'99 § 8.1 #s 1, 5, 9, 11, 69

#s 1–14 Use square root property to solve each equation. (Sol'ns are real)

(1) $x^2 = 16$

$\boxed{x = \pm 4}$

(5) $x^2 = 18$

$x = \pm\sqrt{18}$

$= \pm\sqrt{3^2 \cdot 2}$

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

(9) $(x+5)^2 = 9$

$x + 5 = \pm 3$

$\boxed{x = -5 \pm 3}$

#s 15–26 Use square root property to solve each equation. (Sol'ns might not be real.)

(17) $x^2 - 6 = 0$

$x^2 = 6$

$\boxed{x = \pm\sqrt{6}}$

(21) $(x-1)^2 = -16$

$x - 1 = \pm\sqrt{-16}$

$x - 1 = \pm 4i$

$\boxed{x = 1 \pm 4i}$

(25) $(x+3)^2 = -8$

$x + 3 = \pm\sqrt{-8}$

$x + 3 = \pm 2i\sqrt{2}$

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

$2 \mid 8$

$2 \mid 4$

2

$\sqrt{8} = \sqrt{2^3}$

$= \sqrt{2^2 \cdot 2} = 2\sqrt{2}$

099 §8.1 #s 29, 33, 41, 69

#s 27-34 Add the proper constant so that the resulting trinomial is a perfect square trinomial.

(29) $z^2 - 12z$

$\frac{12}{2} = 6 \rightarrow 6^2$

$z^2 - 12z + 6^2$

$\boxed{(z-6)^2}$

(33) $x^2 + x$

$\frac{1}{2} \rightarrow \left(\frac{1}{2}\right)^2$

$x^2 + x + \left(\frac{1}{2}\right)^2$

$\boxed{\left(x + \frac{1}{2}\right)^2}$

#s 35-56 Solve by completing the square. Solutions are real.

(37) $x^2 + 6x + 2 = 0$

$x^2 + 6x = -2$

$\frac{6}{2} = 3 \rightarrow 3^2 = 9$

$x^2 + 6x + 3^2 = -2 + 9$

$(x+3)^2 = 7$

$x + 3 = \pm\sqrt{7}$

$\boxed{x = -3 \pm \sqrt{7}}$

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

$x^2 + 2x = 5$

$\frac{2}{2} = 1 \rightarrow 1^2 = 1$

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

$(x+1)^2 = 6$

$x + 1 = \pm\sqrt{6}$

$\boxed{x = -1 \pm \sqrt{6}}$

099 §8.1 #s 45, 49, ..., 69

(45) $4y^2 - 12y - 2 = 0$

$\frac{4y^2}{4} - \frac{12y}{4} - \frac{2}{4} = \frac{0}{4}$

$y^2 - 3y - \frac{1}{2} = 0$

$y^2 - 3y + \left(\frac{3}{2}\right)^2 = \frac{1}{2} + \frac{9}{4}$

$\frac{3}{2} \rightarrow \left(\frac{3}{2}\right)^2 = \frac{3^2}{2^2} = \frac{9}{4}$

$\left(y - \frac{3}{2}\right)^2 = \frac{11}{4}$

$y - \frac{3}{2} = \pm\sqrt{\frac{11}{4}} = \pm\frac{\sqrt{11}}{\sqrt{4}} = \pm\frac{\sqrt{11}}{2}$

$\frac{1}{2} + \frac{9}{4} = \frac{1}{2}\cdot\frac{2}{2} + \frac{9}{4}$

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

$\boxed{y = \frac{3}{2} \pm \frac{\sqrt{11}}{2}}$ OR $\frac{3 \pm \sqrt{11}}{2}$ $\boxed{\left\{\frac{3 \pm \sqrt{11}}{2}\right\}}$

