

Algebra P4  
Practice Test 2

Calculator OK. Show all work for full credit.

1. Factor the polynomials completely. DO NOT SOLVE!

a.  $2x^2 - 18$

$$2(x^2 - 9)$$

$$\boxed{2(x+3)(x-3)}$$

b.  $-2x^2 + 10x + 12$

$$-2(x^2 - 5x - 6)$$

$$\boxed{-2(x-6)(x+1)}$$

2. Solve the equation by factoring.

a.  $5x^2 - 7x + 2 = 0$

$$(5x - 2)(x - 1) = 0$$

$$5x - 2 = 0 \quad x - 1 = 0$$

$$\boxed{x = \frac{2}{5} \quad x = 1}$$

b.  $4x^2 + 24x = 0$

$$4x(x + 6) = 0$$

$$4x = 0 \quad x + 6 = 0$$

$$\boxed{x = 0 \quad x = -6}$$

3. Solve the equation by using the square root method.

a.  $x^2 - 24 = 0$

$$x^2 = 24$$

$$x = \pm\sqrt{24}$$

$$\boxed{x = \pm 2\sqrt{6}}$$

b.  $12 = 3x^2$

$$x^2 = 4$$

$$\boxed{x = \pm 2}$$

4. Solve by using the quadratic formula. Do NOT use a calculator on these problems, but simplify completely.

a.  $x^2 - 7x + 6 = 0$

$$a = 1 \quad b = -7 \quad c = 6$$

$$x = \frac{7 \pm \sqrt{(-7)^2 - 4(1)(6)}}{2(1)}$$

$$x = \frac{7 \pm \sqrt{49 - 24}}{2}$$

$$x = \frac{7 \pm 5}{2}$$

$$\boxed{x = 6, 1}$$

b.  $2x^2 + x + 4 = 0$

$$a = 2 \quad b = 1 \quad c = 4$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(2)(4)}}{2(2)}$$

$$x = \frac{-1 \pm \sqrt{-31}}{4}$$

$$\boxed{\text{No solution}}$$

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

$$a = 3 \quad b = -2 \quad c = -2$$

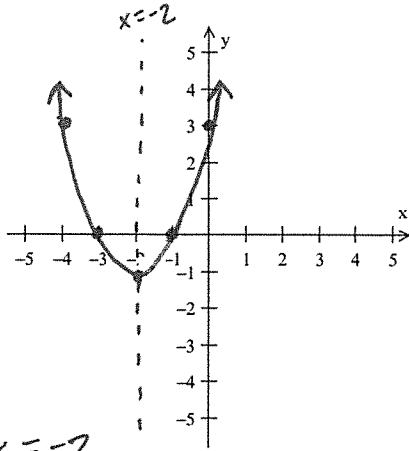
$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(3)(-2)}}{2(3)}$$

$$x = \frac{2 \pm \sqrt{28}}{6} = \frac{2 \pm 2\sqrt{7}}{6}$$

$$\boxed{x = \frac{1}{3} \pm \frac{1}{3}\sqrt{7}}$$

5. Graph each quadratic function. Also, find all the information below.

a.  $y = x^2 + 4x + 3$



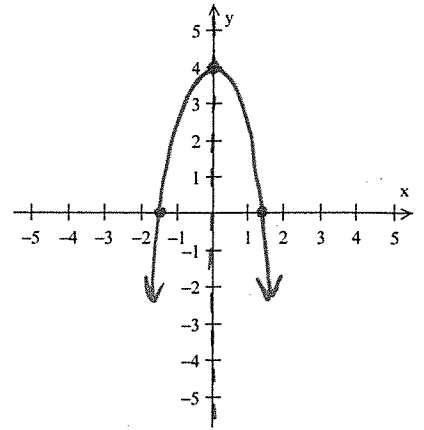
vertex:  $(-2, -1)$

axis of symmetry:  $x = -2$

x-intercept(s):  $(-3, 0)$   $(-1, 0)$

y-intercept:  $(0, 3)$

b.  $y = -2x^2 + 4$



vertex:  $(0, 4)$

axis of symmetry:  $x = 0$

x-intercept(s):  $(\sqrt{2}, 0)$   $(-\sqrt{2}, 0)$

y-intercept:  $(0, 4)$

6. The soccer ball kicked from the ground can be modeled by the equation  $y = -16x^2 + 45x$ , where  $y$  is the height in feet and  $x$  is the time in seconds. Find the maximum height of the soccer ball and the time it takes for the ball to reach that height. Then find when the ball hits the ground.

