

11 points possible

14.  $f(x) = 0$

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

$$a = 1, b = 4, c = 8$$

$$b^2 - 4ac = 4^2 - 4(1)(8) = 16 - 32 = -16$$

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

The zeros are  $-2 - 2i$  and  $-2 + 2i$ . 2pts

16.  $f(x) = 0$

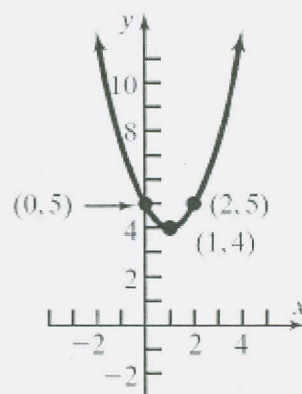
$$x^2 - 2x + 5 = 0$$

$$a = 1, b = -2, c = 5$$

$$b^2 - 4ac = (-2)^2 - 4(1)(5) = 4 - 20 = -16$$

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

The zeros are  $1 - 2i$  and  $1 + 2i$ .



15.  $f(x) = 0$

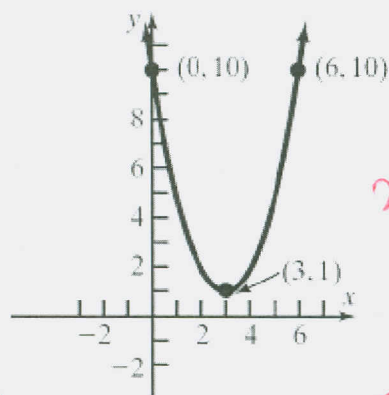
$$x^2 - 6x + 10 = 0$$

$$a = 1, b = -6, c = 10$$

$$b^2 - 4ac = (-6)^2 - 4(1)(10) = 36 - 40 = -4$$

$$x = \frac{-(-6) \pm \sqrt{-4}}{2(1)} = \frac{6 \pm 2i}{2} = 3 \pm i$$

The zeros are  $3 - i$  and  $3 + i$ .



2pts

23.  $f(x) = 0$

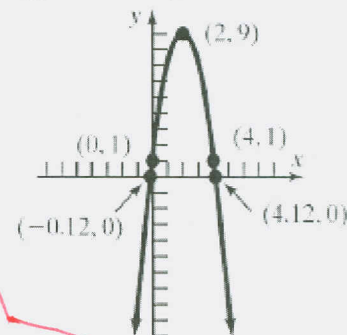
$$-2x^2 + 8x + 1 = 0$$

$$a = -2, b = 8, c = 1$$

$$b^2 - 4ac = 8^2 - 4(-2)(1) = 64 + 8 = 72$$

$$x = \frac{-8 \pm \sqrt{72}}{2(-2)} = \frac{-8 \pm 6\sqrt{2}}{-4} = \frac{4 \pm 3\sqrt{2}}{2} = 2 \pm \frac{3\sqrt{2}}{2}$$

The zeros are  $\frac{4 - 3\sqrt{2}}{2}$  and  $\frac{4 + 3\sqrt{2}}{2}$ , or approximately  $-0.12$  and  $4.12$ .



2pts

2 pts for context.

25.  $3x^2 - 3x + 4 = 0$

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

$$b^2 - 4ac = (-3)^2 - 4(3)(4) = 9 - 48 = -39$$

The equation has two complex solutions that are conjugates of each other. 1pt

27.  $2x^2 + 3x - 4 = 0$

$a = 2, b = 3, c = -4$

$b^2 - 4ac = 3^2 - 4(2)(-4) = 9 + 32 = 41$

The equation has two unequal real solutions.

→ 1 pt

29.  $9x^2 - 12x + 4 = 0$

$a = 9, b = -12, c = 4$

$b^2 - 4ac = (-12)^2 - 4(9)(4) = 144 - 144 = 0$

The equation has a repeated real solution.

→ 1 pt