(49) $x^2 - 4x - 5 = 0$

$x^2 - 4x = 5$

$\frac{4}{2} = 2 \rightarrow 2^2 = 4$

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

$(x-2)^2 = 9$

$x - 2 = \pm 3$

$x = 2 \pm 3$

$x = 2+3 = 5$

$x = 2-3 = -1$

$\boxed{\{-1, 5\}}$

099 § 8.1 #s 53, 57, ..., 69

(53) $3y^2 + 6y - 4 = 0$

$y^2 + 2y - \frac{4}{3} = 0$

$y^2 + 2y = \frac{4}{3}$

$\frac{2}{2} = 1 \longrightarrow 1^2 = 1$

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

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

$\frac{4}{3} + \frac{1}{1} \cdot \frac{3}{3} =$

$\frac{4}{3} + \frac{3}{3} = \frac{7}{3}$

$(y+1)^2 = \frac{7}{3}$

$y + 1 = \pm\sqrt{\frac{7}{3}}$

$y = -1 \pm \sqrt{\frac{7}{3}}$

$= -1 \pm \frac{\sqrt{21}}{3}$

$= -\frac{1}{1} \cdot \frac{3}{3} \pm \frac{\sqrt{21}}{3}$

$= -\frac{3}{3} \pm \frac{\sqrt{21}}{3}$

$$y = \frac{-3 \pm \sqrt{21}}{3}$$

you should rationalize the denominator:

$\sqrt{\frac{7}{3}} = \frac{\sqrt{7}}{\sqrt{3}} = \frac{\sqrt{7}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{\sqrt{21}}{3}$

$$\left\{ \frac{-3 \pm \sqrt{21}}{3} \right\}$$

099 §8.1 #s 57, 61, 65, 69

#s 57-74 Solve by completing the square. (Solns might not be real!)

(57) $y^2 + 2y + 2 = 0$

$y^2 + 2y = -2$

$\frac{2}{2} = 1 \longrightarrow 1^2 = 1$

$y^2 + 2y + 1^2 = -2 + 1$

$(y+1)^2 = -1$

$y + 1 = \pm\sqrt{-1} = \pm i$

$y = -1 \pm i$

$\{-1 \pm i\}$

(61) $2a^2 + 8a = -12$

$a^2 + 4a = -6$

$\frac{4}{2} = 2 \longrightarrow 2^2 = 4$

$a^2 + 4a + 2^2 = -6 + 4$

$(a+2)^2 = -2$

$a + 2 = \pm\sqrt{-2} = \pm i\sqrt{2}$

$a = -2 \pm i\sqrt{2}$

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

099 § 8.1 #s 65, 69

(65) $2x^2 - x + 6 = 0$

$x^2 - \frac{1}{2}x + 3 = 0$

$x^2 - \frac{1}{2}x = -3$

$\frac{\frac{1}{2}}{2} = \frac{1}{2}\cdot\frac{1}{2} = \frac{1}{4} \longrightarrow \left(\frac{1}{4}\right)^2 = \frac{1^2}{4^2} = \frac{1}{16}$

$x^2 - \frac{1}{2}x + \left(\frac{1}{4}\right)^2 = -3 + \frac{1}{16} = \frac{-3\cdot 16}{16} + \frac{1}{16} = \frac{-48+1}{16} = \frac{-47}{16}$

$\left(x - \frac{1}{4}\right)^2 = -\frac{47}{16}$

$x - \frac{1}{4} = \pm\sqrt{-\frac{47}{16}} = \pm\frac{i\sqrt{47}}{4}$

$x = \frac{1 \pm i\sqrt{47}}{4}$

$\left\{\frac{1 \pm i\sqrt{47}}{4}\right\}$

(69) $z^2 + 3z - 4 = 0$

$z^2 + 3z = 4$

$\frac{3}{2} \longrightarrow \left(\frac{3}{2}\right)^2 = \frac{9}{4}$

$z^2 + 3z + \left(\frac{3}{2}\right)^2 = 4 + \frac{9}{4} = \frac{16+9}{4} = \frac{25}{4}$

$\left(z + \frac{3}{2}\right)^2 = \frac{25}{4}$

$z + \frac{3}{2} = \pm\frac{5}{2}$

$z = \frac{-3 \pm 5}{2}$

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

$\frac{-3-5}{2} = -\frac{8}{2} = -4$

$\{-4, 1\}$