

Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: N

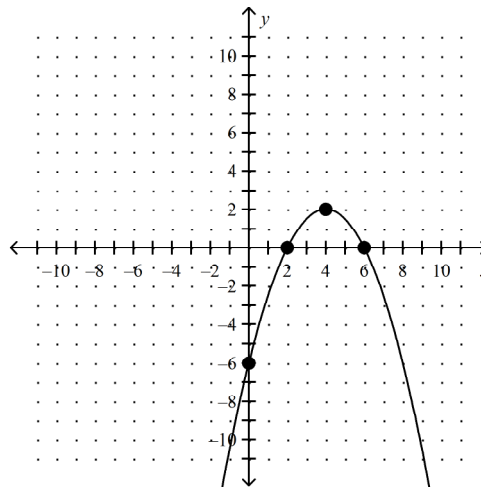
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(3x + 4)(x - 4)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

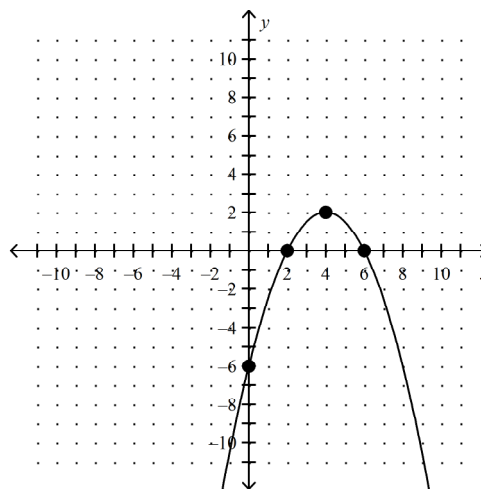
$$y = (x + 3)(x + 1)$$

3. Fully factor  $x^2 + 4x - 45$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	down
Number of Zeroes	2
Location of Zeroes	2 and 6
y-intercept	-6
Axis of Symmetry	$x = 4$
Max/Min Value	2
Vertex	(4, 2)



2. Use an area model, FOIL, or distributive property.

$$(3x + 4)(x - 4)$$

$$= (3x)(x) + (-4)(3x) + (4)(x) + (4)(-4)$$

$$= 3x^2 - 12x + 4x - 16$$

$$= 3x^2 - 8x - 16$$

	$3x$	$4$
$x$	$3x^2$	$+4x$
$-4$	$-12x$	$-16$

3. Need two *integers* that *add to +4* and *multiply to -45*

$$\text{Sum: } +4 \quad \text{Product: } -45 \quad \text{Integers: } -5 \text{ and } 9$$

$$(x - 5)(x + 9)$$

4. for y-intercept, set  $x = 0$ ,  $y = 3$ zeroes are  $-3$  and  $-1$ 

$$\text{axis of symmetry: } x = \frac{(-3) + (-1)}{2}$$

$$x = -2$$

for y-coord of vertex, sub  $x = -2$ ,  $y = -1$ vertex is  $(-2, -1)$

Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: O

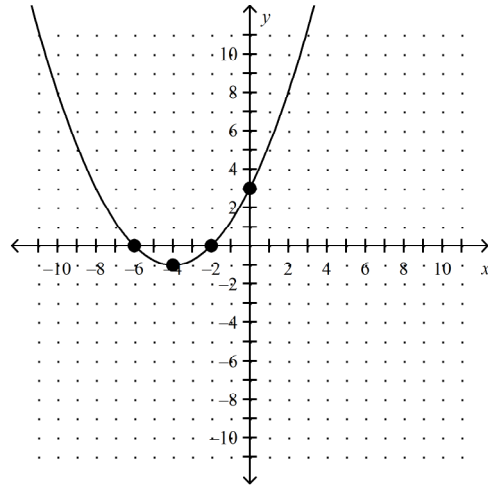
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(x - 3)(5x + 3)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

