Quadratics Extra Practice

1. What is the standard form of a quadratic equation?

2. What is the vertex form of a quadratic equation?

3. What determines a maximum or minimum point?

4. What is the axis of symmetry?

5. Write the axis of symmetry and the vertex of the following equations:
   a. $y = x^2 - 4$
   b. $y = x^2 - 2x - 4$
   c. $y = -2x^2 - 4x + 6$
   d. $y = -x^2$

6. What does it mean to solve a quadratic? Give two ways you can solve a quadratic.

7. Solve each equation by factoring:
   a. $x^2 + x - 42 = 0$
   b. $c^2 = 5c$
   c. $n^2 - 9n = -18$
   d. $m^2 = 4m$
   e. $22x - x^2 = 96$
   f. $3x^2 + 12x + 9 = 0$
   g. $4c^2 = 16$

8. Solve each equation by completing the square
   a. $b^2 + 2b = -20$
   b. $r^2 - 4r - 91 = 7$
   c. $x^2 - 12x + 11 = 0$
   d. $9n^2 + 79 = -18n$
   e. $10p^2 + 4p + 77 = 9$
   f. $p^2 + 14p - 38 = 0$
   g. $v^2 + 6v - 59 = 0$

9. Solve each equation by using the quadratic formula
   a. $4b^2 + 8b + 7 = 4$
   b. $2m^2 - 7m - 13 = -10$
   c. $5x^2 + 9x = -4$
   d. $k^2 - 31 - 2k = -6 - 3k^2 - 2k$
   e. $x^2 + 2x - 1 = 2$
   f. $2x^2 - 3x - 5 = 0$
   g. $5r^2 = 80$

10. Find the axis of symmetry and the vertex in the following equations:
   a. $y = 3(x-2)^2 - 4$
   b. $y = (x + 5)^2 + 7$

11. Use the graphing calculator to solve the following:
   a. $-2x^2 + 0.7x = -0.3$
   b. $2x^2 - 11x + 5 = 0$
   c. $(x + 5)(x - 2) = 0$

12. Graph the following using the vertex and x intercepts: (Name the y intercepts, domain and range)
   a. $x^2 - 4x + 5 = 0$
   b. $n^2 - 8n + 15 = 0$

13. The amount of medicine in Elizabeth's blood is modeled by the function $M(t) = -2t^2 + 14t$, where t is the number of hours after she take the medicine.
   a. How many hours after Elizabeth takes her medicine is the amount of medicine in her blood the highest?
   b. What is the highest amount of medicine in Elizabeth's blood?
   c. When will there be no medicine left in Elizabeth's blood?

14. The expression $h(t) = -16t^2 + 12t + 48$ predicts the height h, in meters, of an object t seconds after a person launches it into the air. Using this expression, answer the following:
   a. After how many seconds will it take the object to hit the ground?
   b. After how many seconds does the object reach its maximum height?
   c. What is the object's maximum height?

15. There are three consecutive positive integers such that the product of the smaller two is 34 less than 10 times the largest integer. What is the value of the smallest integer?

16. There are three consecutive positive integers such that the product of the larger two integers is four more than twice the smallest integer. What is the value of the largest integer?

17. The area of a triangle is 12 square meters. The height of the triangle is eight less than twice the base. What is the height of the triangle?

18. Solve the system of equations $y = x^2-5$ and $y=3x+7$
   a. By graphing (by hand)
   b. By elimination
   c. By substitution
   d. With your graphing calculator