Name: KEY Date: _____ Hr: _____

# Algebra 2/Trig
## CH 5 Review

5.1 Multiply linear binomials, and identify and graph a quadratic function.

Show that each function is a quadratic function by writing it in the form $f(x) = ax^2 + bx + c$ and identifying a, b, and c.

1.) $f(x) = -(x + 1)(x - 4)$

$f(x) = -x^2 + 3x + 4$

$a = -1$
$b = 3$
$c = 4$

2.) $f(x) = 5(2x - 1)(3x + 2)$

$f(x) = 30x^2 + 5x - 10$

$a = 30$
$b = 5$
$c = -10$

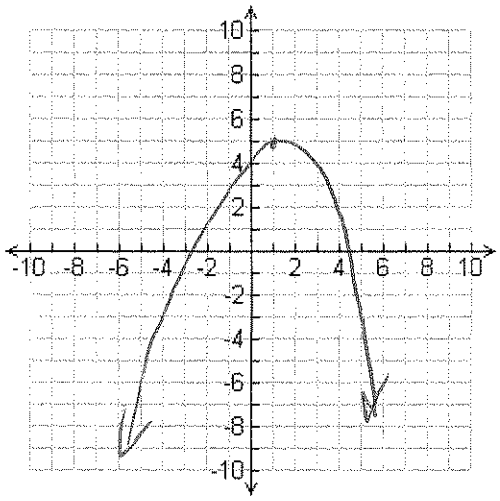
Graph the function and give the approximate coordinates of the vertex, write the equation for the axis of symmetry and state whether the graph opens up or down.

3.) $f(x) = 4 + 2x - x^2$

opens down

$x = 1$

$V = (1, 5)$



5.2 Solve quadratic equations by taking square roots.

Solve each equation, giving both exact solutions and approximate solutions to the nearest hundredth.

4.) $x^2 = 8$

$x = \pm 2\sqrt{2}$ $\quad \sqrt{8} = 2\sqrt{2}$

5.) $(x-5)^2 = 48$

$48 = 16 \cdot 3$

$x = 5 \pm \sqrt{48}$

$x = 5 \pm 4\sqrt{3}$

6.) $3(x-4)^2 - 24 = 0$

$x = 4 \pm 2\sqrt{2}$

In right triangle A, B, C, *a* and *b* are legs, *c* is the hypotenuse. Find the unknown length. Give answers to nearest tenth.

7.) a = 4, b = 5, c = ?

$4^2 + 5^2 = c^2$

$16 + 25 = c^2$

$\sqrt{41} = c$

8.) c = 4, a = 1, b =?

$1^2 + b^2 = 4^2$

$b^2 = 15$

$b = \sqrt{15}$

5.3 Use factoring to solve a quadratic equation and to find the zeros of a quadratic function.

Factor each expression. Then use the Zero-Product Property to find the zeros of each function.

9.) $f(x) = 2x^2 - 5x - 25$

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

$x = -\frac{5}{2}, 5$

10.) $f(x) = 4x^2 - 49$

$0 = (2x-7)(2x+7)$

$x = \frac{7}{2}, -\frac{7}{2}$

11.) $f(x) = x^2 - 16x + 64$

$0 = (x-8)^2$

$x = 8$

5.4 Use completing the square to solve a quadratic equation.

Solve each quadratic equation by completing the square. Give exact solutions.

12.) $x^2 - 6x = 27$

$x^2 - 6x + 9 = 27 + 9$

$(x-3)^2 = 36$

$x - 3 = \pm 6$

$x = 3 \pm 6$

$x = 9, -3$

13.) $5x^2 = 2x + 1$

$\frac{5}{5}x^2 - \frac{2}{5}x = \frac{1}{5}$

$(x^2 - \frac{2}{5} + \frac{1}{25}) = \frac{1}{5} + \frac{1}{25}$

$(x - \frac{1}{5})^2 = \frac{6}{25}$

$x - \frac{1}{5} = \frac{\pm\sqrt{6}}{5}$

$x = \frac{1}{5} \pm \frac{\sqrt{6}}{5}$

Write each function in vertex form, and identify the coordinates of the vertex and equation of the axis of symmetry.

14.) $y = 2x^2 - 16x + 33$

$y - 33 = 2(x^2 - 8x + 16)$

$+32$

$y + 1 = 2(x-4)^2$

$y = 2(x-4)^2 + 1$

V(4, 1)

$x = 4$ axis of sym.

15.) $y = -3x^2 - 6x - 7$

$y = -3(x+1)^2 - 4$

V(-1, -4)

$x = -1$ axis of sym.

5.5 Use the quadratic formula to find the real roots of quadratic equations.

Find the coordinates of the vertex of the graph and the equation of the axis of symmetry.

16.) $f(x) = x^2 + 7x + 6$

$x = \frac{-b}{2a}$

$x = -\frac{7}{2}$ axis of sym

$v\left(-\frac{7}{2}, -\frac{25}{4}\right)$

17.) $f(x) = x^2 - x - 12$

$x = \frac{1}{2}$ $\quad v\left(\frac{1}{2}, -\frac{49}{4}\right)$

5.6 Quadratic Equations and Complex Numbers.

Find the discriminant and determine the number of real solutions. Then solve.