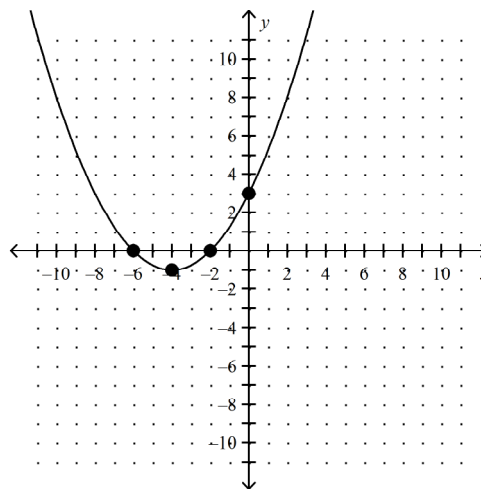
$$y = (x + 11)(x - 9)$$

3. Fully factor  $x^2 - x - 2$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	up
Number of Zeroes	2
Location of Zeroes	-2 and -6
y-intercept	3
Axis of Symmetry	$x = -4$
Max/Min Value	-1
Vertex	$(-4, -1)$



2. Use an area model, FOIL, or distributive property.

$$(x - 3)(5x + 3)$$

$$= (x)(5x) + (3)(x) + (-3)(5x) + (-3)(3)$$

$$= 5x^2 + 3x - 15x - 9$$

$$= 5x^2 - 12x - 9$$

	$x$	$-3$
$5x$	$5x^2$	$-15x$
$3$	$+3x$	$-9$

3. Need two *integers* that *add to* - and *multiply to* -2

Sum: -    Product: -2    Integers: 1 and -2

$$(x + 1)(x - 2)$$

4. for y-intercept, set  $x = 0$ ,  $y = -99$ 

zeroes are -11 and 9

$$\text{axis of symmetry: } x = \frac{(-11) + (9)}{2}$$

$$x = -1$$

for y-coord of vertex, sub  $x = -1$ ,  $y = -100$ vertex is  $(-1, -100)$

Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: P

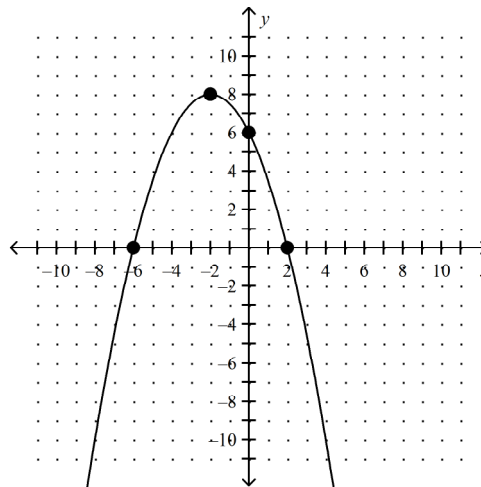
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(2x - 3)(x + 3)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

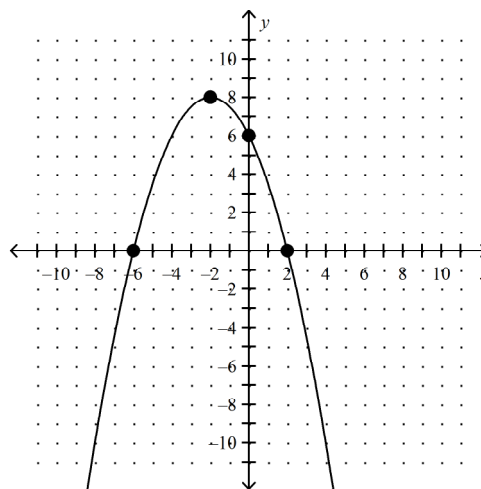
$$y = (x + 2)(x + 4)$$

3. Fully factor  $x^2 + 4x - 45$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	down
Number of Zeroes	2
Location of Zeroes	-6 and 2
y-intercept	6
Axis of Symmetry	$x = -2$
Max/Min Value	8
Vertex	$(-2, 8)$



