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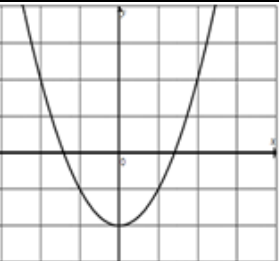
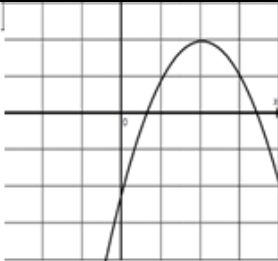

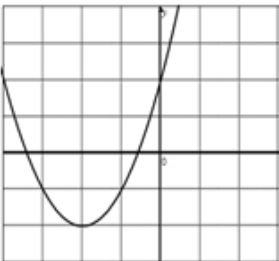
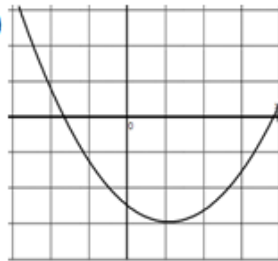
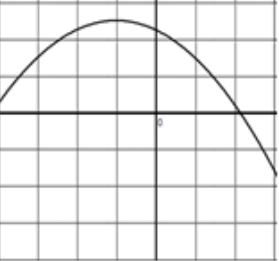
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**Pre-Calculus 11 Ch3/4 HW Lesson 6 Quadratic Functions in Standard Form**  $y = a(x - p)^2 + q$

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

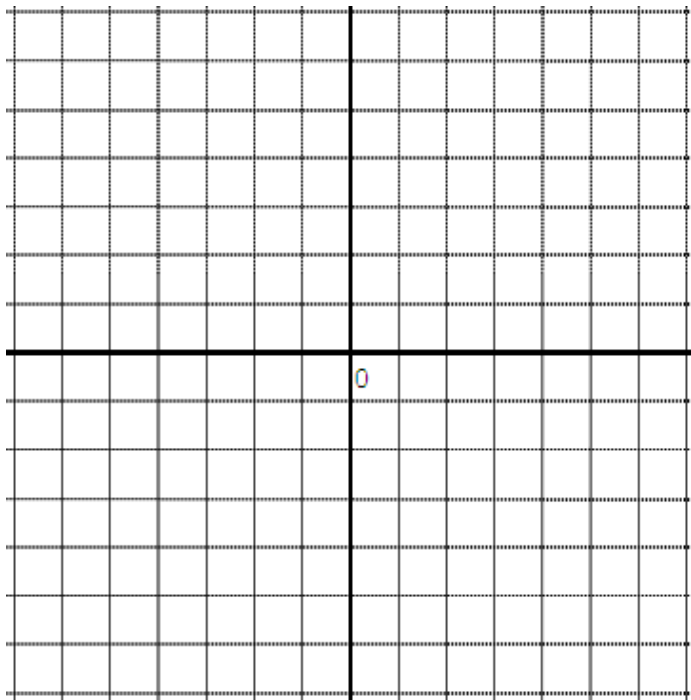
<p>a) <math>y = 3(x - 4)^2 + 8</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>	<p>b) <math>y = 2(x + 6)^2 - 13</math></p> <p><math>a =</math>      <math>p =</math>      <math>q =</math></p> <p>Vertex:</p>	<p>c) <math>y = -4x^2 + 10</math></p> <p><math>a =</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:

