Solve $3x^2 - 12x - 15 = 0$ by completing the square.

$x^2 - 4x - 5 = 0$

$x^2 - 4x + 4 = 5 + 4$

$(x-2)^2 = 9$

$x - 2 = \pm 3$

$x = 2 \pm 3$

$x = 5, -1$

Solve $4n^2 - 24n - 56 = 8$ by completing the square.

$n^2 - 6n - 14 = 2$

$n^2 - 6n + 9 = 16 + 9$

$(n-3)^2 = 25$

$n - 3 = \pm 5$

$n = 3 \pm 5$

$n = -2, 8$

Solve $\frac{2x^2}{2} - \frac{3x}{2} = \frac{20}{2}$ by completing the square.

$10 + \frac{9}{16}$

$\frac{160}{16} + \frac{9}{16}$

$\frac{169}{16}$

$x^2 - \frac{3}{2}x + \frac{9}{16} = 10 + \frac{9}{16}$

$\sqrt{\left(x - \frac{3}{4}\right)^2} = \sqrt{\frac{169}{16}}$

$x - \frac{3}{4} = \pm \frac{13}{4}$

$x = \frac{3}{4} \pm \frac{13}{4}$

$\frac{3+13}{4}$ $\quad$ $\frac{3-13}{4}$

$\frac{16}{4}$ $\quad$ $\frac{-10}{4}$

4 $\quad$ $-\frac{5}{2}$

Solve $3r^2 - 2r = 21$ by completing the square.

$7 + \frac{1}{9}$

$\frac{63}{9} + \frac{1}{9}$

$r^2 - \frac{2}{3}r + \frac{1}{9} = 7 + \frac{1}{9}$

$(r - \frac{1}{3})^2 = \frac{64}{9}$

$r - \frac{1}{3} = \pm \frac{8}{3}$

$r = \frac{1}{3} \pm \frac{8}{3}$

$\frac{1}{3} + \frac{8}{3}$ $\quad$ $\frac{1}{3} - \frac{8}{3}$

3 $\quad$ $-\frac{7}{3}$

$r^2 - \frac{2}{3}r + \frac{4}{36} = 7 + \frac{4}{36}$

$(r - \frac{2}{6})^2 = \frac{256}{36}$

$r - \frac{2}{6} = \pm \frac{16}{6}$

$r = \frac{2}{6} \pm \frac{16}{6}$

3 $\quad$ $-\frac{14}{6}$

$-\frac{7}{3}$

Solve $4t^2 + 2t = 20$ by completing the square.

$t^2 + \frac{1}{2}t + \frac{1}{16} = 5 + \frac{1}{16}$

$\left(t + \frac{1}{4}\right)^2 = \frac{81}{16}$

$t + \frac{1}{4} = \pm \frac{9}{4}$

$t = -\frac{1}{4} \pm \frac{9}{4}$

$-\frac{1}{4} + \frac{9}{4}$ $\quad$ $-\frac{1}{4} - \frac{9}{4}$

2 $\quad$ $-\frac{10}{4}$

$-\frac{5}{2}$

Solve $3x^2 + 2x = 4$ by completing the square.

$\frac{4}{3} + \frac{1}{9}$

$\frac{12}{9} + \frac{1}{9}$

$x^2 + \frac{2}{3}x + \frac{1}{9} = \frac{4}{3} + \frac{1}{9}$

$\left(x + \frac{1}{3}\right)^2 = \frac{13}{9}$

$x + \frac{1}{3} = \pm \frac{\sqrt{13}}{3}$

$x = -\frac{1}{3} \pm \frac{\sqrt{13}}{3}$

Solve $4x^2 + 3x = 12$ by completing the square.

$x^2 + \frac{3}{4}x + \frac{9}{64} = 3 + \frac{9}{64}$

$\left(x + \frac{3}{8}\right)^2 = \frac{201}{64}$

$x + \frac{3}{8} = \pm \frac{\sqrt{201}}{8}$

$x = -\frac{3}{8} \pm \frac{\sqrt{201}}{8}$

The solutions to a quadratic equation of the form $ax^2 + bx + c = 0, a \neq 0$ are given by the formula:

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

Solve $2x^2 + 9x - 5 = 0$ by using the Quadratic Formula.

$a=2 \quad b=9 \quad c=-5$

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

$$\frac{-9 \pm \sqrt{81-(-40)}}{4} = \frac{-9 \pm \sqrt{121}}{4}$$

$$\frac{-9 \pm 11}{4}$$

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

$\frac{-9-11}{4} = \frac{-20}{4} = -5$

Solve $4z^2 + 2z - 6 = 0$ by using the Quadratic Formula.

