

❖ Solve using the Quadratic Formula → $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

❖ Express answers in simplest radical form or complex form. NO DECIMALS!!

1. $4x^2 + 11x - 20 = 0$

$$\frac{-11 \pm \sqrt{121 - 4(4)(-20)}}{8}$$

$$\frac{-11 \pm \sqrt{441}}{8} \quad \frac{-11 \pm 21}{8}$$

$$\frac{-11 + 21}{8} = \frac{10}{8} = \frac{5}{4}$$

$$\frac{-11 - 21}{8} = \frac{-32}{8} = -4$$

2. $x^2 - 5x - 24 = 0$

$$(x-8)(x+3) = 0$$

$$x-8=0 \quad x+3=0$$

$$x=8 \quad x=-3$$

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

$$\frac{3 \pm \sqrt{9 + 12}}{2}$$

$$\frac{3 \pm \sqrt{21}}{2}$$

4. $x^2 + 5x + 5 = 0$

$$\frac{-5 \pm \sqrt{25 - 20}}{2}$$

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

5. $x^2 = -x + 1$

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

$$\frac{-1 \pm \sqrt{1 + 4}}{2}$$

$$\frac{-1 \pm \sqrt{5}}{2}$$

6. $4x^2 + 8x = 1$

$$4x^2 + 8x - 1 = 0$$

$$\frac{-8 \pm \sqrt{64 + 16}}{8}$$

$$\frac{-8 \pm \sqrt{80}}{8}$$

$$\frac{-8 \pm 4\sqrt{5}}{8}$$

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

7. $4x^2 + 7x - 15 = 0$

$$\frac{-7 \pm \sqrt{49 + 240}}{8}$$

$$\frac{-7 \pm 17}{8}$$

$$\frac{-7 + 17}{8} = \frac{10}{8} = \frac{5}{4}$$

$$\frac{-7 - 17}{8} = \frac{-24}{8} = -3$$

8. $x^2 + 3x = 10$
 $x^2 + 3x - 10 = 0$
 $(x+5)(x-2) = 0$
 $x = -5 \quad x = 2$

9. $x^2 - x + 3 = 0$

$$\frac{1 \pm \sqrt{1 - 12}}{2}$$

$$\frac{1 \pm i\sqrt{11}}{2}$$

$$\frac{1 \pm \sqrt{-11}}{2}$$

10. $2x^2 - 14x = -23$

$$2x^2 - 14x + 23 = 0$$

$$\frac{14 \pm \sqrt{196 - 184}}{4}$$

$$\frac{14 \pm \sqrt{12}}{4}$$

$$\frac{14 \pm 2\sqrt{3}}{4} = \frac{7 \pm \sqrt{3}}{2}$$

11. $x^2 = 2x + 48$

$$x^2 - 2x - 48 = 0$$

$$(x-8)(x+6) = 0$$

$$x = 8 \quad x = -6$$

12. $2x^2 + 39 = -18x$

$$2x^2 + 18x + 39 = 0$$

$$\frac{-18 \pm \sqrt{324 - 312}}{4}$$

$$\frac{-18 \pm \sqrt{12}}{4}$$

$$\frac{-9 \pm \sqrt{3}}{2}$$

13. $5x^2 + 3x + 1 = 0$

$$\frac{-3 \pm \sqrt{9 - 20}}{10}$$

$$\frac{-3 \pm \sqrt{-11}}{10}$$

$$\frac{-3 \pm i\sqrt{11}}{10}$$

14. $5x^2 + 50x + 125 = 0$

$$5(x^2 + 10x + 25) = 0$$

$$5(x+5)(x+5) = 0$$

$$5 = 0 \quad x+5 = 0$$

$$x = -5$$

$$x = -5$$

Solve using the best method: Factoring, Completing the Square or Quadratic Formula
Express all solutions in simplest form.