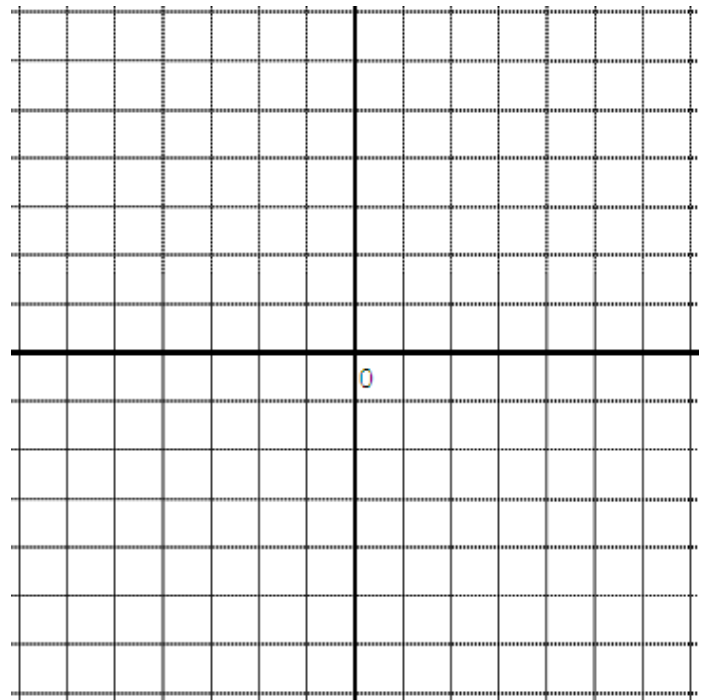
i) $a < -1, p < 0, q > 0$		a) 	b) 	c) 
ii) $0 < a < 1, p > 0, q < 0$				
iii) $a > 0, p = 0, q < 0$		d) 	e) 	f) 
iv) $0 > a > -1, p < 0, q > 0$				

3. Graph each of the following quadratic functions and label the following: Equation of the Axis of Symmetry, Coordinates of the Vertex, and location of the X and Y-intercepts. Do **NOT** use a graphing calculator:

