

Name _____

Date _____

Quadratic Equations

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Solve each equation by factoring.

1) $n^2 - 3n = 0$

2) $p^2 - 2p - 15 = 0$

3) $2x^2 - 7x - 49 = 0$

4) $3r^2 + 8r - 3 = 0$

Solve each equation by taking square roots.

5) $-n^2 = -12$

6) $x^2 + 4 = 19$

Solve each equation by completing the square.

7) $a^2 + 10a + 18 = 9$

8) $v^2 - 12v - 81 = -9$

Quadratic Equations

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Solve each equation by factoring.

$$1) \frac{n^2}{n} - \frac{3n}{n} = 0 \quad \text{GCF}$$

$$n(n-3) = 0$$

$$\boxed{n=0} \quad \begin{array}{r} n-3=0 \\ +3 \quad +3 \end{array}$$

$$\boxed{n=3}$$

$$2) p^2 - 2p - 15 = 0 \quad \text{Trinomial } a > 1$$

$$\begin{array}{r} -15 \\ 3 \times -5 \\ -2 \end{array}$$

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

$$\begin{array}{r} p+3=0 \\ -3 \quad -3 \end{array} \quad \begin{array}{r} p-5=0 \\ 5 \quad 5 \end{array}$$

$$\boxed{p=-3}$$

$$\boxed{p=5}$$

$$3) 2x^2 - 7x - 49 = 0 \quad \text{Trinomial } a > 1$$

$$x^2 - 7x - 98 = 0 \quad \begin{array}{r} -98 \\ -14 \times 7 \\ -7 \end{array}$$

$$(x-14)\left(\frac{x+7}{2}\right) = 0$$

$$(x-7)(2x+7) = 0$$

$$x-7=0 \quad 2x+7=0$$

$$\boxed{x=7}$$

$$\frac{2x}{2} = \frac{-7}{2}$$

$$\boxed{x = -\frac{7}{2}}$$

Solve each equation by taking square roots.

$$5) \frac{n^2}{-1} = \frac{-12}{-1}$$

$$\sqrt{n^2} = \sqrt{12}$$

$$\boxed{n = \pm 2\sqrt{3}}$$

$$4) 3r^2 + 8r - 3 = 0 \quad \text{Trinomial } a > 1$$

$$r^2 + 8r - 9 = 0 \quad \begin{array}{r} -9 \\ 9 \times -1 \\ 8 \end{array}$$

$$\left(\frac{r+9}{3}\right)\left(\frac{r-1}{3}\right) = 0$$

$$(r+3)(3r-1) = 0$$

$$r+3=0 \quad 3r-1=0$$

$$\boxed{r=-3}$$

$$\frac{3r}{3} = \frac{1}{3}$$

$$\boxed{r = \frac{1}{3}}$$

$$6) \frac{x^2}{-4} + 4 = 19$$

$$\sqrt{x^2} = \sqrt{15}$$

$$\boxed{x = \pm \sqrt{15}}$$

Solve each equation by completing the square.

$$7) a^2 + 10a + 18 = 9$$

$$\frac{10}{2} = 5 \quad \frac{10}{2} = 5$$

$$\sqrt{(a+5)^2} = \sqrt{16}$$

$$\begin{array}{r} a+5 = \pm 4 \\ -5 \quad -5 \end{array}$$

$$a = -5 \pm 4$$

$$a = -5 + 4 \quad a = -5 - 4$$

$$\boxed{a = -1}$$

$$\boxed{a = -9}$$

$$8) v^2 - 12v - 81 = -9$$

$$\frac{12}{2} = 6 \quad \frac{12}{2} = 6$$

$$\sqrt{(v-6)^2} = \sqrt{108}$$

$$v-6 = \pm 6\sqrt{3}$$

$$+6 \quad +6$$

$$\boxed{v = 6 \pm 6\sqrt{3}}$$

$$ax^2 + bx + c = 0$$

$$\left(\frac{b}{2}\right)^2$$

$$\left(\frac{-12}{2}\right)^2 = 36$$

$$\begin{array}{r} 36 \\ -6 \times -6 \\ -12 \end{array}$$

$$(x-6)(x-6)$$