<p>1. $x^2 + 4x - 9 = 13$ $A=1$ $B=4$ $C=-22$ $x^2 + 4x - 22$ $\frac{-4 \pm \sqrt{(4)^2 - 4(1)(-22)}}{2}$ $\frac{-4 \pm \sqrt{16+88}}{2}$ $\frac{-4 \pm \sqrt{104}}{2}$ $\frac{-4 \pm 2\sqrt{26}}{2}$ $-2 \pm \sqrt{26}$</p>	<p>2. $x^2 + 7x + 12 = 0$ $(x+3)(x+4) = 0$ $x = -3, -4$</p>
<p>3. $7(x-3)^2 = 35$ $x^2 - 6x + 9 = 5$ $x^2 - 6x + 4 = 0$ $\frac{6 \pm \sqrt{36-16}}{2}$ $\frac{6 \pm \sqrt{20}}{2}$ $\frac{6 \pm 2\sqrt{5}}{2}$ $3 \pm \sqrt{5}$</p>	<p>4. $4x^2 = 36$ $x^2 = 9$ $x^2 - 9 = 0$ $(x-3)(x+3)$ $x = 3, -3$</p>
<p>5. $x^2 = 81$ $x^2 - 81 = 0$ $(x-9)(x+9)$ $x = 9, -9$</p>	<p>6. $x^2 + 9x + 38 = 13$ $x^2 + 9x + 25 = 0$ $\frac{-9 \pm \sqrt{81-100}}{2}$ $\frac{-9 \pm \sqrt{-19}}{2}$ $\frac{-9 \pm i\sqrt{19}}{2}$</p>
<p>7. $3x^2 - 6x = 13$ $3x^2 - 6x - 13$ $\frac{6 \pm \sqrt{36-4(3)(-13)}}{6}$ $\frac{6 \pm \sqrt{192}}{6}$ $\frac{6 \pm 8\sqrt{3}}{6}$ $\frac{3 \pm 4\sqrt{3}}{3}$</p>	<p>8. $x^2 + 6x - 8 = 0$ $\frac{-6 \pm \sqrt{36+32}}{2}$ $\frac{-6 \pm \sqrt{68}}{2}$ $\frac{-6 \pm 2\sqrt{17}}{2}$ $-3 \pm \sqrt{17}$</p>
<p>9. $x^2 = 3x + 8$ $x^2 - 3x - 8 = 0$ $\frac{3 \pm \sqrt{9+32}}{2}$ $\frac{3 \pm \sqrt{41}}{2}$</p>	<p>10. $x^2 - 121 = 0$ $(x-11)(x+11) = 0$ $x = 11, -11$</p>
<p>11. $(x+2)^2 - 6 = 11$ $x^2 + 4x + 4 - 6 = 11$ $x^2 + 4x - 2 = 11$ $x^2 + 4x - 13 = 0$ $\frac{-4 \pm \sqrt{16+52}}{2}$ $\frac{-4 \pm \sqrt{68}}{2}$ $\frac{-4 \pm 2\sqrt{17}}{2}$ $-2 \pm \sqrt{17}$</p>	<p>12. $5x^2 - 7x + 13 = 0$ $\frac{7 \pm \sqrt{49-260}}{10}$ $\frac{7 \pm \sqrt{-211}}{10} = \frac{7 \pm i\sqrt{211}}{10}$</p>

Solve by FACTORING.

1.) $x^2 - 64 = 0$
 $(x-8)(x+8) = 0$
 $x = -8, 8$

2.) $8x^2 - 2x - 18 = -15$
 $8x^2 - 2x - 3 = 0$
 $x^2 - 2x - 24 = 0$
 $(x-6)(x+4) = 3/4, -1/2$

3.) $x^2 + 3x = 40$
 $x^2 + 3x - 40 = 0$
 $(x+8)(x-5) = 0$
 $x = -8, 5$

4.) $2x^2 + 3x + 1 = 0$
 $x^2 + 3x + 2 = 0$
 $(x+2)(x+1) = 0$
 $(x+1)(2x+1) = 0$
 $x = -1, -1/2$

5.) $4x^2 - 8x = -3$
 $4x^2 - 8x + 3 = 0$
 $x^2 - 8x + 12 = 0$
 $(x-2)(x-6) = 0$
 $(2x-1)(2x-3) = 0$
 $x = 1/2, 3/2$

6.) $3x^2 + 15x - 42 = 0$
 $3(x^2 + 5x - 14) = 0$
 $3(x+7)(x-2) = 0$
 $x = -7, 2$

Solve by COMPLETING THE SQUARE.

