

Name: Key

Solve each equation by using the Square Root Property.

1. $x^2 - 18x + 81 = 49$

$$(x - 9)^2 = 49$$

$$x - 9 = \pm 7$$

$$x = 9 \pm 7$$

$$\boxed{x = 16, 2}$$

2. $x^2 + 20x + 100 = 64$

$$(x + 10)^2 = 64$$

$$x + 10 = \pm 8$$

$$x = -10 \pm 8$$

$$\boxed{x = -2, -18}$$

3. $\frac{4x^2}{4} - \frac{28x}{4} + \frac{49}{4} = \frac{64}{4}$

$$x^2 - 7x + \frac{49}{4} = 16$$

$$(x - \frac{7}{2})^2 = 16$$

$$x - \frac{7}{2} = \pm 4$$

$$x = 3.5 \pm 4$$

$$\boxed{x = 19.5, -12.5}$$

4. $\frac{25x^2}{25} + \frac{20x}{25} + \frac{4}{25} = \frac{75}{25}$

$$x^2 + \frac{4}{5}x + \frac{4}{25} = 3$$

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

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

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

Find the value of c that makes each trinomial a perfect square. Then write the trinomial as a perfect square.

5. $x^2 - 10x + c$

$$c = 100$$

$$x^2 - 10x + 100$$

$$(x - 10)^2$$

6. $x^2 + 60x + c$

$$c = 900$$

$$x^2 + 60x + 900$$

$$(x + 30)^2$$

7. $x^2 + 3.2x + c$

$$c = 2.56$$

$$x^2 + 3.2x + 2.56$$

$$(x + 1.6)^2$$

8. $x^2 + \frac{1}{2}x + c$

$$c = \frac{1}{16}$$

$$x^2 + \frac{1}{2}x + \frac{1}{16}$$

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

Solve each equation by completing the square.

9. $y^2 - 4y - 5 = 0$

$$y^2 - 4y = 5$$

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

$$(y - 2)^2 = 9$$

$$y - 2 = \pm 3$$

$$y = 2 \pm 3$$

$$y = 5, -1$$

11. $2x^2 - 3x + 1 = 0$

$$x^2 - \frac{3}{2}x + \frac{9}{16} = -\frac{1}{2} + \frac{9}{16}$$

$$(x - \frac{3}{4})^2 = \frac{1}{16}$$

$$x - \frac{3}{4} = \pm \frac{1}{4}$$

$$x = \frac{3}{4} \pm \frac{1}{4}$$

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

13. $x^2 + 4x + 1 = 0$

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

$$(x + 2)^2 = 3$$

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

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

10. $x^2 - 8x - 65 = 0$

$$x^2 - 8x + 16 = 65 + 16$$

$$(x - 4)^2 = 81$$

$$x - 4 = \pm 9$$

$$x = 4 \pm 9$$

$$x = 13, -5$$

12. $\frac{2x^2}{2} - \frac{13x}{2} - \frac{7}{2} = \frac{0}{2}$

$$\left(\frac{13}{4}\right) \frac{169}{16}$$

$$x^2 - 13\frac{1}{2}x - \frac{7}{2} = 0$$

$$x^2 - 13\frac{1}{2}x + \frac{169}{16} = \frac{7}{2} + \frac{169}{16}$$

$$\left(x - \frac{13}{4}\right)^2 = \frac{225}{16}$$

$$x - \frac{13}{4} = \pm \frac{15}{4}$$

$$x = \frac{13}{4} \pm \frac{15}{4} =$$

$$\frac{18}{4}, -\frac{2}{4}$$

14. $y^2 + 12y + 4 = 0$

$$y^2 + 12y + 36 = -4 + 36$$

$$\left(\frac{9}{2}, -\frac{1}{2}\right)$$

$$(y + 6)^2 = 32$$

$$y + 6 = \pm 4\sqrt{2}$$

$$y = -6 \pm 4\sqrt{2}$$

For exercises 15 – 22, complete parts a – c for each quadratic equation.