2. Use an area model, FOIL, or distributive property.

$$(2x - 3)(x + 3)$$

$$= (2x)(x) + (3)(2x) + (-3)(x) + (-3)(3)$$

$$= 2x^2 + 6x - 3x - 9$$

$$= 2x^2 + 3x - 9$$

	$2x$	$-3$
$x$	$2x^2$	$-3x$
$3$	$+6x$	$-9$

3. Need two *integers* that *add to* +4 and *multiply to* -45

Sum: +4    Product: -45    Integers: 9 and -5

$$(x + 9)(x - 5)$$

4. for y-intercept, set  $x = 0$ ,  $y = 8$ 

zeroes are -2 and -4

$$\text{axis of symmetry: } x = \frac{(-2) + (-4)}{2}$$

$$x = -3$$

for y-coord of vertex, sub  $x = -3$ ,  $y = -1$ vertex is  $(-3, -1)$

Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: Q

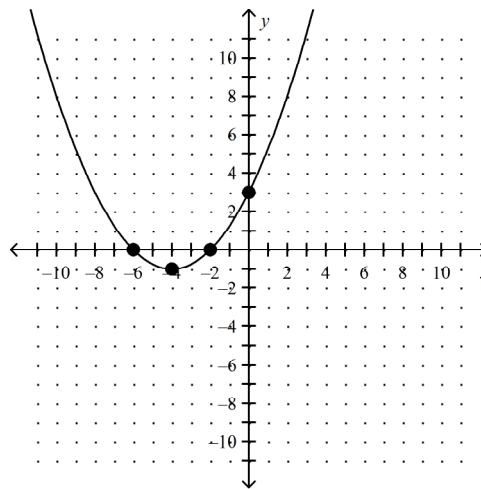
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(x - 4)(5x - 2)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

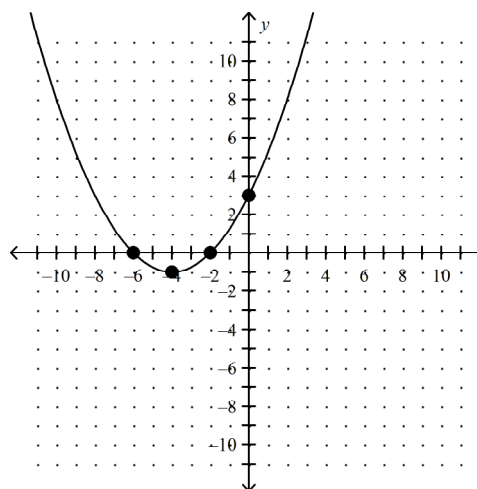
$$y = (x + 9)(x + 11)$$

3. Fully factor  $x^2 - 7x + 6$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	up
Number of Zeroes	2
Location of Zeroes	-2 and -6
y-intercept	3
Axis of Symmetry	$x = -4$
Max/Min Value	-1
Vertex	$(-4, -1)$



2. Use an area model, FOIL, or distributive property.

$$(x - 4)(5x - 2)$$

$$= (x)(5x) + (-2)(x) + (-4)(5x) + (-4)(-2)$$

$$= 5x^2 - 2x - 20x + 8$$

$$= 5x^2 - 22x + 8$$

	$x$	$-4$
$5x$	$5x^2$	$-20x$
$-2$	$-2x$	$+8$

3. Need two *integers* that *add to*  $-7$  and *multiply to*  $6$ 

Sum:  $-7$    Product:  $6$    Integers:  $-1$  and  $-6$

$$(x - 1)(x - 6)$$

4. for y-intercept, set  $x = 0$ ,  $y = 99$ zeroes are  $-9$  and  $-11$ 

$$\text{axis of symmetry: } x = \frac{(-9) + (-11)}{2}$$

$$x = -10$$

for y-coord of vertex, sub  $x = -10$ ,  $y = -1$ vertex is  $(-10, -1)$



Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: R

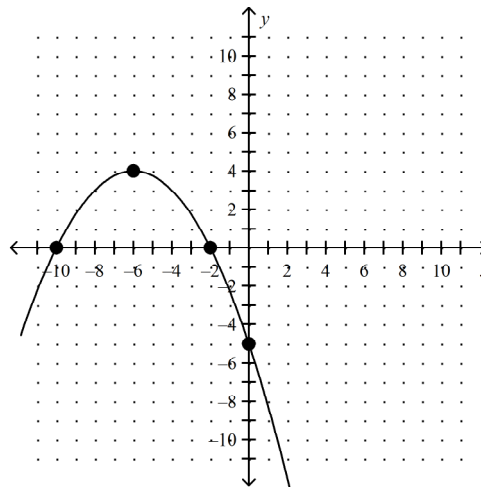
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(x + 1)(3x - 1)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

