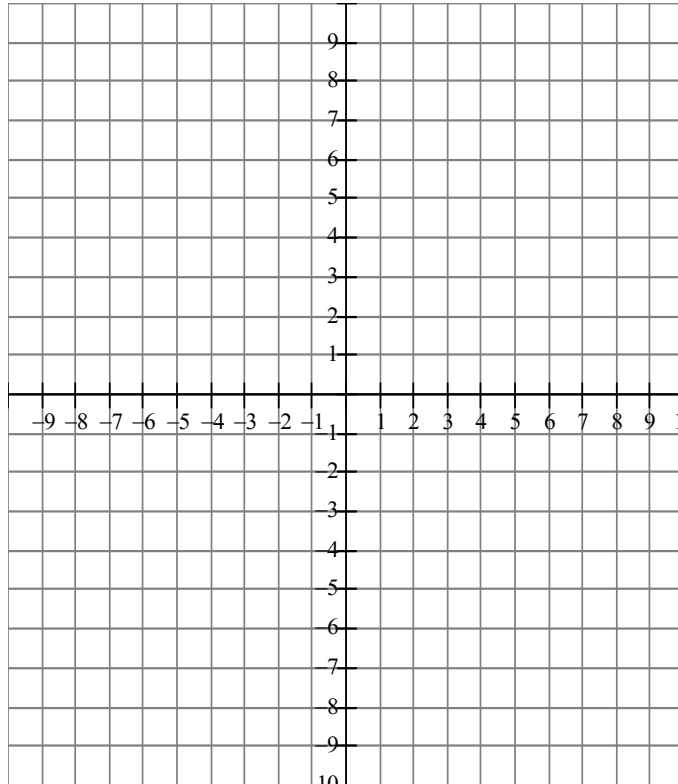Name: _____

Chapter 4 - Quadratic Equations Review

Complete all questions on a separate piece of paper. Show all of your work. Hand in on test day.

$$ax^2 + bx + c = 0 \qquad y = a(x-p)^2 + q \qquad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1. Solve the following by **graphing**: $y = (x+3)^2 - 1$ and $y = x^2 + 5x + 4$

2. Solve each equation by **factoring**.
   a) $x^2 + 7x + 10 = 0$
   b) $x^2 - x = 6$
   c) $8x^2 = 72x - 144$
   d) $5x^2 + 20 = -25x$
   e) $4x^2 + 8x + 3 = 0$
   f) $2x^2 - 5x = 0$

3. Write a **quadratic equation** that has the following solutions.
   a) $x = -5; \ x = 7$
   b) $x = 4; \ x = 3$
   c) $x = 2; \ x = \dfrac{4}{3}$

4. Solve each equation by **completing the square** using the square root principle.
   a) $3x^2 - 12x + 9 = 0$
   b) $x^2 - 12x + 31 = 0$

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5. Use the **discriminant** to determine the nature of the roots. What does each answer mean?

a) $2x^2 - 9x + 4 = 0$

f) $-6x^2 + 7x - 5 = 0$

c) $-6x^2 - 3x + 9 = 0$

d) $-x^2 - 6x - 9 = 0$

6. Solve each equation using the **quadratic formula**.

a) $4x^2 - 3x - 27 = 0$

b) $x^2 - 10x + 22 = 0$

7. Solve the following quadratic equations by the method of your choice.

a) $x - 1 = \dfrac{2}{x}$

b) $x(2x - 3) + 4(x + 1) = 2(3 + 2x)$

8. When a football is kicked, its height can be modeled by the function $h(d) = -0.1d^2 + 4.8d$, where d is the horizontal distance that the ball has travelled from the kicker, in metres, and h is the height of the ball, in metres. Find the distance from the kicker that the ball lands on the ground again. Show all work.

9. There is a picture of Albert Einstein on the wall in Ms. Donnelly's class and it is surrounded by a uniform mat. The area of the mat is three times the area of the picture which measures 12 cm by 10 cm. What are the outside dimensions of the mat, to the nearest tenth?

10. The length of the base of a rectangular prism is 2 m more than its width and the height of the prism is 15 m. Find the dimensions of the base of the rectangular prism if its volume is 2145 m³.

11. A rock is thrown straight up from the edge of a cliff and falls onto the ground. The height, h, in meters, of the rock above the ground, t seconds after being thrown is approximately modeled by the equation: $h(t) = -4t^2 + 8t + 28$

a) What is the maximum height of the rock above the ground?
b) How long does it take the rock to reach the maximum height?
c) How high is the cliff above the ground?
d) How many seconds (to the nearest tenth of a second) does it take the rock to hit the ground?

12. A rectangle with an area of $700 \; cm^2$ is $x + 2 \; cm$ wide and $2x - 1 \; cm$ long. What is the width of the rectangle? Show your steps.

Keep practicing! p. 258 # 5, 10, 11, 16, 20, 21