

121 §154 #s 51-56, 61, 71, 91, 102, 104

SPECIAL INSTRUCTIONS

#s 51-56 solve by

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- (A) Quadratic Formula
- (B) completing the square

(51) $2x^2 - 3 = 0$

(A) $a=2, b=0, c=-3$

$b^2 - 4ac = 0^2 - 4(2)(-3) = 24$

$\sqrt{b^2 - 4ac} = \sqrt{24} = 2\sqrt{6}$

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

$= \frac{0 \pm 2\sqrt{6}}{2(2)} = \pm \frac{2\sqrt{6}}{4} = \pm \frac{\sqrt{6}}{2}$

$x \in \left\{ \pm \frac{\sqrt{6}}{2} \right\}$

(52) $-2x^2 + 5 = 0$

$a=-2, b=0, c=5$

$b^2 - 4ac = 0^2 - 4(-2)(5) = 40$

$\sqrt{b^2 - 4ac} = \sqrt{40} = 2\sqrt{10}$

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

$= \frac{0 \pm 2\sqrt{10}}{2(-2)} = \pm \frac{\sqrt{10}}{2}$

$x \in \left\{ \pm \frac{\sqrt{10}}{2} \right\}$

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

$2x^2 = 3$

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

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

$= \pm \frac{\sqrt{3}\sqrt{2}}{\sqrt{3}\sqrt{2}} = \pm \frac{\sqrt{6}}{2}$

$x \in \left\{ \pm \frac{\sqrt{6}}{2} \right\}$
Rationalizing the denominator.

$-2x^2 = -5$

$x^2 = \frac{5}{2}$

$x = \pm \sqrt{\frac{5}{2}} = \pm \frac{\sqrt{5}}{\sqrt{2}}$

$= \pm \frac{\sqrt{5}\sqrt{2}}{\sqrt{2}\sqrt{2}} = \pm \frac{\sqrt{10}}{2}$

$x \in \left\{ \pm \frac{\sqrt{10}}{2} \right\}$

121 $\int 4.5$

(53) $x^2 + 5 = 4x$

(A) $x^2 - 4x + 5 = 0$

$a=1, b=-4, c=5$

$b^2 - 4ac = (-4)^2 - 4(1)(5)$
 $= 16 - 20 = -4$

$\sqrt{b^2 - 4ac} = \sqrt{-4} = 2\sqrt{-1} = 2i$

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

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

$= 2 \pm i$

$x \in \{2 \pm i\}$

(54) $x^2 = 6x - 13$

(A) $x^2 - 6x + 13 = 0$

$a=1, b=-6, c=13$

$b^2 - 4ac = (-6)^2 - 4(1)(13)$

$= 36 - 52 = -16$

$\sqrt{b^2 - 4ac} = \sqrt{-16} = 4i$

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

$= \frac{6 \pm 4i}{2(1)} = 3 \pm 2i$

$x \in \{3 \pm 2i\}$

(B) $x^2 + 5 = 4x$

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

$x^2 - 4x = -5$

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

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

$x-2 = \pm\sqrt{-1} = \pm i$

$x = 2 \pm i$

$x \in \{2 \pm i\}$

(6B) $x^2 = 6x - 13$

$x^2 - 6x = -13$

$x^2 - 6x + 3^2 = -13 + 9$

$(x-3)^2 = -4$

$x-3 = \pm\sqrt{-4} = \pm 2i$

$x = 3 \pm 2i$

121 §1.5

(55) $x^2 - 2x + 4 = 0$ $2 \mid 12$

(A) $a=1, b=-2, c=4$ $2 \mid 6$
 3

$$b^2 - 4ac = (-2)^2 - 4(1)(4) = 4 - 16 = -12$$

$$\sqrt{b^2 - 4ac} = \sqrt{-12} = i\sqrt{12} = 2i\sqrt{3} \text{ or } -2i\sqrt{3}$$

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

$$= \frac{2 \pm 2i\sqrt{3}}{2} = 1 \pm i\sqrt{3}$$

$$x \in \{1 \pm i\sqrt{3}\}$$

(56) $x^2 - 4x + 9 = 0$ $2 \mid 20$

(A) $a=1, b=-4, c=9$ $2 \mid 10$

$$b^2 - 4ac = (-4)^2 - 4(1)(9) = 16 - 36 = -20$$

$$\sqrt{b^2 - 4ac} = \sqrt{-20} = 2i\sqrt{5}$$

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

$$= \frac{4 \pm 2i\sqrt{5}}{2(1)} = 2 \pm i\sqrt{5}$$

$$x \in \{2 \pm i\sqrt{5}\}$$

(B) $x^2 - 2x + 4 = 0$

$$x^2 - 2x = -4$$

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

$$(x-1)^2 = -3$$

$$x-1 = \pm \sqrt{-3} = \pm i\sqrt{3}$$

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

$$x \in \{1 \pm i\sqrt{3}\}$$

(B) $x^2 - 4x + 9 = 0$

$$x^2 - 4x = -9$$

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

$$(x-2)^2 = -5$$

$$x-2 = \pm \sqrt{-5} = \pm i\sqrt{5}$$

$$x = 2 \pm i\sqrt{5}$$

$$x \in \{2 \pm i\sqrt{5}\}$$

$$\frac{4 \pm 2i\sqrt{5}}{2} = \frac{2(2 \pm i\sqrt{5})}{2} = 2 \pm i\sqrt{5}$$

121 $\int 1.5x^2$ #561, 71, 91, 102, 104

#561-64 Use a calculator & quadratic formula to solve. Round final answer to 2 decimal places.

