

# ASSIGNMENT #3

## Circled Ones Only

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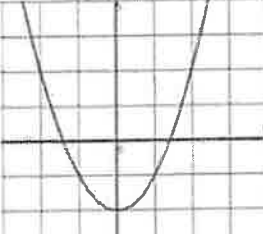
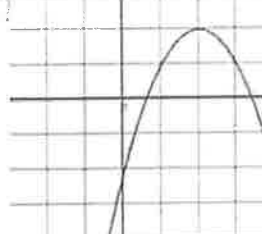
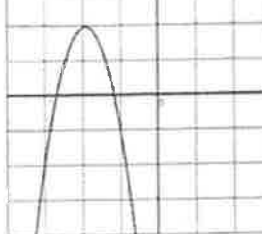
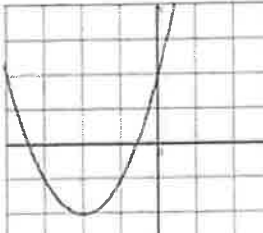
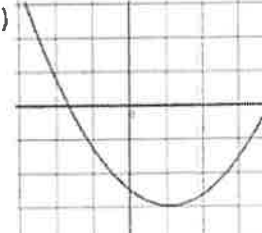
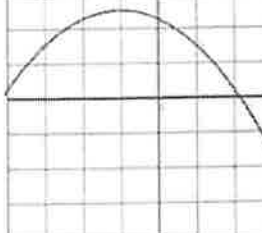
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### Pre-Calculus 11 Ch3/4 HW Lesson 6 Quadratic Functions in Standard Form $y = a(x - p)^2 + q$

1. Indicate the values of "a", "p", "q" and the coordinates of the vertex in each equation:

<p>a) <math>y = 3(x - 4)^2 + 8</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>	<p>b) <math>y = 2(x + 6)^2 - 13</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>	<p>c) <math>y = -4x^2 + 10</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>
<p>d) <math>y = 21 - (x - 1)^2</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>	<p>e) <math>y = 4(x - 20)^2 + 11</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>	<p>f) <math>y = (-3x)^2 + 2</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>
<p>g) <math>y = -\frac{2}{3}(x - 1)^2 - 2</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>	<p>h) <math>y = -3\left(x + \frac{2}{3}\right)^2 - 2</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>	<p>i) <math>y = (2x - 1)^2 - 3</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>

2. If each parabola is in the form of  $y = a(x - p)^2 + q$ , then which graph best describes each equation:

i) $a < -1, p < 0, q > 0$	a) 	b) 	c) 
ii) $0 < a < 1, p > 0, q < 0$	d) 	e) 	f) 
iii) $a > 0, p = 0, q < 0$			
iv) $0 > a > -1, p < 0, q > 0$			

8. The parabola  $y = x^2$  is shifted 4 units to the right, 3 units down, and then flipped upside down over its vertex. What is the equation of the parabola now in APQ form?
9. The parabola  $y = x^2 - 2x + 4$  is moved ' $p$ ' units to the right and ' $q$ ' units down. The x-intercepts of the resulting parabola are 3 and 5. What are the values of ' $p$ ' and ' $q$ '?
10. Given the parabola, what is the vertex and axis of symmetry?  $y = 4x^2 + 4x + 9$
11. If the quadratic equation  $(x-2)^2 + k = 0$  has two distinct real roots, then what is the range of ' $k$ '? (Multiple choice, circle one) Justify your answer.
- a)  $k > 2$                   b)  $k < 0$                   c)  $k \leq 0$                   d)  $k \leq 4$
12. Point "A" is the vertex of the parabola  $y = x^2 + 2$ , point "B" is the vertex of the parabola  $y = (x-3)^2 + 2$ , and "O" is the origin. Determine the area of  $\triangle AOB$ .
13. Given the parabola:  $y = 3(x-4)^2 - q$  with  $1 < q < 50$ . If both x-intercepts are positive integers, then what are the possible values of ' $q$ '?