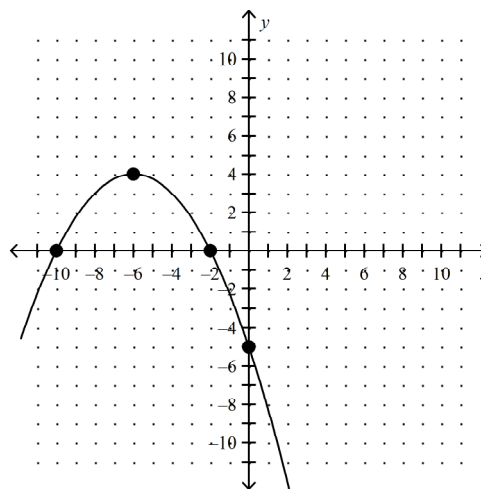
$$y = (x - 10)(x + 8)$$

3. Fully factor  $x^2 + 9x + 14$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	down
Number of Zeroes	2
Location of Zeroes	-10 and -2
y-intercept	-5
Axis of Symmetry	$x = -6$
Max/Min Value	4
Vertex	$(-6, 4)$



2. Use an area model, FOIL, or distributive property.

$$(x + 1)(3x - 1)$$

$$= (x)(3x) + (-1)(x) + (1)(3x) + (1)(-1)$$

$$= 3x^2 - x + 3x - 1$$

$$= 3x^2 + 2x - 1$$

	$x$	$1$
$3x$	$3x^2$	$+3x$
$-1$	$-x$	$-1$

3. Need two *integers* that *add to +9* and *multiply to 14*

Sum: +9    Product: 14    Integers: 2 and 7

$$(x + 2)(x + 7)$$

4. for y-intercept, set  $x = 0$ ,  $y = -80$ 

zeroes are 10 and -8

$$\text{axis of symmetry: } x = \frac{(10) + (-8)}{2}$$

$$x = 1$$

for y-coord of vertex, sub  $x = 1$ ,  $y = -81$ vertex is  $(1, -81)$

Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: S

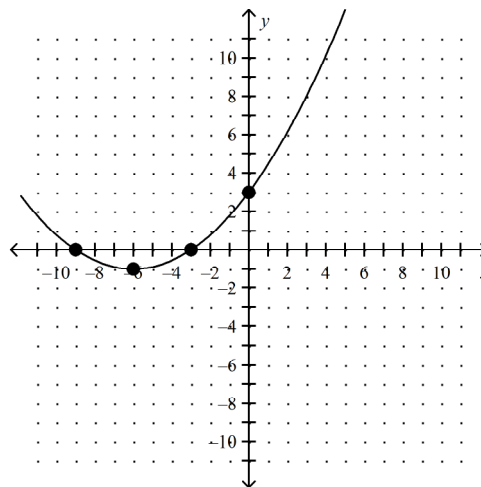
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(5x + 4)(x + 5)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

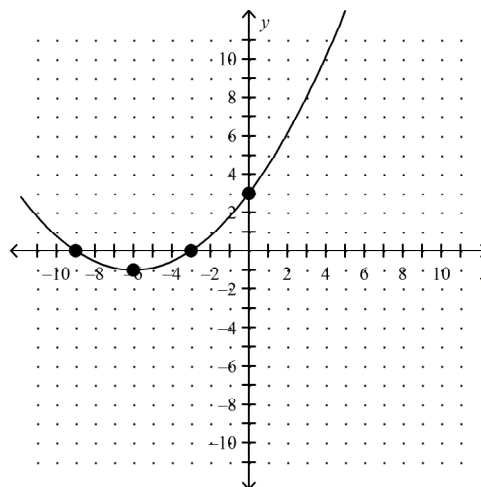
$$y = (x + 5)(x - 3)$$

3. Fully factor  $x^2 + 11x + 24$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	up
Number of Zeroes	2
Location of Zeroes	-3 and -9
y-intercept	3
Axis of Symmetry	$x = -6$
Max/Min Value	-1
Vertex	$(-6, -1)$



