**Practice**
**Solving Equations: Solving Quadratics by Factoring or Quadratic Formula**

Answer these problems, then check your answers using the key on the next page. If you missed something, look at the solutions after the answer key, and if you still don't understand, watch the review video again.

#1) Solve the quadratic equation twice (use factoring and quadratic formula): $x^2 - 3x - 10 = 0$

Factoring Quadratic Formula

#2) Solve the quadratic equation twice (use factoring and quadratic formula): $2x^2 - 9x - 5 = 0$

Factoring Quadratic Formula

#3) Solve the quadratic equation twice (use factoring and quadratic formula): $2x^2 + 3x = 2$

Factoring Quadratic Formula

#4) If the solutions to a quadratic equation are $x=-3$ and $x=2$:

a) Is it okay to write the answer as $(-3, 2)$? Why, or why not?

b) Is it okay to write the answer as $\{-3, 2\}$? Why, or why not?

#5) Solve the quadratic equation twice (use factoring and quadratic formula): $a^2+10a+21=0$

Factoring Quadratic Formula

#6) Solve the quadratic equation twice (use factoring and quadratic formula): $2m^2+64=24m$

Factoring Quadratic Formula

#7) Solve the quadratic equation twice (use factoring and quadratic formula): $0=28c-21c^2$

Factoring Quadratic Formula

#8) Solve the quadratic equation twice (use factoring and quadratic formula): $x^2 - 2x = 11$

Factoring

Quadratic Formula

#9) Solve the quadratic equation twice (use factoring and quadratic formula): $2x^2 + 7x + 4 = 0$

Factoring

Quadratic Formula

**Answers:**

#1) $x=-2,\ x=5$

#2) $x=-\frac{1}{2},\ x=5$

#3) $x=-2,\ x=\frac{1}{2}$

#4) (a) No (b) Yes (see solutions)

#5) $a=-7,\ a=-3$

#6) $m=4,\ m=8$

#7) $c=0,\ c=\frac{4}{3}$

#8) $x=1+2\sqrt{3},\quad x=1-2\sqrt{3}$

#9) $x=\frac{-7+\sqrt{17}}{4},\quad x=\frac{-7-\sqrt{17}}{4}$

**Solutions:**

#1) Solve the quadratic equation twice (use factoring and quadratic formula): $x^2 - 3x - 10 = 0$

Factoring

$x^2 - 3x - 10 = 0$

$(x+2)(x-5) = 0$

$x+2=0$ $\quad$ $x-5=0$

$x=-2$ $\quad$ $x=5$

| M | A |
|---|---|
| -10 | -3 |
| 1, -10 | -9 |
| -1, 10 | 9 |
| 2, -5 | -3 ← |
| -2, 5 | 3 |

Quadratic Formula

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ $\quad a=1,\ b=-3,\ c=-10$

$x = \frac{-(-3) \pm \sqrt{(-3)^2-4(1)(-10)}}{2(1)}$

$x = \frac{3 \pm \sqrt{9+40}}{2}$

$x = \frac{3 \pm \sqrt{49}}{2}$

$x = \frac{3 \pm 7}{2}$

$x = \frac{3+7}{2}$ $\quad x=5$ $\quad x = \frac{3-7}{2}$ $\quad x=-2$

#2) Solve the quadratic equation twice (use factoring and quadratic formula): $2x^2 - 9x \quad 5 \quad 0$

Factoring

$2x^2 - 9x - 5 = 0$

$(2x+1)(2x-10) = 0$

$\frac{(2x+1)}{1}\frac{(2x-10)}{2}$

$(2x+1)(x-5) = 0$

$2x+1=0$ $\quad$ $x-5=0$

$-1 \quad -1$ $\quad x=5$

$2x = -1$

$\frac{2x}{2} = \frac{-1}{2}$

$x = -\frac{1}{2}$

| M | A |
|---|---|
| -10 | -9 |
| 1, -10 | -9 ← |
| -1, 10 | 9 |
| 2, -5 | -3 |
| -2.5 | 3 |

Quadratic Formula

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ $\quad a=2,\ b=-9,\ c=-5$

$x = \frac{-(-9) \pm \sqrt{(-9)^2-4(2)(-5)}}{2(2)}$

$x = \frac{9 \pm \sqrt{81+40}}{4}$

$x = \frac{9 \pm \sqrt{121}}{4}$

$x = \frac{9 \pm 11}{4}$

$x = \frac{9+11}{4}$ $\quad x=5$ $\quad x = \frac{9-11}{4} = \frac{-2}{4}$ $\quad x = -\frac{1}{2}$

#3) Solve the quadratic equation twice (use factoring and quadratic formula): $2x^2 + 3x = 2$

Factoring

(move everything left to get zero on right)

$2x^2 + 3x = 2$

$-2 \quad -2$

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

$(2x-1)(2x+4) = 0$

$\frac{(2x-1)}{1}\frac{(2x+4)}{2}$

$(2x-1)(x+2) = 0$

$2x-1=0$ $\quad$ $x+2=0$

$2x = 1$ $\quad x=-2$

$x = \frac{1}{2}$

| M | A |
|---|---|
| -4 | 3 |
| 1, -4 | -3 |
| -1, 4 | 3 ← |
| 2, -2 | 0 |

Quadratic Formula

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

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ $\quad a=2,\ b=3,\ c=-2$

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

$x = \frac{-3 \pm \sqrt{9+16}}{4}$

$x = \frac{-3 \pm \sqrt{25}}{4}$

$x = \frac{-3 \pm 5}{4}$

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

#4) If the solutions to a quadratic equation are $x = -3$ and $x = 2$:

a) Is it okay to write the answer as $(-3, 2)$? Why, or why not?

