Solving Quadratic Equations with Square Roots

Solve each equation by taking square roots.

1) $k^2 = 76$

$\sqrt{k^2} = \sqrt{76}$

$k = \pm\sqrt{76}$

$k = \pm 2\sqrt{19}$

$k = 2\sqrt{19}$, $k = -2\sqrt{19}$

2) $k^2 = 16$

$k^2 = 16$

$\sqrt{k^2} = \sqrt{16}$

$k = \pm 4$

$k = 4$, $k = -4$

3) $x^2 = 21$

$\sqrt{x^2} = \sqrt{21}$

$x = \pm\sqrt{21}$

$x = \sqrt{21}$, $x = -\sqrt{21}$

4) $a^2 = 4$

$\sqrt{a^2} = \sqrt{4}$

$a = \pm 2$

$a = 2$, $a = -2$

5) $x^2 + 8 = 28$

$-8 \quad -8$

$\sqrt{x^2} = \sqrt{20}$

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

$x = 2\sqrt{5}$, $x = -2\sqrt{5}$

6) $2n^2 = -144$

No solution

7) $-6m^2 = -414$

$\frac{-6}{} \quad \frac{-414}{-6}$

$m^2 = 69$

$m = \pm\sqrt{69}$

$m = \sqrt{69}$, $m = -\sqrt{69}$

8) $7x^2 = -21$

No solution

9) $m^2 + 7 = 88$

$-7 \quad -7$

$\sqrt{m^2} = \sqrt{81}$

$m = \pm 9$

$m = 9$, $m = -9$

10) $-5x^2 = -500$

$\frac{-5x^2}{-5} = \frac{-500}{-5}$

$\sqrt{x^2} = \sqrt{100}$

$x = \pm 10$

$x = 10$, $x = -10$

11) $-7n^2 = -448$

$\frac{-7n^2}{-7} = \frac{-448}{-7}$

$n^2 = 64$

$n = \pm 8$

$n = 8$, $n = -8$

12) $-2k^2 = -162$

$\frac{-2k^2}{-2} = \frac{-162}{-2}$

$k^2 = 81$

$k = \pm 9$

$k = 9$, $k = -9$

13) $x^2 - 5 = 73$

$+5 \quad +5$

$x^2 = 78$

$x = \pm\sqrt{78}$

$x = \sqrt{78}$, $x = -\sqrt{78}$

14) $16n^2 = 49$

$\frac{16n^2}{16} = \frac{49}{16}$

$\sqrt{n^2} = \sqrt{\frac{49}{16}}$

$n = \pm\frac{7}{4}$

$n = \frac{7}{4}$, $n = -\frac{7}{4}$

15) $n^2 - 5 = -4$

$+5 \quad +5$

$n^2 = 1$

$n = \pm 1$

$n = 1$, $n = -1$

16) $n^2 + 8 = 80$

$-8 \quad -8$

$n^2 = 72$

$n = \pm 6\sqrt{2}$

$n = 6\sqrt{2}$, $n = -6\sqrt{2}$

17) $7v^2 + 1 = 29$

$-1 \quad -1$

$\frac{7v^2}{7} = \frac{28}{7}$

$v^2 = 4$

$v = \pm 2$

$v = 2$, $v = -2$

18) $10n^2 + 2 = 292$

$-2 \quad -2$

$\frac{10n^2}{10} = \frac{290}{10}$

$n^2 = 29$

$n = \pm\sqrt{29}$

$n = \sqrt{29}$, $n = -\sqrt{29}$

19) $2m^2 + 10 = 210$

$-10 \quad -10$

$\frac{2m^2}{2} = \frac{200}{2}$

$m^2 = 100$

$m = \pm 10$

$m = 10$, $m = -10$

20) $9n^2 + 10 = 91$

$-10 \quad -10$

$\frac{9n^2}{9} = \frac{81}{9}$

$n^2 = 9$

$n = \pm 3$

$n = 3$, $n = -3$

21) $5n^2 - 7 = 488$

$+7 \quad +7$

$\frac{5n^2}{5} = \frac{495}{5}$

$\sqrt{n^2} = \sqrt{99}$

$n = \pm 3\sqrt{11}$

$n = 3\sqrt{11}$, $n = -3\sqrt{11}$

22) $8n^2 - 6 = 306$

$+6 \quad +6$

$\frac{8n^2}{8} = \frac{312}{8}$

$n^2 = 39$

$n = \pm\sqrt{39}$

$n = \sqrt{39}$, $n = -\sqrt{39}$

23) $10n^2 - 10 = 470$

$+10 \quad +10$

$\frac{10n^2}{10} = \frac{480}{10}$

$n^2 = 48$

$n = 4\sqrt{3}$

$n = 4\sqrt{3}$, $n = -4\sqrt{3}$

24) $8n^2 - 4 = 532$

$+4 \quad +4$

$\frac{8n^2}{8} = \frac{536}{8}$

$n^2 = 67$

$n = \pm\sqrt{67}$

$n = \sqrt{67}$, $n = -\sqrt{67}$

25) $4r^2 + 1 = 325$

$-1 \quad -1$

$\frac{4r^2}{4} = \frac{324}{4}$

$\sqrt{r^2} = \sqrt{81}$

$r = \pm 9$

$r = 9$, $r = -9$

26) $8b^2 - 7 = 193$

$+7 \quad +7$

$\frac{8b^2}{8} = \frac{200}{8}$

$b^2 = 25$

$b = \pm 5$

$b = 5$, $b = -5$

27) $2k^2 - 2 = 144$

$+2 \quad +2$

$\frac{2k^2}{2} = \frac{146}{2}$

$k^2 = 73$

$k = \pm\sqrt{73}$

$k = \sqrt{73}$, $k = -\sqrt{73}$

28) $3 - 4x^2 = -85$

$-3 \quad -3$

$\frac{-4x^2}{-4} = \frac{-88}{-4}$

$x^2 = 22$

$x = \pm\sqrt{22}$

$x = \sqrt{22}$, $x = -\sqrt{22}$