

Section 6.4 – Practice Questions

Solve by the Square Root Method

1. $x^2 = 16$

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

$$x = \pm 4$$

2. $3y^2 = 13$

$$y^2 = \frac{13}{3}$$

$$y = \pm \sqrt{\frac{13}{3}}$$

3. $5z^2 - 12 = 0$

$$5z^2 = 12$$

$$z^2 = \frac{12}{5}$$

$$z = \pm \sqrt{\frac{12}{5}}$$

4. $8x^2 + 3 = 11x^2$

$$-3x^2 = -3$$

$$x^2 = 1$$

$$x = \pm 1$$

5. $x^2 + 4 = 1$

$$x^2 = -3$$

$$x = \sqrt{-3} \quad \text{NO SOLUTION}$$

6. $(x - 2)^2 = 16$

$$x - 2 = \pm 4$$

$$x = 4 + 2$$

$$x = -4 + 2$$

$$\rightarrow \begin{matrix} x = 6 \\ x = -2 \end{matrix}$$

7. $(2x - 1)^2 = 12$

$$2x - 1 = \pm \sqrt{12}$$

$$2x = \pm \sqrt{12} + 1$$

$$x = \frac{1 \pm \sqrt{12}}{2}$$

8. $(3x + 2)^2 = 18$

$$3x + 2 = \pm \sqrt{18}$$

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

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

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

9. $\frac{(5x-2)^2}{3} = 3$

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

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

$5x-2 = \pm 3$

$5x = 2 \pm 3$

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

$x = 1$
 $x = -\frac{1}{5}$

10. $-2(4x-1)^2 + 18 = 0$

$-2(4x-1)^2 = -18$

$(4x-1)^2 = 9$

$4x-1 = 3$ or $4x-1 = -3$

$4x = 4$

$x = 1$

$4x = -2$

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

11.

$\frac{4(x^2-1)+4}{x^2+3} = 1$

$4(x^2-1)+4 = x^2+3$

$4(x^2-1) = x^2-1$

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

$3x^2 = 3$

$x^2 = 1$

$x = \pm 1$

12.

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

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

$4 - 2(x-1)^2 = -1(x-1)^2$
 $+2(x-1)^2 \quad +2(x-1)^2$

$4 = (x-1)^2$

$\pm 2 = x-1$

$x = 3$
 $x = -1$

13. $(x^2 + 6x + 9) = 5$

Perfect square trinomial

$(x+3)^2 = 5$

$x+3 = \pm \sqrt{5}$

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

14.

$(x-\frac{3}{2})^2 = \frac{7}{4}$

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

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

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

15.

$$\left(x + \frac{2}{3}\right)^2 = \frac{5}{9}$$

$$x + \frac{2}{3} = \pm \frac{\sqrt{5}}{3}$$

$$x = -\frac{2}{3} \pm \frac{\sqrt{5}}{3}$$

$$\boxed{x = \frac{-2 \pm \sqrt{5}}{3}}$$

16.

$$\left(x + \frac{1}{2}\right)^2 - \frac{5}{4} = 0$$

$$\left(x + \frac{1}{2}\right)^2 = \frac{5}{4}$$

$$x + \frac{1}{2} = \pm \frac{\sqrt{5}}{2}$$

$$x = -\frac{1}{2} \pm \frac{\sqrt{5}}{2}$$

$$\boxed{x = \frac{-1 \pm \sqrt{5}}{2}}$$

Solve using the Quadratic formula. Give exact answers to 2 decimal places.

17. $y^2 - 4y - 3 = 0$

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

$$\frac{4 \pm \sqrt{16 + 12}}{2} = \frac{4 \pm \sqrt{28}}{2}$$

$$\frac{4 \pm 2\sqrt{7}}{2} = 2 \pm \sqrt{7} = \boxed{4.65}$$

$$\boxed{-0.65}$$

19. $3z^2 - 6z + 4 = 0$

$$\frac{6 \pm \sqrt{36 - 4(3)(4)}}{2(3)} = \frac{6 \pm \sqrt{-12}}{6}$$

DNE

NO SOLUTION

18. $x^2 + 5x - 3 = 0$

$$\frac{-5 \pm \sqrt{25 - (-12)}}{2}$$

$$\frac{-5 \pm \sqrt{37}}{2}$$

$$\frac{-5 + \sqrt{37}}{2} = \boxed{0.54}$$

$$\frac{-5 - \sqrt{37}}{2} = \boxed{-5.54}$$

20. $\frac{3}{2}x^2 - 2 = x$

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

$$\frac{1 \pm \sqrt{1^2 - 4(\frac{3}{2})(-2)}}{2(\frac{3}{2})} = \frac{1 \pm \sqrt{13}}{3}$$