2. Use an area model, FOIL, or distributive property.

$$(5x + 4)(x + 5)$$

$$= (5x)(x) + (5)(5x) + (4)(x) + (4)(5)$$

$$= 5x^2 + 25x + 4x + 20$$

$$= 5x^2 + 29x + 20$$

	$5x$	$4$
$x$	$5x^2$	$+4x$
$5$	$+25x$	$+20$

3. Need two *integers* that *add to* + 11 and *multiply to* 24

Sum: + 11    Product: 24    Integers: 3 and 8

$$(x + 3)(x + 8)$$

4. for y-intercept, set  $x = 0$ ,  $y = -15$ 

zeroes are -5 and 3

$$\text{axis of symmetry: } x = \frac{(-5) + (3)}{2}$$

$$x = -1$$

for y-coord of vertex, sub  $x = -1$ ,  $y = -16$ vertex is  $(-1, -16)$

Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: T

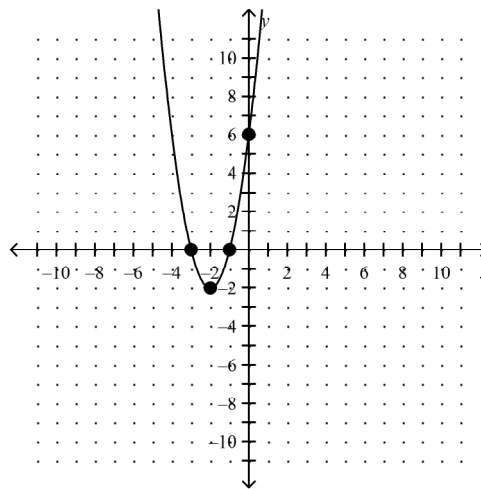
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(5x - 4)(x - 4)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

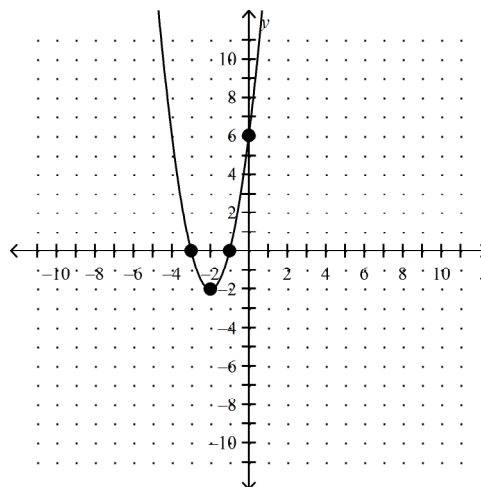
$$y = (x + 4)(x + 6)$$

3. Fully factor  $x^2 - 9x + 20$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	up
Number of Zeroes	2
Location of Zeroes	-1 and -3
y-intercept	6
Axis of Symmetry	$x = -2$
Max/Min Value	-2
Vertex	$(-2, -2)$



2. Use an area model, FOIL, or distributive property.

$$(5x - 4)(x - 4)$$

$$= (5x)(x) + (-4)(5x) + (-4)(x) + (-4)(-4)$$

$$= 5x^2 - 20x - 4x + 16$$

$$= 5x^2 - 24x + 16$$

	$5x$	$-4$
$x$	$5x^2$	$-4x$
$-4$	$-20x$	$+16$

3. Need two *integers* that *add to*  $-9$  and *multiply to*  $20$ 

$$\text{Sum: } -9 \quad \text{Product: } 20 \quad \text{Integers: } -4 \text{ and } -5$$

$$(x - 4)(x - 5)$$

4. for y-intercept, set  $x = 0$ ,  $y = 24$ zeroes are  $-4$  and  $-6$ 

$$\text{axis of symmetry: } x = \frac{(-4) + (-6)}{2}$$

$$x = -5$$

for y-coord of vertex, sub  $x = -5$ ,  $y = -1$ vertex is  $(-5, -1)$

Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: U

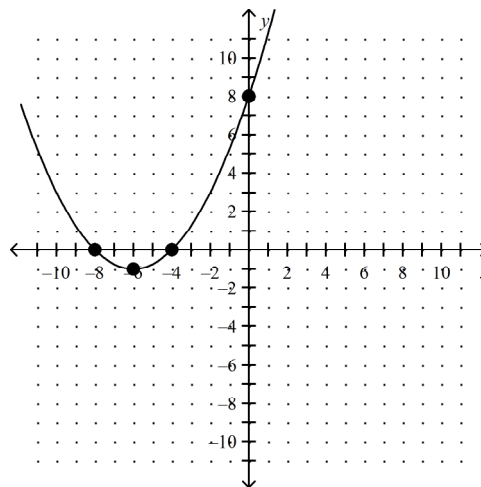
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(2x + 5)(x - 4)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