No, $(x, y)$ used for x, y coordinates of a point, These are both x,

b) Is it okay to write the answer as $\{-3, 2\}$? Why, or why not?

Yes $\{$item, item, item$\}$ is another way to show a 'set' or 'list'

#5) Solve the quadratic equation twice (use factoring and quadratic formula): $a^2 + 10a + 21 = 0$

Factoring

$a^2+10a+21=0$

$(a+7)(a+3)=0$

$a+7=0$ $\quad$ $a+3=0$

$\boxed{a=-7}$ $\quad$ $\boxed{a=-3}$

| M | A |
|---|---|
| 21 | 10 |
| 1, 21 | 22 |
| -1, -21 | -22 |
| 7, 3 | 10 ✓ |
| -7, -3 | -10 |

Quadratic Formula

$a = \dfrac{-b \pm \sqrt{b^2-4ac}}{2a}$ $\quad a=1,\ b=10,\ c=21$

$a = \dfrac{-(10) \pm \sqrt{(10)^2-4(1)(21)}}{2(1)}$

$a = \dfrac{-10 \pm \sqrt{100-84}}{2}$

$a = \dfrac{-10 \pm \sqrt{16}}{2}$

$a = \dfrac{-10 \pm 4}{2}$

$a = \dfrac{-10+4}{2}$ $\quad a = \dfrac{-10-4}{2}$

$\boxed{a=-3}$ $\quad \boxed{a=-7}$

#6) Solve the quadratic equation twice (use factoring and quadratic formula): $2m^2 + 64 = 24m$

Factoring

$2m^2+64=24m$

$-24m \quad -24m$

$2m^2-24m+64=0$

$2(m^2-12m+32)=0$

$2(m-4)(m-8)=0$

$m-4=0$ $\quad$ $m-8=0$

$\boxed{m=4}$ $\quad$ $\boxed{m=8}$

| M | A |
|---|---|
| 32 | -12 |
| 1, 32 | 33 |
| -1, -32 | -33 |
| 2, 16 | 18 |
| -2, -16 | -18 |
| 4, 8 | 12 |
| -4, -8 | -12 ✓ |

Quadratic Formula

$2m^2-24m+64=0$

$m = \dfrac{-b \pm \sqrt{b^2-4ac}}{2a}$ $\quad a=2,\ b=-24,\ c=64$

$m = \dfrac{-(-24) \pm \sqrt{(-24)^2-4(2)(64)}}{2(2)}$

$m = \dfrac{24 \pm \sqrt{576-512}}{4}$

$m = \dfrac{24 \pm \sqrt{64}}{4}$

$m = \dfrac{24 \pm 8}{4}$

$m = \dfrac{24+8}{4}$ $\quad m = \dfrac{24-8}{4}$

$\boxed{m=8}$ $\quad \boxed{m=4}$

#7) Solve the quadratic equation twice (use factoring and quadratic formula): $0 = 28c - 21c^2$

Factoring

$28c - 21c^2 = 0$

$(7c)(4 - 3c) = 0$

$7c = 0$ | $4 - 3c = 0$

$\frac{7c}{7} = \frac{0}{7}$ | $-4 \quad -4$

$c = 0$ | $\frac{-3c}{-3} = \frac{-4}{-3}$

$c = \frac{4}{3}$

Quadratic Formula

$0 = 28c - 21c^2$

$-21c^2 + 28c + 0 = 0$

$c = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $a = -21, b = 28, c = 0$

$c = \frac{-(28) \pm \sqrt{(28)^2 - 4(-21)(0)}}{2(-21)}$

$c = \frac{-28 \pm \sqrt{784 + 0}}{-42}$

$c = \frac{-28 \pm 28}{-42}$

$c = \frac{-28 + 28}{-42}$ $c = \frac{-28 - 28}{-42}$

$c = 0$ $c = \frac{-56}{-42} = \frac{4}{3}$

#8) Solve the quadratic equation twice (use factoring and quadratic formula): $x^2 - 2x = 11$

Factoring

$x^2 - 2x = 11$

$-11 \quad -11$

$x^2 - 2x - 11 = 0$

$(x \quad)(x \quad) = 0$

no integer factorization possible

| M | A |
|---|---|
| -11 | -2 |
| 1, -11 | -10 |
| -1, 11 | 10 |

Quadratic Formula

$x^2 - 2x - 11 = 0$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $a = 1, b = -2, c = -11$

$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-11)}}{2(1)}$

$x = \frac{2 \pm \sqrt{4 + 44}}{2}$

$x = \frac{2 \pm \sqrt{48}}{2}$

$x = \frac{2 \pm \sqrt{16}\sqrt{3}}{2}$

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

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

$x = 1 \pm 2\sqrt{3}$

$x = 1 + 2\sqrt{3}$ $x = 1 - 2\sqrt{3}$

#9) Solve the quadratic equation twice (use factoring and quadratic formula): $2x^2 + 7x + 4 = 0$

Factoring

$2x^2 + 7x + 4 = 0$

$(2x \quad)(2x \quad) = 0$

no integer factorization possible

| M | A |
|---|---|
| 8 | 7 |
| 1, 8 | 9 |
| -1, -8 | -9 |
| 2, 4 | 6 |
| -2, -4 | -6 |

Quadratic Formula

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $a = 2, b = 7, c = 4$

$x = \frac{-(7) \pm \sqrt{(7)^2 - 4(2)(4)}}{2(2)}$

$x = \frac{-7 \pm \sqrt{49 - 32}}{4}$

$x = \frac{-7 \pm \sqrt{17}}{4}$

$x = \frac{-7 + \sqrt{17}}{4}$ $x = \frac{-7 - \sqrt{17}}{4}$