18.) $4x^2 - 20x - 25$

$b^2 - 4ac$

$400 - 4(4)(-25) = 800 \rightarrow$ 2 real solutions

$x = \frac{20 \pm \sqrt{800}}{8} = \frac{20 \pm 20\sqrt{2}}{8} = \frac{5 \pm 5\sqrt{2}}{2}$

19.) $-x^2 + 6x = 10$

$0 = x^2 - 6x + 10$

$b^2 - 4ac$

$36 - 4(1)(10) = -4$ so 0 real solutions

$x = \frac{6 \pm \sqrt{-4}}{2} = \frac{6 \pm 2i}{2} = \frac{3 \pm i}{2}$

Solve each equation. Write your answers in the form a + bi.

20.) $x^2 + 8x + 20 = 0$

$b^2 - 4ac$

$64 - 4(1)(20) = -16$

$x = \frac{-8 \pm \sqrt{-16}}{2} = \frac{-8 \pm 4i}{2} = -4 \pm 2i$

21.) $x^2 - 6x + 11 = 0$

$x^2 - 6x + 11 = 0$

$b^2 - 4ac$

$36 - 4(1)(11) = -8$

$x = \frac{6 \pm \sqrt{-8}}{2}$

$x = \frac{6 \pm 2i\sqrt{2}}{2} = 3 \pm i\sqrt{2}$

Simplify:

22.) $\frac{(-3+3i)}{(3-3i)} \cdot \frac{(3+3i)}{(3+3i)} = \frac{-9-9i+9i+9i^2}{9-9i^2} = \frac{-18}{18} = -1$

23.) $(-2-i)(1+3i)$

$-2-6i-i-3i^2 \rightarrow 1-7i$

$-2-7i+3$

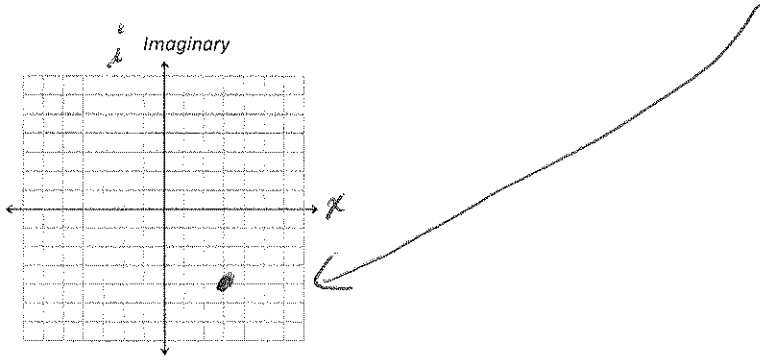
24.) $(2+7i)-(-2-6i)$

$4+13i$

25.) $(9-3i)+(-3-6i)$

$6-9i$

26.) Graph the complex number on the complex plane: $3-4i$




5.7 Find a quadratic function that exactly fits three data points.

Find a quadratic function that fits each set of data points exactly.

27.) (0, 6), (1, 0), (-2, -12)

$y = -5x^2 - x + 6$

28.) Find a quadratic model to represent the data set.

| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| y | 50 | 28 | 10 | -2 | 20 | 33 | 80 |

$y = 6.76x^2 + 3.93x + 4.24$

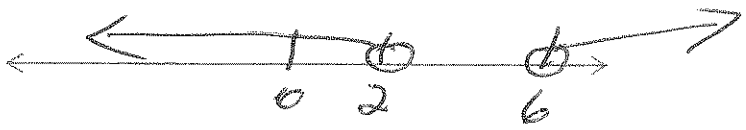
5.8 Solve and graph quadratic inequalities in one variable.

Solve each quadratic inequality and graph the solution on a number line.

29.) $x^2 - 8x + 12 > 0$

$(x-6)(x-2) > 0$

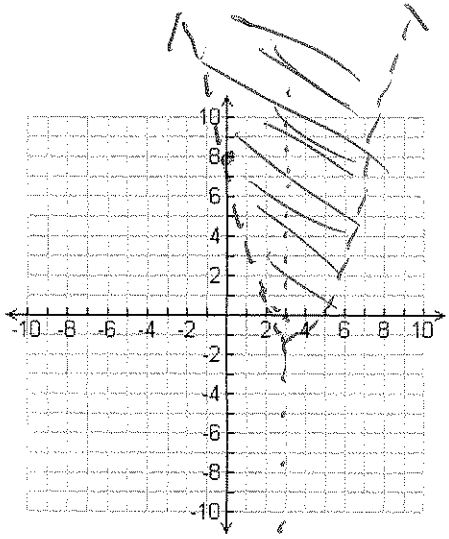
$x = 6, \ 2$




Graph each quadratic inequality on a coordinate plane.

30.) $y > x^2 - 6x + 8$

$\frac{-b}{2a} = \frac{6}{2} = 3$




31.) An athletic shoe wholesaler uses the table to determine the revenue for an order of pairs of shoes from various retail outlets.

| Number of pairs of shoes | Price per pair of shoes | Revenue per order |
|---|---|---|
| 1 | \$45 | \$40 |
| 5 | \$43 | \$215 |
| 100 | \$39 | \$3900 |
| 500 | \$35 | \$17,500 |

A. Determine the revenue function. $R(x) = -.01x^2 + 39.91x + 7.70$

B. What is the maximum revenue? \$39,822.90

C. How many pairs of shoes would result in maximum revenue? 1995.5