## **Section 3.3 Extra Practice**

1. What value of *c* makes each trinomial expression a perfect square? What is the equivalent binomial square expression for each?

a) 
$$x^2 - 10x + c$$
  
b)  $x^2 + 8x + c$   
c)  $x^2 - 12x + c$ 

d) 
$$x^2 + 2x + c$$

**2.** Write each function in vertex form by completing the square. Use your answer to identify the vertex of the function.

a) 
$$y = x^2 + 2x - 4$$
  
b)  $y = x^2 - 6x + 13$   
c)  $y = x^2 + 8x + 6$   
d)  $y = x^2 + 24x + 54$ 

3. Convert each function to the form  $y = a(x-p)^2 + q$  by completing the square. a)  $y = 3x^2 - 12x + 13$ b)  $y = -2x^2 - 20x - 56$ c)  $y = 6x^2 - 48x$ d)  $y = -4x^2 - 56x - 196$  **4.** Write each function in vertex form. Determine the maximum or minimum of each function and the *x*-value at which it occurs. Then, sketch a graph of the function.

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a) 
$$y = x^2 + 6x + 4$$
  
b)  $y = 2x^2 - 16x + 31$   
c)  $y = -3x^2 - 12x - 7$ 

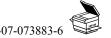
**d**) 
$$y = -x^2 + 18x$$

5. Convert each function to the form  $y = a(x-p)^2 + q$ . State the coordinates of the vertex, axis of symmetry, maximum or minimum value, domain, and range.

a) 
$$y = x^2 + 10x + 16$$
  
b)  $y = -3x^2 - 6x + 3$   
c)  $y = 2x^2 + 30x + 117$ 

**d**) 
$$y = 6x^2 - 4x + \frac{4}{3}$$

- 6. If a farmer harvests his crop today, he will have 1200 bushels worth \$6 per bushel. Every week he waits, the crop yield increases by 100 bushels, but the price drops 30¢ per bushel.
  - a) What quadratic function can be used to model this situation?
  - **b)** When should the farmer harvest his crop to maximize his revenue? What is the maximum revenue?
  - c) What assumptions are being made in using this model?



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