<table>
<tr><td>

EXAMPLE:

$$f(x) = 2x^2 + 6x + 2$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(6) \pm \sqrt{(6)^2 - 4(2)(2)}}{2(2)}$$

$$= \frac{-6 \pm \sqrt{36 - 16}}{4} = \frac{-6 \pm \sqrt{20}}{4}$$

Simplify the $\sqrt{20}$ as much as you can:

$$\frac{-6 \pm \sqrt{20}}{4} = \frac{-6 \pm \sqrt{4}\sqrt{5}}{4} = \frac{-6 \pm 2\sqrt{5}}{4}$$

Since you can't add/subtract the top, split the fraction.

$$= -\frac{6}{4} \pm \frac{2\sqrt{5}}{4}$$

Simplify each fraction. ***Leave $\sqrt{5}$ as it is!***

$$= -\frac{6 \div 2}{4 \div 2} \pm \frac{2 \div 2}{4 \div 2}\sqrt{5} = -\frac{3}{2} \pm \frac{1\sqrt{5}}{2}$$

The roots are:

$$\boxed{x = -\frac{3}{2} \pm \frac{\sqrt{5}}{2}}$$

</td><td>

EXAMPLE:

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

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(2) \pm \sqrt{(2)^2 - 4(-3)(-4)}}{2(-3)}$$

$$= \frac{-2 \pm \sqrt{4 - 48}}{-6} = \frac{-2 \pm \sqrt{-44}}{-6}$$

Simplify the $\sqrt{-44}$ as much as you can:

$$\frac{-2 \pm \sqrt{-44}}{-6} = \frac{-2 \pm i\sqrt{4}\sqrt{11}}{-6} = \frac{-2 \pm 2i\sqrt{11}}{-6}$$

Since you can't add/subtract the top, split the fraction.

$$= \frac{-2}{-6} \pm \frac{2i\sqrt{11}}{-6}$$

Simplify each fraction. ***Leave $i\sqrt{11}$ as it is!***

$$= \frac{-2 \div -2}{-6 \div -2} \pm \frac{2 \div 2}{-6 \div 2}i\sqrt{11} = \frac{1}{3} \pm -\frac{1\sqrt{5}}{3}$$

The roots are:

$$\boxed{x = \frac{1}{3} \mp \frac{i\sqrt{11}}{3}}$$

</td></tr>
</table>

Use the quadratic formula to determine the zeros (also known as roots, solutions, & x-intercepts).

1. $f(x) = x^2 + 2x + 8$	2. $g(x) = x^2 + 2x - 6$	3. $h(x) = 3x^2 - 12x + 2$

4. $j(x) = -x^2 - 5x + 5$	5. $k(x) = 3x^2 + 6x - 2$	6. $m(x) = -4x^2 + 8x - 5$
7. $n(x) = x^2 + 10x + 5$	8. $p(x) = -x^2 - 4x + 3$	9. $r(x) = 2x^2 - 2x - 1$
10. $t(x) = -2x^2 + 5x + 2$	11. $w(x) = x^2 + 4x + 20$	12. $z(x) = 10x + 3x - 1$

Answers

1. $x = -1 \pm i\sqrt{7}$	2. $x = -1 \pm \sqrt{7}$	3. $x = 2 \pm \frac{\sqrt{30}}{3}$
4. $x = -\frac{5}{2} \mp \frac{3\sqrt{5}}{2}$	5. $x - 1 \pm \frac{\sqrt{15}}{3}$	6. $x = 1 \pm \frac{i}{2}$ same as $x = 1 \pm \frac{1}{2}i$
7. $x = -5 \pm 2\sqrt{5}$	8. $x = -2 \mp \sqrt{7}$	9. $x = \frac{1}{2} \pm \frac{\sqrt{3}}{2}$
10. $x = \frac{5}{4} \pm \frac{\sqrt{41}}{4}$	11. $x = -2 \pm 4i$	12. $x = \frac{1}{5}$ or $x = -\frac{1}{5}$