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**PC11 Ch3/4 HW Lesson 3 Graphing Quadratic Functions by factoring  $y = ax^2 + bx + c$**

1. For each of the following quadratic functions find the coefficients "a,b,c" and then find i) the Coordinates of the Vertex and the ii) Domain and Range

<p>a) <math>y = x^2 + 3x - 18</math>  <math>a =</math>                      <math>b =</math>                      <math>c =</math></p> <p>X-intercepts:                      Axis of Symmetry:            Vertex :                      Y-intercept:</p>	<p>b) <math>y = (2x - 1)(x + 3)</math>  <math>a =</math>                      <math>b =</math>                      <math>c =</math></p> <p>X-intercepts:                      Axis of Symmetry:            Vertex :                      Y-intercept:</p>
<p>c) <math>y = x^2 - 12x + 35</math>  <math>a =</math>                      <math>b =</math>                      <math>c =</math></p> <p>X-intercepts:                      Axis of Symmetry:            Vertex :                      Y-intercept:</p>	<p>d) <math>y = 6x^2 + 13x - 5</math>  <math>a =</math>                      <math>b =</math>                      <math>c =</math></p> <p>X-intercepts:                      Axis of Symmetry:            Vertex :                      Y-intercept:</p>
<p>e) <math>y = 2x(x - 4)</math>  <math>a =</math>                      <math>b =</math>                      <math>c =</math></p> <p>X-intercepts:                      Axis of Symmetry:            Vertex :                      Y-intercept:</p>	<p>f) <math>y = 6x^2 + 5x - 4</math>  <math>a =</math>                      <math>b =</math>                      <math>c =</math></p> <p>X-intercepts:                      Axis of Symmetry:            Vertex :                      Y-intercept:</p>

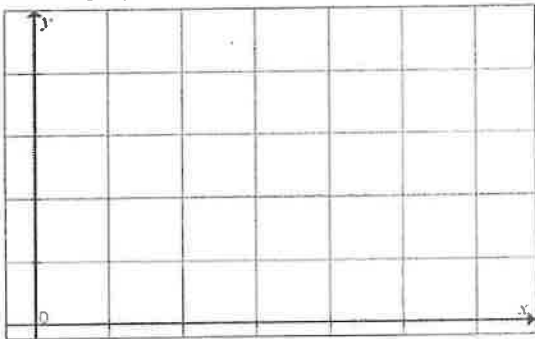
3. A pebble is thrown from a bridge into a river at height "h" meters above the river. Let "t" be the number of seconds after the release. If the height of the pebble is given by the equation:  $h(t) = -4.9t^2 + 10t + 65$ ,

then:

- a) How high is the pebble after 3 seconds?
- b) What is the vertex of the equation? What does the vertex represent?
- c) What is the domain and range of this scenario and what does it represent?
- d) What is the y-intercept and what does it represent?

4. Tom throws a football from the top of his building. The height of the ball is given by the formula:  $h(t) = -3t^2 + 60t + 132$ , where "h" is the height of the football and "t" is the number of seconds after the throw.

a) Draw a graph for this scenario and then find the vertex of this equation? Show your work algebraically



b) What is the domain and range of this scenario? Explain it in the context of this question:

c) When will the ball be falling to 150m?

5. A pebble is dropped from a bridge into a river at height "h" meters above. Let "t" be the number of seconds after the release. If  $h(t) = 65 - 4.9t^2$ , then how high is the pebble after 3 seconds? What is the domain and range of this scenario? When will the pebble hit the ground?

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Pre Calculus 11 Ch3/4 HW: Lesson 7 Completing the Square

1. What is a perfect trinomial? Explain using your own words? How do you tell if a trinomial is a perfect trinomial?

2. Which of the following are perfect trinomials? Indicate YES or NO (If not, explain why If yes, factor it.

a) $y = x^2 + 12x + 36$	b) $y = x^2 + 10x - 25$	c) $y = x^2 - 14x + 49$
d) $y = x^2 - 20x - 100$	e) $y = x^2 + 22x + 121$	f) $y = x^2 - 40x + 400$
g) $y = 4x^2 - 4x + 1$	h) $y = 4x^2 - 9$	i) $y = 25x^2 - 20x + 4$

3. What does it mean to complete the square? Explain:

4. Indicate what value should be added to the trinomial so that the equation could be a perfect trinomial:

a) $x^2 + (?) + 9$	b) $x^2 + 8x + (?)$
c) $(?) - 2x + 1$	d) $x^2 - (?) + 81$
e) $x^2 - 15x + (?)$	f) $x^2 + 17x + (?)$
g) $4x^2 + 4x + (?)$	h) $9x^2 - (?) + 1$

$$e) y = 2x(x-5)$$

*Equation :*

$$g) y = -2x^2 - 15x + 100$$

*Equation :*

$$e) y = -\frac{1}{2}x^2 + 14x + 100$$

*Equation :*

$$f) y = 3x^2 + 6x + 10$$

*Equation :*

$$h) y = -3x^2 + 18x + 50$$

*Equation :*

$$f) y = \frac{1}{2}x^2 + 8x - 30$$

*Equation :*