# 5.5 Quadratic Formula

solutions, roots
x intercepts,

Obj: 1. Use quad. formula to find real zeros of quadratic equations.

*2. Find vertex & axis of symmetry.

$ax^2+bx+c=0$

Quadratic Formula:

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

Nov 27-10:38 AM

Solve using the quadratic formula:

$x^2+5x-14=0$

$a=1 \quad b=5 \quad c=-14$

$$x=\frac{-5\pm\sqrt{25-4(1)(-14)}}{2}$$

$$=\frac{-5\pm\sqrt{25+56}}{2}=\frac{-5\pm\sqrt{81}}{2}=\frac{-5\pm9}{2}$$

$$=\frac{-5+9}{2} \quad \frac{-5-9}{2}$$

$x=2,-7$

Nov 27-11:01 AM

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

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

$$x = \frac{7 \pm \sqrt{49 - 4(1)(6)}}{2}$$

$$= \frac{7 \pm \sqrt{25}}{2} = \frac{7 \pm 5}{2}$$

$$= \frac{7+5}{2}, \frac{7-5}{2}$$

$$= 6, 1$$

Nov 27-11:05 AM

Solve. Give exact & approximate answers:

$4x^2 = 8 - 3x$

$-8 \quad +3x \quad -8 \quad +3x$

$4x^2 + 3x - 8 = 0$

$a=4 \quad b=3 \quad c=-8$

$$x = \frac{-3 \pm \sqrt{9 - 4(4)(-8)}}{8}$$

exact $= \frac{-3 \pm \sqrt{137}}{8}$

approx: $\left(\frac{-3+\sqrt{137}}{8}\right), \frac{-3-\sqrt{137}}{8}$

$\approx 1.1, -1.8$

Nov 27-11:10 AM

$2x^2 - 6x = -3$

$+3 \quad +3$

$2x^2 - 6x + 3 = 0$

$a = 2 \quad b = -6 \quad c = 3$

$$x = \frac{6 \pm \sqrt{36 - 4(2)(3)}}{4} = \frac{6 \pm \sqrt{12}}{4}$$

$\sqrt{4 \cdot 3}$

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

$\approx 2.4, .6$

Nov 27-11:14 AM

**Axis of Symmetry:**

If $y = ax^2 + bx + c$ then the axis of symmetry is: $x = \frac{-b}{2a}$

that's the x coordinate of the vertex.

Find the axis of symm. & vertex:

$f(x) = 19 + 8x + 2x^2$

$a = 2 \quad b = 8 \quad c = 19$

axis: $x = \frac{-8}{4}$ vertex: $(-2, 11)$ ($h$, $k$)

$x = -2$

$f(-2) = 19 + 8(-2) + 2(-2)^2$

$= 19 - 16 + 8 = 11$

vertex form: $y = a(x-h)^2 + k$

$y = 2(x+2)^2 + 11$

Nov 27-11:22 AM

Find axis/vertex/vertex form:

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

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

axis: $x = \frac{4}{2}$ vertex: $(2, -3)$

$x = 2$

$g(2) = 2^2 - 4(2) + 1$

$= -3$

vertex form: $y = 1(x-2)^2 - 3$

Nov 27-11:30 AM