7.) $4x^2 - 8x - 3 = 0$
 $x^2 - 8x - 12 = 0$
 $x^2 - 8x + 16 = 12 + 16$
 $\sqrt{(x-4)^2} = \sqrt{28}$
 $x - 4 = \pm 2\sqrt{7}$
 $x = \frac{4 \pm 2\sqrt{7}}{4}$
 $x = \frac{2 \pm \sqrt{7}}{2}$

8.) $3x^2 + 6x - 42 = 0$
 $x^2 + 6x - 12 = 0$
 $x^2 + 6x + 9 = 12 + 9$
 $\sqrt{(x+3)^2} = \sqrt{21}$
 $x + 3 = \pm \sqrt{21}$
 $x + 3 = \pm 3\sqrt{15}$
 $x = \frac{-3 \pm 3\sqrt{15}}{3} = -1 \pm \sqrt{15}$

Find the discriminant for each equation. Then describe the number and type of roots.

9.) $2x^2 - 3x - 1 = 0$
 $b^2 - 4ac$
 $(-3)^2 - 4(2)(-1)$
 17
 2 real irrational

10.) $x^2 + 4x = -7$
 $x^2 + 4x + 7 = 0$
 $(4)^2 - 4(1)(7)$
 -12
 2 imaginary

11.) $x^2 + 9 = 6x$
 $x^2 - 6x + 9 = 0$
 $(-6)^2 - 4(1)(9)$
 0
 1 real rational solution

Solve using the QUADRATIC FORMULA.

12.) $2x^2 + 5x = -3$

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

$\frac{-5 \pm \sqrt{25 - 24}}{4} = \frac{-5 \pm \sqrt{1}}{4}$

$\frac{-5+1}{4} = -1$ $\frac{-5-1}{4} = -\frac{6}{4} = -\frac{3}{2}$

$-1, -\frac{3}{2}$

13.) $2x^2 - 7 = -x$

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

$\frac{-1 \pm \sqrt{1 + 56}}{4}$
 $\frac{-1 \pm \sqrt{57}}{4}$

14.) $3x^2 - 2x - 5 = 0$

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

$(x-5)(x+3) = 0$

$x = 5, -3$

15.) $x^2 - 2x + 5 = 0$

$\frac{2 \pm \sqrt{4 - 20}}{2}$

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

$\frac{2 \pm 4i}{2} = 1 \pm 2i$

16.) $2x^2 = 6x + 9$

$2x^2 - 6x - 9 = 0$

$A=2 \quad B=-6 \quad C=-9$

$\frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(-9)}}{2(2)}$

$\frac{6 \pm \sqrt{108}}{4}$

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

$\frac{3 \pm 3\sqrt{3}}{2}$

17.) $x^2 + 2x + 1 = -15$

$x^2 + 2x + 16 = 0$

$\frac{-2 \pm \sqrt{4 - 64}}{2}$

$\frac{-2 \pm \sqrt{-60}}{2}$

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

$-1 \pm i\sqrt{15}$

18.) Which method can't you use to solve this problem? $x^2 - 47 = 0$

Circle one:

Factoring

Complete the Square

Quadratic Formula

Solve:

$\frac{-(-0) \pm \sqrt{0^2 - 4(1)(-47)}}{2}$ $\pm \frac{\sqrt{188}}{2}$

$\frac{\pm 2\sqrt{47}}{2} = \pm \sqrt{47}$

19.) What would be the BEST method for solving this problem? $x^2 + 7x = 0$

Circle one:

Factoring

Square Roots

Quadratic Formula

Solve:

$x(x+7) = 0$

$x = 0 \quad x = -7$

20.) Identify the two mistakes in setting up the quadratic formula. Write the formula correctly & solve:

$x = 2, -\frac{3}{2}$

Solve: $2x^2 - x - 6 = 0$

$x = \frac{(-1) \pm \sqrt{(-1)^2 - 4(2)(6)}}{2(2)}$ should be (-6)

$x^2 - x - 12 = 0$

$(x-4)(x+3) = 0$

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

Opp. of B would be $-(-1)$