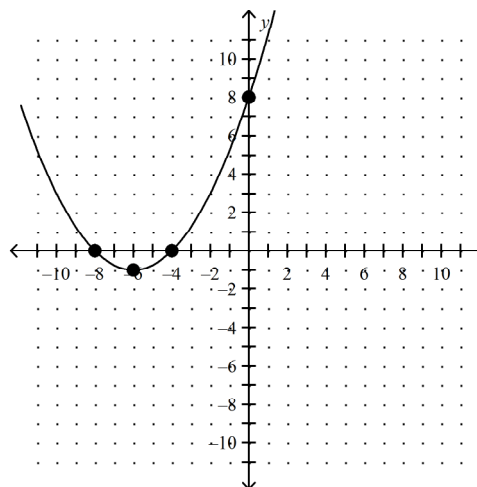
$$y = (x + 6)(x + 8)$$

3. Fully factor  $x^2 - 13x + 12$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	up
Number of Zeroes	2
Location of Zeroes	-4 and -8
y-intercept	8
Axis of Symmetry	$x = -6$
Max/Min Value	-1
Vertex	$(-6, -1)$



2. Use an area model, FOIL, or distributive property.

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

$$= (2x)(x) + (-4)(2x) + (5)(x) + (5)(-4)$$

$$= 2x^2 - 8x + 5x - 20$$

$$= 2x^2 - 3x - 20$$

	$2x$	$5$
$x$	$2x^2$	$+5x$
$-4$	$-8x$	$-20$

3. Need two *integers* that *add to* -13 and *multiply to* 12

$$\text{Sum: } -13 \quad \text{Product: } 12 \quad \text{Integers: } -12 \text{ and } -1$$

$$(x - 12)(x - 1)$$

4. for y-intercept, set  $x = 0$ ,  $y = 48$ 

zeroes are -6 and -8

$$\text{axis of symmetry: } x = \frac{(-6) + (-8)}{2}$$

$$x = -7$$

for y-coord of vertex, sub  $x = -7$ ,  $y = -1$ vertex is  $(-7, -1)$



Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: V

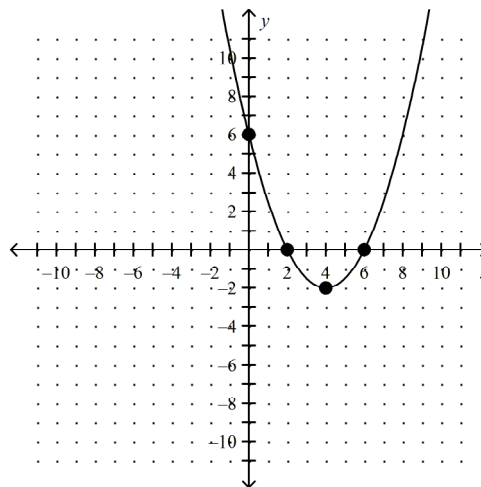
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(3x + 5)(x + 1)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

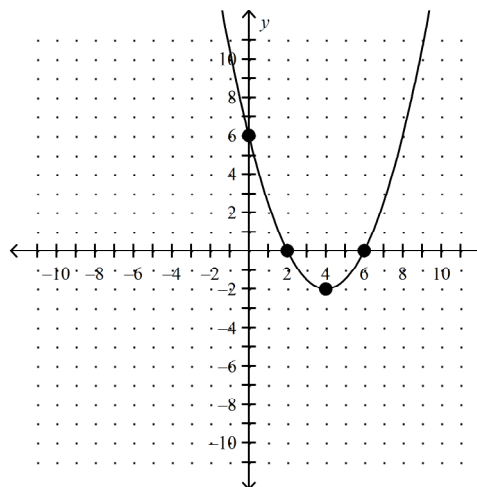
$$y = (x + 9)(x + 7)$$

3. Fully factor  $x^2 + 9x + 14$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	up
Number of Zeroes	2
Location of Zeroes	6 and 2
y-intercept	6
Axis of Symmetry	$x = 4$
Max/Min Value	-2
Vertex	$(4, -2)$



