

HW: Worksheet/1-18

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Warm up:

Solve by using the Quadratic Formula.

1) $3x^2 - 7x - 1 = 0$

$$\frac{7 \pm \sqrt{49 - 4(3)(-1)}}{2(3)}$$

$$\frac{7 \pm \sqrt{49 + 12}}{6}$$

$$\frac{7 \pm \sqrt{61}}{6}$$

2) $x^2 + 2x + 9 = 0$

$$\frac{-2 \pm \sqrt{4 - 4(1)(9)}}{2(1)}$$

$$\frac{-2 \pm \sqrt{4 - 36}}{2}$$

$$\frac{-2 \pm \sqrt{-32}}{2}$$

no solution

$$y = x^2 + 4x + 1$$

x-intercepts



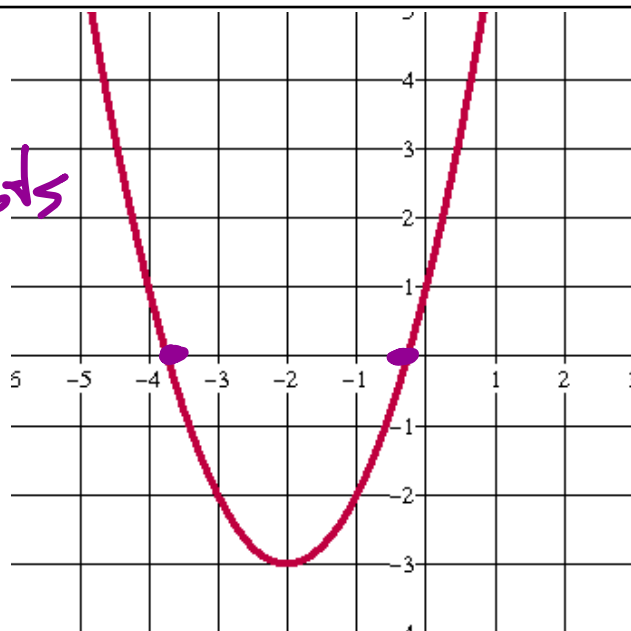
Finding the zeros

$$x^2 + 4x + 1 = 0$$

$$\frac{-4 \pm \sqrt{16 - 4(1)(1)}}{2}$$

$$\frac{-4 \pm \sqrt{16 - 4}}{2}$$

$$\frac{-4 \pm \sqrt{12}}{2} = \frac{-4 \pm 2\sqrt{3}}{2} = -2 \pm \sqrt{3}$$



$$-2 + \sqrt{3} \approx -0.27$$

$$-2 - \sqrt{3} \approx -3.73$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

How do we know when there is no solution to a quadratic equation?

$$\sqrt{-}$$

When are there two solutions?

$$\sqrt{+}$$

Can there be only one solution? How?

$$\sqrt{0}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Discriminant

$$b^2 - 4ac$$

discriminant

Positive	2 Real Roots
Zero	1 Real Root
Negative	0 Real Roots

Find the number of x-intercepts. Where is the vertex (above, below, or on the x-axis)?

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

$$b^2 - 4ac$$

$$36 - 4(1)(2)$$

$$36 - 8$$

$$28$$

2 x-intercepts
below

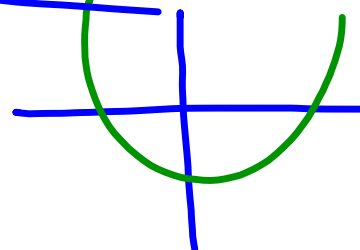
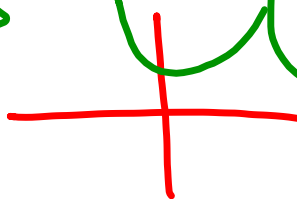
$$y = x^2 - 5x + 7$$

$$25 - 4(1)(7)$$

$$25 - 28$$

$$-3$$

0 x-intercepts
above



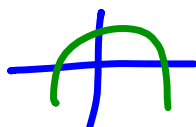
$$f(x) = -2x^2 + 3x + 2$$

$$9 - 4(-2)(2)$$

$$9 + 16$$

$$25$$

2 x-intercepts
above



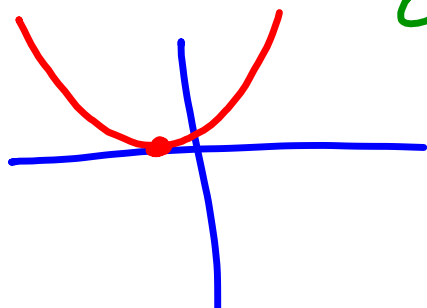
$$g(x) = x^2 + 2x + 1$$

$$4 - 4(1)(1)$$

$$4 - 4$$

$$0$$

1 x-intercept
on the
x-axis



HW Solutions

Determine how many x-intercepts the following functions have and whether the vertex lies above, below, or on the x-axis.

$$1) f(x) = 6x^2 - 7x - 4$$

$$49 - 4(6)(-4)$$

$$49 + 96 = 145$$

2 x-intercepts
below

$$2) h(x) = -4x^2 + 8x - 3$$

$$64 - 4(-4)(-3)$$

$$64 - 48 = 16$$

2 x-ints
above

$$3) A(x) = -x^2 + 6x - 9$$

$$36 - 4(-1)(-9)$$

$$36 - 36 = 0$$

1 x-int
on

$$4) q(x) = 5x^2 - 2x + 7$$

$$4 - 4(5)(7)$$

$$4 - 140$$

$$-136$$

0 x-ints
above

$$1) f(x) = 6x^2 - 7x - 4$$

$$2) h(x) = -4x^2 + 8x - 3$$

$$3) A(x) = -x^2 + 6x - 9$$

$$4) q(x) = 5x^2 - 2x + 7$$