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

$$\frac{-2 \pm \sqrt{4-(-96)}}{8}$$

$$\frac{-2 \pm \sqrt{100}}{8} = \frac{-2 \pm 10}{8}$$

$\frac{-2+10}{8}$ $\quad$ $\frac{-2-10}{8}$

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

Solve $x^2 - 6x + 5 = 0$ by using the Quadratic Formula.

$$\frac{6 \pm \sqrt{(-6)^2-4(1)(5)}}{2(1)}$$

$$\frac{6 \pm \sqrt{36-20}}{2}$$

$$\frac{6 \pm \sqrt{16}}{2}$$

$\frac{6 \pm 4}{2}$

$\frac{6+4}{2}$ $\quad$ $\frac{6-4}{2}$

5 $\quad$ 1

Solve $2p^2 + 8p + 5 = 0$ by using the Quadratic Formula.

$$\frac{-8 \pm \sqrt{(8)^2 - 4(2)(5)}}{2(2)}$$

$$\frac{-8 \pm \sqrt{64 - 40}}{4}$$

$$\frac{-8 \pm \sqrt{24}}{4}$$

$$\frac{-8 \pm 2\sqrt{6}}{4}$$

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

Solve $2x^2 + 10x + 11 = 0$ by using the Quadratic Formula.

Solve $3p^2 + 2p + 9 = 0$ by using the Quadratic Formula.

$$\frac{-2 \pm \sqrt{(2)^2 - 4(3)(9)}}{2(3)}$$

$$\frac{-2 \pm \sqrt{4 - 108}}{6}$$

No Real Solution

Solve $x(x + 6) + 4 = 0$ by using the Quadratic Formula.

$$x^2 + 6x + 4 = 0$$

$$\frac{-6 \pm \sqrt{6^2 - 4(1)(4)}}{2(1)}$$

$$\frac{-6 \pm \sqrt{36 - 16}}{2}$$

$$\frac{-6 \pm \sqrt{20}}{2}$$

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

$$-3 \pm \sqrt{5}$$

Solve $x(x+2)-5=0$ by using the Quadratic Formula.

Solve $\left(\frac{1}{2}u^2\right)^4+\left(\frac{2}{3}u\right)^4=\left(\frac{1}{3}\right)^4$ by using the Quadratic Formula.

$3u^2+4u=2$

$3u^2+4u-2=0$

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

$\frac{-4\pm\sqrt{16-(-24)}}{6}$

$\frac{-4\pm\sqrt{40}}{6}$

$\frac{-4\pm2\sqrt{10}}{6}=\frac{-2\pm\sqrt{10}}{3}$

Solve $\frac{1}{9}d^2-\frac{1}{2}d=-\frac{1}{2}$ by using the Quadratic Formula.

$2d^2-9d=-9$

$2d^2-9d+9=0$

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

$\frac{9\pm\sqrt{81-72}}{4}$

$\frac{9\pm\sqrt{9}}{4}$

$\frac{9\pm3}{4}$ $3, \frac{3}{2}$

Solve $4x^2-20x=-25$ by using the Quadratic Formula.

$4x^2-20+25=0$

$\frac{20\pm\sqrt{(-20)^2-4(4)(25)}}{2(4)}$

$\frac{20\pm\sqrt{400-400}}{8}$

$\frac{20\pm\sqrt{0}}{8}=\frac{20\pm0}{8}=\frac{20}{8}=\frac{5}{2}$

The Discriminate

b^2-4ac

$D>0$ 2 Real solutions

$D<0$ No Real solutions

$D=0$ 1 Real solution

Determine the number of solutions to each quadratic equation:

$2v^2-3v+6=0$

$(-3)^2-4(2)(6)$

$9-48$

-39

No Real Solutions

$3x^2+7x-9=0$

$7^2-4(3)(-9)$

$49-(-108)$

157 2 Real solutions

$\frac{1}{49}$ $\frac{108}{7}$

$5n^2+n+4=0$

$9y^2-6y+1=0$

Identify the most appropriate method to use to solve each quadratic equation.

$\frac{5z^2}{5}=\frac{17}{5}$

$z^2=\frac{17}{5}$

$z=\pm\sqrt{\frac{17}{5}}$

$=\pm\frac{\sqrt{17}}{\sqrt{5}}\frac{\sqrt{5}}{\sqrt{5}}$

$=\pm\frac{\sqrt{85}}{5}$

$4x^2-12x+9=0$

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

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

$8u^2+6u=11$

$8u^2+6u-11=0$

$\frac{-6\pm\sqrt{(6)^2-4(8)(-11)}}{2(8)}$

$\frac{-6\pm\sqrt{388}}{16}$

$\sqrt{(n-3)^2}=\sqrt{16}$

$n-3=\pm4$

$n=3\pm4$

$7, -1$

$\frac{-6\pm13\sqrt{2}}{16}$

$\frac{-6\pm2\sqrt{97}}{16}$

$\frac{-3\pm\sqrt{97}}{8}$