2. Use an area model, FOIL, or distributive property.

$$(3x + 5)(x + 1)$$

$$= (3x)(x) + (1)(3x) + (5)(x) + (5)(1)$$

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

$$= 3x^2 + 8x + 5$$

	$3x$	$5$
$x$	$3x^2$	$+5x$
$1$	$+3x$	$+5$

3. Need two *integers* that *add to +9* and *multiply to 14*

Sum: +9    Product: 14    Integers: 2 and 7

$$(x + 2)(x + 7)$$

4. for y-intercept, set  $x = 0$ ,  $y = 63$ zeroes are  $-9$  and  $-7$ 

$$\text{axis of symmetry: } x = \frac{(-9) + (-7)}{2}$$

$$x = -8$$

for y-coord of vertex, sub  $x = -8$ ,  $y = -1$ vertex is  $(-8, -1)$

Name: \_\_\_\_\_ Class/Period: \_\_\_\_\_ Attempt # \_\_\_\_\_ Date: 01/20/2012 ID: W

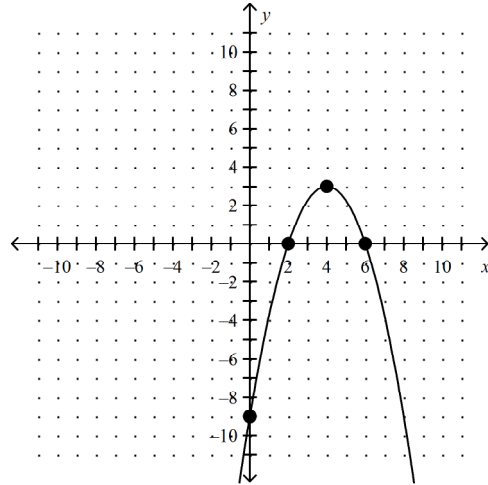
$$y = ax^2 + bx + c \quad y = a(x-r)(x-s) \quad y = a(x-h)^2 + k \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad D = b^2 - 4ac$$

Proficiency Demonstrated:      Perfect       Sufficient       Insufficient (Repeat Evaluation)

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring**

1. Determine the key features of the provided graph and record them in the table.

Direction of Opening	
Number of Zeroes	
Location of Zeroes	
y-intercept	
Axis of Symmetry	
Max/Min Value	
Vertex	



2. Expand and simplify  $(x - 5)(5x - 4)$

4. Determine the y-intercept, zeroes, equation of the axis of symmetry, and the vertex of:

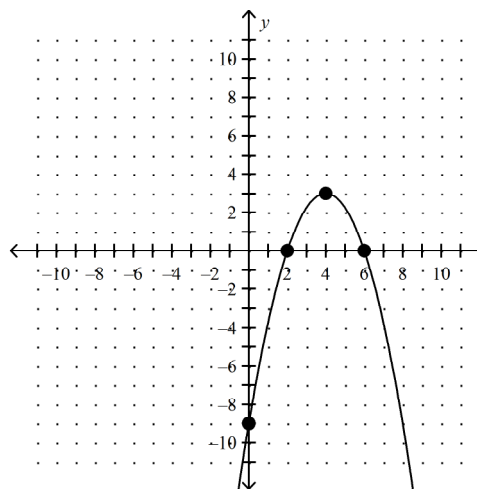
$$y = (x - 7)(x + 3)$$

3. Fully factor  $x^2 + 6x - 27$

**MPM2D - Essential Skills Proficiency Assessment # 3 - Quadratic Properties, Expanding, and Factoring Answer Section**

1.

Direction of Opening	down
Number of Zeroes	2
Location of Zeroes	2 and 6
y-intercept	-9
Axis of Symmetry	$x = 4$
Max/Min Value	3
Vertex	(4, 3)



2. Use an area model, FOIL, or distributive property.

$$(x - 5)(5x - 4)$$

$$= (x)(5x) + (-4)(x) + (-5)(5x) + (-5)(-4)$$

$$= 5x^2 - 4x - 25x + 20$$

$$= 5x^2 - 29x + 20$$

	$x$	$-5$
$5x$	$5x^2$	$-25x$
$-4$	$-4x$	$+20$

3. Need two *integers* that *add to +6* and *multiply to -27*

$$\text{Sum: } +6 \quad \text{Product: } -27 \quad \text{Integers: } 9 \text{ and } -3$$

$$(x + 9)(x - 3)$$

4. for y-intercept, set  $x = 0$ ,  $y = -21$ 

zeroes are 7 and -3

$$\text{axis of symmetry: } x = \frac{(7) + (-3)}{2}$$

$$x = 2$$

for y-coord of vertex, sub  $x = 2$ ,  $y = -25$ 

vertex is (2, -25)