(6) $3.2x^2 + 7.6x - 9 = 0$

$a = 3.2, b = 7.6, c = -9$

$b^2 - 4ac = 7.6^2 - 4(3.2)(-9)$
 $= 172.96$

$\sqrt{b^2 - 4ac} = \sqrt{172.96} \approx 13.1514257782$

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

$= \frac{-7.6 \pm \sqrt{172.96}}{2(3.2)} \rightarrow \frac{-7.6 + \sqrt{172.96}}{6.4} \approx .867410277847$

$\downarrow \frac{-7.6 - \sqrt{172.96}}{6.4} \approx -3.24241027785$

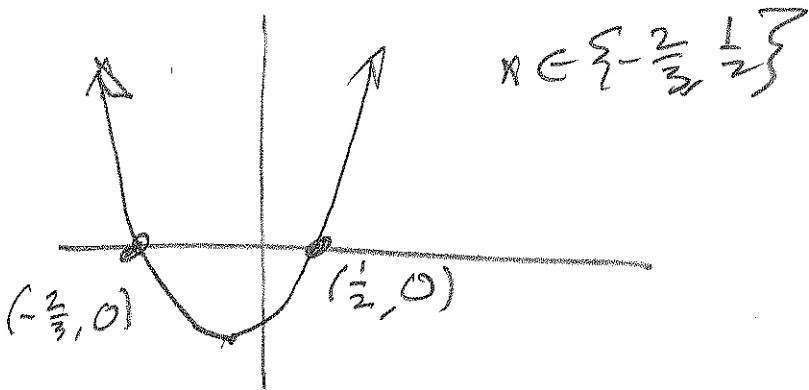
$x \in \{-3.24, .86\}$

Don't round off until final step. With a better calculator, you can leave $\sqrt{172.96}$ in that form until final step.

121 §1.5

#571-74 Solve the equation by interpreting the graph.

(71) $6x^2 + x - 2 = 0$



#581-98 Solve. (Practice with rational expressions)

(91) $\frac{28}{x} - \frac{7}{x^2} = 7$

$$\begin{array}{r} 2 \overline{) 588} \\ 2 \overline{) 294} \\ 3 \overline{) 147} \\ 7 \overline{) 49} \\ 7 \end{array}$$

$$\begin{array}{r} 6 \overline{) 28} \quad 5 \overline{) 28} \\ \underline{28} \quad \underline{7} \\ 0 \quad 196 \end{array}$$

$$\frac{28}{x} \cdot \frac{x}{x} - \frac{7}{x^2} = 7 \cdot \frac{x^2}{x^2}$$

$$\sqrt{588} = 14\sqrt{3}$$

$$\frac{28x - 7}{LCD} = \frac{7x^2}{LCD}$$

(Won't throw away LCD when it's " $<$ " OR " $>$ " OR " \leq " OR " \geq " But OK if it's " $=$ ")

$$-7x^2 + 28x - 7 = 0$$

$$7x^2 - 28x + 7 = 0$$

$$a=7, b=-28, c=7$$

$$b^2 - 4ac = (-28)^2 - 4(7)(7)$$

$$= 784 - 196 = 588$$

$$\sqrt{b^2 - 4ac} = 14\sqrt{3}$$

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

$$= \frac{28 \pm 14\sqrt{3}}{2(7)} = \frac{14(2 \pm \sqrt{3})}{14}$$

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

$$x \in \left\{ 2 \pm \sqrt{3} \right\}$$

121 S1.5 #s 99-104

Use methods for solving quadratic equations to solve each formula for the given variable

(102) $ky^2 - ky = P$ for y

$$ky^2 - ky - P = 0$$

$$a = k, b = -k, c = -P$$

$$b^2 - 4ac = (-k)^2 - 4(k)(-P)$$

$$= k^2 + 4kP$$

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

$$\left[\frac{k \pm \sqrt{k^2 + 4kP}}{2k} \right]$$

$$y \in \left\{ \frac{k \pm \sqrt{k^2 + 4kP}}{2k} \right\}$$

Solve
(104) $\frac{1}{x+h} - \frac{1}{x} = 1$

for x

$$\frac{1}{h} \left[\frac{1}{x+h} - \frac{1}{x} \right] = 1$$

$$\frac{1}{x+h} - \frac{1}{x} = h$$

LCD = $x(x+h)$

$$\frac{1}{x+h} \cdot \frac{x}{x} - \frac{1}{x} \cdot \frac{x+h}{x+h} = \frac{h}{1} \cdot \frac{x(x+h)}{x(x+h)}$$

$$\frac{x - (x+h)}{LCD} = \frac{hx(x+h)}{LCD}$$

$$-h = hx^2 + h^2x$$

$$-hx^2 - h^2x - h = 0$$

$$hx^2 + h^2x + h = 0$$

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

$$a = 1, b = h, c = 1$$

$$\sqrt{b^2 - 4ac} = \sqrt{h^2 - 4(1)(1)} = \sqrt{h^2 - 4}$$

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

$$x \in \left\{ \frac{-h \pm \sqrt{h^2 - 4}}{2} \right\}$$