Quadratic Formula

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

OR

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

Solve each using the quadratic formula.

$2x^2 - 3x - 5 = 0$

$2m^2 - 7m - 13 = -10$

$9n^2 = 4 + 7n$

$8n^2 + 7n - 15 = -7$

$8a^2 + 6a = -5$

$-\frac{6}{16} \pm \frac{\sqrt{-124}}{16}$

Complex Numbers

$i = \sqrt{-1}$

Simplify each imaginary number.

$\sqrt{-25}$

$\sqrt{25}\sqrt{-1}$

$5i$

$\sqrt{-81}$

$\sqrt{81} \cdot \sqrt{-1}$

$9i$

$-\sqrt{-100}$

$-(\sqrt{100} \cdot \sqrt{-1})$

$-10i$

$\pm\sqrt{-36}$

$\pm 6i$

$\sqrt{-3}$

$i\sqrt{3}$ $\sqrt{3}i$

Operations of Complex Numbers

Standard form
$a+bi$

$i=\sqrt{-1}$

$i^2=-1$

$i+6i$

$7i$

$-3+6i-(-5-3i)-8i$

$-3+6i+5+3i-8i$

$2+i$

$(-2-i)(4+i)$

$-8-2i-4i-i^2$

$-8-6i-(-1)$

$-7-6i$

$(2+3i)(2-3i)$

$4-6i+6i-9i^2$

$4-9(-1)$

13

$-1-8i-4-i$

$-5-9i$

$4i(-2-8i)$

$-8i-32i^2$

$-8i-32(-1)$

$-8i+32$

$32-8i$

$(8+3i)^2$

$(8+3i)(8+3i)$

$64+24i+24i+9i^2$

$64+48i+9(-1)$

$55+48i$

Rational
No square Roots
No i

Irrational
Square Root
No i

Complex
Has i

Solve Each Quadratic. Tell whether the solution is rational, irrational, or complex

$x^2 - 5x + 10 = 0$

$\frac{5 \pm \sqrt{(-5)^2 - 4(1)(10)}}{2}$

$\frac{5 \pm \sqrt{25 - 40}}{2}$

$\frac{5 \pm \sqrt{-15}}{2}$ Complex

$\frac{5 \pm i\sqrt{15}}{2}$ $\frac{5}{2} \pm \frac{\sqrt{15}}{2}i$

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

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

$(x+2)^2 = 2$

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

$x = -2 \pm \sqrt{2}$ Irrational

$-x^2 + 5x - 6 = 0$

$x^2 - 5x + 6 = 0$

$(x-3)(x-2) = 0$

$x - 3 = 0 \quad x - 2 = 0$

$x = 3 \quad x = 2$

Rational #

$a^2 - 5a + 8 = 0$

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

$-\frac{4}{2} \pm \frac{\sqrt{8}}{2}$

$x^2 + 6x + 12 = 0$

$10x^2 - 11x + 9 = 13x - 6x^2$