Solving Quadratics

Name _____ Date _____ Period _____

Solve.

1. $x^2 + 3x + 12 = 22$

2. $3x^3 - 24 = 0$

3. $x^2 - 36 = 0$

4. $-12 = 6x^2 + 5x - 16$

5. $0 = 3x^2 - 5x - 12$

6. $2x^2 + 10x + 6 = 3x$

7. $10x^2 + 6x - 4 = 0$

8. $5x^2 = 30x$

9. $-30 = 2x^2 - 16x$

10. $2x^2 - x = 10$

11. The equation for modeling the height of an object over time is $h(t) = 16t^2 + v_0t + h_0$.
Read the following situation and answer the questions using the given equation.

A toy rocket was launched from the ground into the air from your neighbor's backyard at 120 feet per second.

a. What does t represent in the equation?

b. What does h represent in the equation?

c. What does v_0 represent?

d. What does h_0 represent?

e. What is the starting height of the rocket?

f. What is the initial velocity of the rocket?

g. Where would the initial height go in the equation?

h. Where would the initial velocity go in the equation?

i. Write an equation for the given situation.

j. If you want to find how long the rocket is in the air, what is the end height?

k. Write the equation with the end height.

l. Find how long the rocket is in the air? Show all of your work.

m. Explain how your answer from l and the rocket are related in a complete sentence.

12. The area of a rectangle is 24 square meters. The length is 5 meters more than the width.

     a. What is the formula for area of a rectangle?

     b. What is the area you are given?

     c. What is the width (If you don't know, use a variable.)

     d. Translate the second sentence of the situation into math language.

     e. Write an equation for the area of the given situation.

     f. If you solve the equation from e, what are you solving for?

     g. Since the formula is length times width, what do you need to do first in the equation from e?

     h. What strategy can you use to solve an equation with a squared variable?

     i. What does the equation need to equal before you can do the strategy from h?

     j. Solve the equation from e. Show all of your work.

     k. Explain in a complete sentence why one of your answers from j will not work in this situation.

     l. What are the dimensions of the rectangle?

13. A group of seniors from Bingham High School buy jerseys to wear to the football game. The cost of the jerseys can be modeled by the equation $C(x) = x^2 + 33x + 25$. If the total cost is $455, how many jerseys did they purchase?

    a. What does x represent?

    b. Write an equation to represent the situation.

    c. What solving strategy will work best to solve this equation?

    d. Solve the equation. Show all of your work.

    e. Explain your answer in a complete sentence.

14. Patrick Mahomes is the quarterback for the Kansas City Chiefs NFL football team. He is throwing a pass to a receiver. He gets hit as he releases the ball, so the velocity of the ball is 46 feet per second. He releases the ball at a height of 6 feet.

    a. Using the equation $h(t) = -16t^2 + v_0 t + h_0$, write an equation modeling the height of the ball over time.

    b. How long was the ball in the air if the pass is incomplete (no one catches the ball and it lands on the ground)?

    c. Write your answer in a complete sentence.