- Find the value of the discriminant.
- Describe the number and type of roots.
- Find the exact solutions by using the Quadratic Formula.

$$15. p^2 + 12p + 4 = 0$$

$$X = \frac{-12 \pm \sqrt{144 - 16}}{2}$$

$$X = \frac{-12 \pm \sqrt{128}}{2}$$

$$X = \frac{-12 \pm 8\sqrt{2}}{2}$$

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

15a. 128

15b. 2 Real IRRATIONAL

15c. $-6 \pm 4\sqrt{2}$

$$16. 9x^2 - 6x + 1 = 0$$

$$X = \frac{+6 \pm \sqrt{36 - 4(9)}}{2(9)}$$

$$= \frac{6 \pm \sqrt{0}}{18}$$

$$= \frac{6}{18} = \frac{1}{3}$$

16a. 0

16b. 1 Real Rational

16c. $\frac{1}{3}$

$$17. 2x^2 - 7x - 4 = 0$$

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

$$= \frac{7 \pm \sqrt{49 + 32}}{4} = \frac{7 \pm \sqrt{81}}{4}$$

$$X = \frac{7 \pm 9}{4} = \frac{16}{4} \text{ or } \frac{-2}{4}, 4 \text{ or } -\frac{1}{2}$$

17a. 81

17b. 2 Real Rational

17c. $4, -\frac{1}{2}$

$$18. 25x^2 - 40x + 16 = 0$$

$$X = \frac{40 \pm \sqrt{1600 - 4(25)(16)}}{50}$$

$$= \frac{40 \pm \sqrt{0}}{50}$$

$$= \frac{4}{5}$$

18a. 0

18b. One Real Rational

18c. $\frac{4}{5}$

$$19. x^2 - 7x + 6 = 0$$

$$\begin{aligned} X &= \frac{7 \pm \sqrt{49 - 4(6)}}{2} \\ &= \frac{7 \pm \sqrt{25}}{2} \\ &= \frac{7 \pm 5}{2} \\ &= \frac{12}{2} = 6 \text{ or } \frac{2}{2} = 1 \end{aligned}$$

19a. 25

19b. 2 Real Rational

19c. 6, 1

$$20. 4x^2 - 4x + 11 = 0$$

$$\begin{aligned} X &= \frac{4 \pm \sqrt{16 - 4(4)(11)}}{2(4)} \\ &= \frac{4 \pm \sqrt{-160}}{8} \\ &= \frac{4 \pm 4i\sqrt{10}}{8} \\ &= \frac{1}{2} \pm \frac{i\sqrt{10}}{2} \end{aligned}$$

20a. -160

20b. 2 complex

20c. $\frac{1}{2} \pm \frac{i\sqrt{10}}{2}$

$$21. 4x^2 + 20x + 29 = 0$$

$$\begin{aligned} X &= \frac{-20 \pm \sqrt{400 - 4(4)(29)}}{2(4)} \\ &= \frac{-20 \pm \sqrt{-64}}{8} \\ &= \frac{-20 \pm 8i}{8} \\ &= \frac{-20}{8} \pm i \\ &= -\frac{5}{2} \pm i \end{aligned}$$

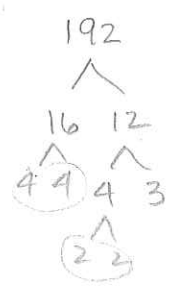
21a. -64

21b. 2 complex

21c. $-\frac{5}{2} \pm i$

$$22. 4x^2 - 4x - 11 = 0$$

$$\begin{aligned} X &= \frac{4 \pm \sqrt{16 - 4(4)(-11)}}{2(4)} \\ &= \frac{4 \pm \sqrt{192}}{8} \\ &= \frac{4 \pm 8\sqrt{3}}{8} \\ &= \frac{1}{2} \pm \sqrt{3} \end{aligned}$$



22a. 192

22b. 2 Real Irrational

22c. $\frac{1}{2} \pm \sqrt{3}$