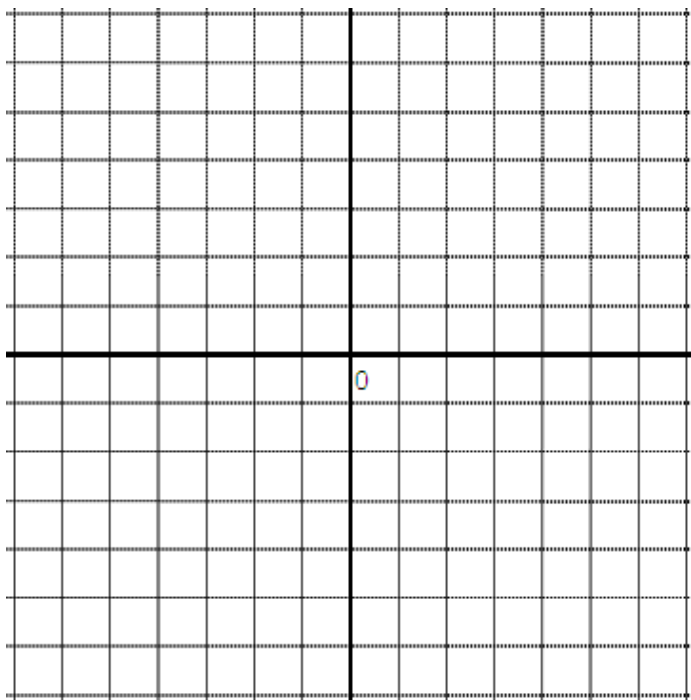
a) Equation:  $y = (x - 4)^2 - 5$



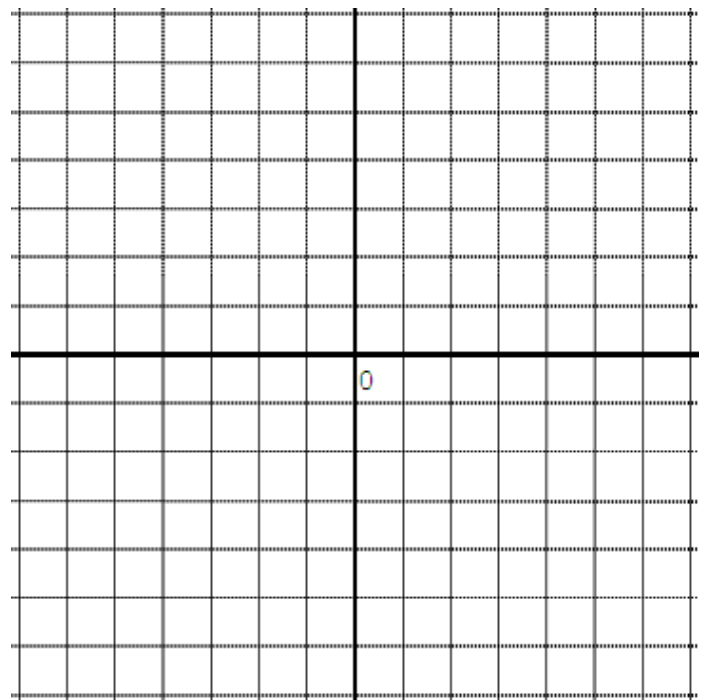
b) Equation:  $y = -(x + 3)^2 + 6$



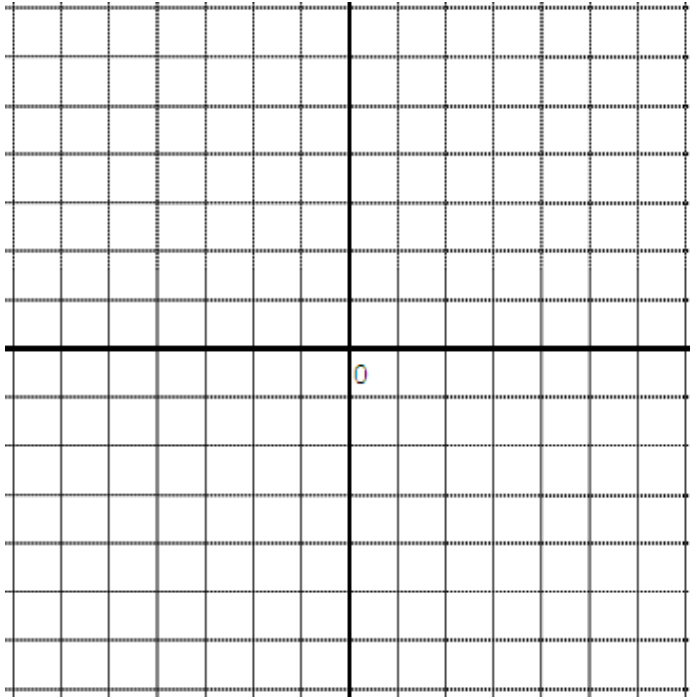
c) Equation:  $y = \frac{1}{3}(x + 3)^2 + 1$



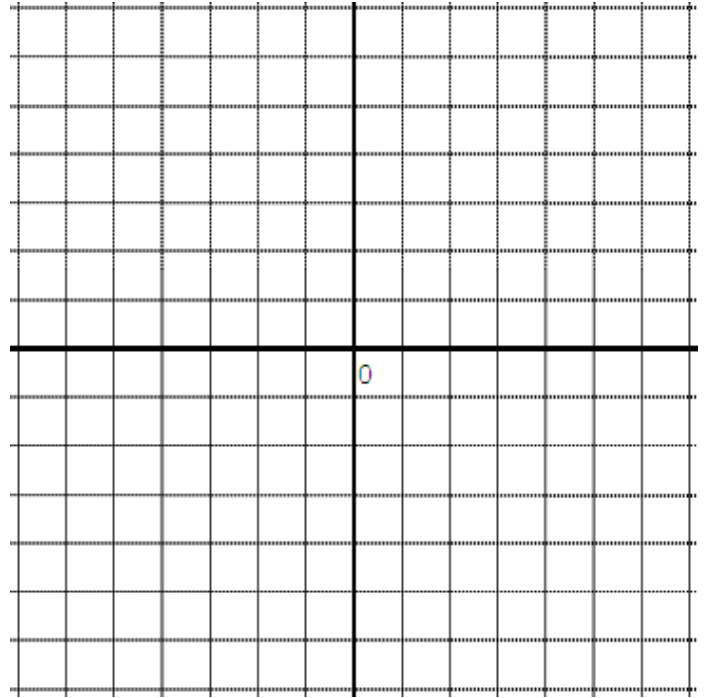
d) Equation:  $y = -\frac{1}{2}(x - 2)^2 + 7$



e) Equation:  $y = 3(x-2)^2 - 5$



f) Equation:  $y = -0.25(2x-6)^2 + 3$  (challenge)



4. What does it mean when two parabola functions are congruent?
  
  
  
  
  
  
  
  
  
  
5. How can the constant "a" in the equation  $y = a(x-p)^2 + q$  determine the shape of a parabola? Explain:
  
  
  
  
  
  
  
  
  
  
6. If a parabola has a maximum value, then which way does the graph open? UP or DOWN? Explain?
  
  
  
  
  
  
  
  
  
  
7. Given the parabola:  $y = -2(x-3)^2 + 4$ , what is the AXIS of Symmetry?

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 ' $q$ '?