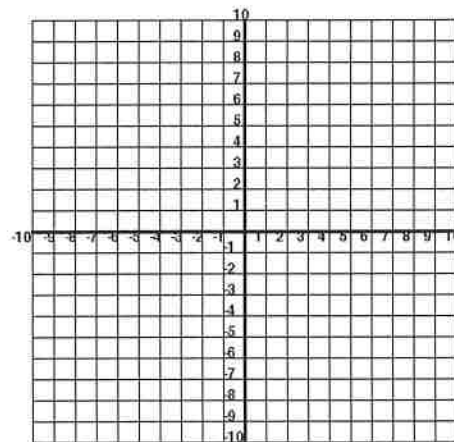
6. Find the roots of each of the following equations by graphing the related function.

a) $3x^2 - 15x - 18 = 0$

b) $x^2 + 8x + 16 = 0$

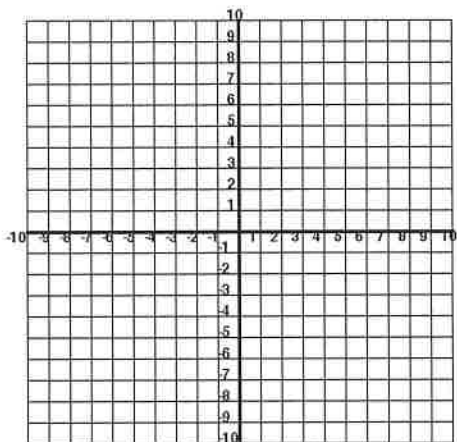


$x =$ _____



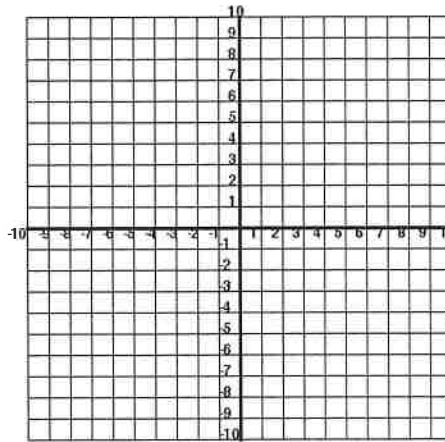
$x =$ _____

c) $-x^2 - 5x - 6 = 0$



$x =$ _____

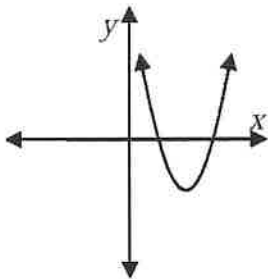
d) $-x^2 - 2x - 4 = 0$



$x =$ _____

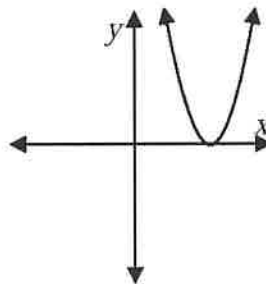
7. If the two x -intercepts of the graph of a quadratic function are -3 and 9 , then the equation of the axis of symmetry is _____.
8. If one x -intercept of the graph of a quadratic function is 4 and the axis of symmetry has an equation of $x = 7$, then what is the other x -intercept? _____
9. Describe the **number** of roots and whether are **positive** or **negative** based on the given graph:

A.



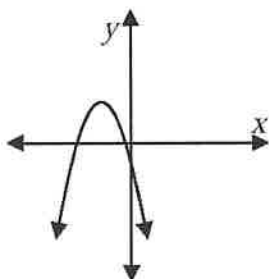
_____ REAL: Both _____

B.



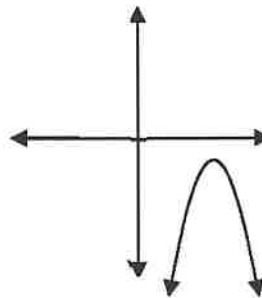
_____ REAL: _____

C.



_____ REAL: Both _____

D.



_____ REAL