$$\frac{1 \pm \sqrt{13}}{3} = \boxed{1.54 \text{ or } -0.87}$$

21. $5z(z + 2) = -4$

$$5z^2 + 10z + 4 = 0$$

$$\frac{-10 \pm \sqrt{100 - 4(5)(4)}}{10}$$

$$\frac{-10 \pm \sqrt{20}}{10} = \frac{-10 \pm 2\sqrt{5}}{10}$$

$$-1 \pm \frac{\sqrt{5}}{5}$$

$$x = -0.55 \text{ or } -1.415$$

22. $12x = 3x^2 - 8$

$$3x^2 - 12x - 8 = 0$$

$$\frac{12 \pm \sqrt{144 - 4(3)(-8)}}{2(3)}$$

$$\frac{12 \pm \sqrt{240}}{6} \rightarrow \frac{12 \pm \sqrt{16 \cdot 15}}{6}$$

$$\frac{12 \pm 4\sqrt{15}}{6} = \frac{6 \pm 2\sqrt{15}}{3}$$

$$x = 4.58 \text{ or } x = -0.58$$

23. $(x - 2)(x - 3) = 8$

$$x^2 - 3x - 2x + 6 - 8 = 0$$

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

$$\frac{5 \pm \sqrt{25 - 4(1)(-2)}}{2}$$

$$\frac{5 \pm \sqrt{33}}{2}$$

$$x = 5.37$$

$$x = -0.37$$

24.

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

LCD $(x+2)(x)$

$$\frac{2x + x + 2}{x(x+2)} = \frac{(x+2)x}{(x+2)x}$$

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

(QE not necessary)

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

$$x = -1 \text{ or } 2$$

25.

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

LCD y^2

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

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

$$\frac{2 \pm \sqrt{4 - 4(2)(3)}}{2(2)} = \frac{2 \pm \sqrt{-20}}{4}$$

NO SOLUTION

26.

$$\frac{1}{x} - \frac{2}{x-4} = 2$$

LCD $x(x-4)$

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

$$-x-4 = 2x^2 - 8x \rightarrow 2x^2 - 7x + 4 = 0$$

$$\frac{7 \pm \sqrt{49 - 4(2)(4)}}{2(2)} = \frac{7 \pm \sqrt{17}}{4}$$

$$\begin{aligned} x &= 2.78 \\ x &= 0.72 \end{aligned}$$

27. $5.13x^2 - 7.27x - 4.32 = 0$

$a = 5.13$

$b = -7.27$

$c = -4.32$

$$\frac{7.27 \pm \sqrt{(-7.27)^2 - 4(5.13)(-4.32)}}{2(5.13)}$$

$$\frac{7.27 \pm \sqrt{141.5}}{10.26}$$

$$x = 1.87$$

$$x = -0.45$$

28. $\sqrt{3}x^2 = 8\sqrt{2}x - 4\sqrt{3}$

$$\sqrt{3}x^2 - 8\sqrt{2}x + 4\sqrt{3} = 0$$

$$\frac{8\sqrt{2} \pm \sqrt{(-8\sqrt{2})^2 - 4(\sqrt{3})(4\sqrt{3})}}{2(\sqrt{3})}$$

$$\frac{8\sqrt{2} \pm \sqrt{128 - 48}}{2\sqrt{3}}$$

$$\frac{8\sqrt{2} \pm \sqrt{80}}{2\sqrt{3}} \rightarrow \frac{8\sqrt{2} \pm 4\sqrt{5}}{2\sqrt{3}}$$

$$= \frac{4\sqrt{2} \pm 2\sqrt{5}}{\sqrt{3}}$$

$$x = 5.85$$

$$x = 0.68$$

Solve each quadratic equation by the method of your choice

29.

$$\frac{9(3x-5)^2}{4} = 1$$

$$9(3x-5)^2 = 4$$

$$(3x-5)^2 = \frac{4}{9}$$

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

$$3x = 5 \pm \frac{2}{3}$$

$$3x = \frac{15 \pm 2}{3}$$

$$x = \frac{15 \pm 2}{9}$$

$$x = \frac{17}{9}$$

$$x = \frac{13}{9}$$

30.

$$\frac{25(2x+1)^2}{9} = 0$$

$$25(2x+1)^2 = 0$$

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

$$2x+1 = 0$$

$$2x = -1$$

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

31. $4t^2 + 25 = 20t$

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

$$\frac{20 \pm \sqrt{(-20)^2 - 4(4)(25)}}{8} = \frac{20 \pm \sqrt{0}}{8}$$

$$x = \frac{20}{8}$$

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

32. $25t^2 - 25t + 6 = 0$

AC Method

$$t^2 - 25t + 150 = 0$$

$$(t - \frac{10}{25})(t - \frac{15}{25}) = 0$$

$$(t - \frac{2}{5})(t - \frac{3}{5}) = 0$$

$$(5t-2)(5t-3) = 0$$

$$x = \frac{2}{5} \text{ or } \frac{3}{5}$$

33. $(x+3)(x-2) = -4$

$$x^2 - 2x + 3x - 6 + 4 = 0$$

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

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

$$x = -2$$

$$x = 1$$

34. $2x(x+3) = 10$

$$2x^2 + 6x - 10 = 0 \rightarrow x^2 + 3x - 5 = 0$$

$$\frac{-3 \pm \sqrt{9 - 4(1)(-5)}}{2}$$

$$\frac{-3 \pm \sqrt{29}}{2}$$

$$x = 1.19 \text{ or } -4.20$$