$$x = \frac{-b}{2a} = \frac{-45}{2(-16)} = \boxed{1.41 \text{ seconds}}$$

$$y = -16(1.41)^2 + 45(1.41) = \boxed{31.6 \text{ feet}}$$

7. The length a rectangle is three less than four times the width. If the area is 7, find the width and length of the rectangle to the nearest tenth.

$$\begin{aligned} \text{width} &= x \\ \text{length} &= 4x - 3 \end{aligned}$$

$$A = l \cdot w$$

$$7 = (4x - 3) \cdot x$$

$$7 = 4x^2 - 3x$$

$$4x^2 - 3x - 7 = 0$$

$$(4x - 7)(x + 1) = 0$$

$$x = \frac{7}{4} \text{ or } -1$$

$$\boxed{\text{width} = \frac{7}{4}}$$

$$\text{length} = 4\left(\frac{7}{4}\right) - 3$$

$$\boxed{\text{length} = 4}$$

8. Graph  $y = -x^2 + 4x + 60$ . Make sure your graph contains ALL the information below!

Does it open up or down?

**Down** (since  $a < 0$ )

Find the equation of the axis of symmetry

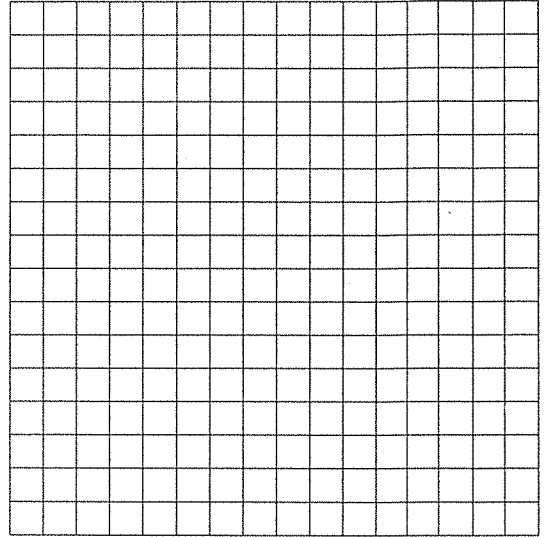
$$x = -\frac{b}{2a} = \frac{-4}{2(-1)} = 2$$

**$x = 2$**

Find the vertex

$$y = -2^2 + 4(2) + 60 = 64$$

**vertex: (2, 64)**



Find the zeros by using the quadratic formula

$$0 = -x^2 + 4x + 60$$

$$x = \frac{-4 \pm \sqrt{4^2 - 4(-1)(60)}}{2(-1)} = \frac{-4 \pm \sqrt{256}}{-2} = \frac{-4 \pm 16}{-2} = -6, 10$$

**(-6, 0) and (10, 0)**

Show that you get the same answers by factoring.

$$0 = -x^2 + 4x + 60$$

$$0 = -(x^2 - 4x - 60)$$

$$0 = -(x - 10)(x + 6)$$

$$x - 10 = 0 \quad x + 6 = 0$$

$$x = 10 \quad x = -6$$

**(-6, 0) and (10, 0)**

Find the y-intercept

$$y = -0^2 + 4(0) + 60 = 60$$

**(0, 60)**

9. Which of the following lines has an undefined slope?

- a)  $y = x$
- b)  $y = -x$
- c)  $x = 2$
- d)  $y = 2$
- e)  $x - y = 2$

10. Find the x-intercept of the line  $7y - 18x = 36$ .

- a) (7, 0)
- b) (-18, 0)
- c) (-2, 0)
- d) (0, -18)
- e) (0, -2)

$$7(0) - 18x = 36$$

$$-18x = 36$$

$$x = -2$$