

SOLVING QUADRATIC EQUATIONS (CONTINUED) - EXERCISES

(1) Solve for x by the square root property:

(a) $x^2 = 5$

(b) $x^2 - 18 = 0$

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

(d) $(2x)^2 = 24$

(e) $3x^2 + 5 = 41$

(f) $(x-3)^2 = 16$

(g) $(x-1)^2 = 6$

(h) $(2x-10)^2 = 12$

(i) $2(x+5)^2 = 14$

(j) $5x^2 + 21 = 6$

(k) $(5x+15)^2 = 50$

(l) $5(x-4)^2 = 25$

(m) $(2x-5)^2 - 180 = 0$

(n) $9(x-1)^2 - 16 = 0$

(o) $(\frac{1}{2}x + 5)^2 = 12$

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

(q) $(2x-85)^2 = 1$

(r) $(x+2.14)^2 = 5.46$

(s) $17x^2 - 20 = 70 + 2x^2$

(t) $x^2 + 14x + 49 = 31$

(u) $4x^2 + 20x + 25 = 10$

(2) Solve for x by the quadratic formula:

(a) $x^2 - 2x - 2 = 0$

(b) $x^2 + 3x - 9 = 0$

(c) $x^2 - 4x - 3 = 0$

(d) $x^2 - 10x + 22 = 0$

(e) $2x^2 - 5x + 1 = 0$

(f) $3x^2 - 4x - 2 = 0$

(g) $4x^2 + 4x - 7 = 0$

(h) $5x^2 - 4x + 3 = 0$

(i) $-x^2 + 2x + 12 = 0$

(j) $2x^2 - 9x - 5 = 0$

(k) $4x^2 - 20x + 25 = 0$

(l) $(x+1)^2 = 5$

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

(n) $x^2 = 10x + 5$

(o) $3x^2 = 6x - 2$

(p) $(x+3)(x-2) = 2$

(q) $3x^2 - 2 = 6x + 3$

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

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

(t) $\frac{x}{4} + \frac{3}{x} = \frac{5}{2}$

(u) $\frac{x+1}{x+2} + \frac{x+2}{x+3} = 1$

(v) $\frac{x}{x-2} - \frac{x}{3} = 1$

(w) $\frac{x}{3x+1} = \frac{x+2}{2x+3}$

(x) $\frac{x}{x-6} - \frac{2}{x-5} = \frac{2x-9}{x-6}$

SOLVING QUADRATIC EQUATIONS (CONTINUED) - EXERCISES

③ Solve for x :

(a) $\frac{39}{x^2+1} = 3$

(b) $\frac{x+3}{x-3} + \frac{x-3}{x+3} = 3$

(c) $(x^2-7)^2 = 4$

(d) $x(2x^2-36) = 0$

(e) $\sqrt{x^2+1} - 7 = 0$

(f) $x^2[9(x+4)^2-5] = 0$

(g) $2x(x-2)-3=0$

(h) $\sqrt{x(x+2)} - 2 = 0$

(i) $\frac{x-1}{x} = \frac{x}{x+4} - \frac{2x-5}{x}$

(j) $x^2 + \frac{x}{2} - \frac{1}{8} = 0$

(k) $x^2 - 0.6x + 0.05 = 0$

(l) $1.2x^2 - 5.2x - 3.9 = 0$

(m) $x^2 + 3\sqrt{2}x - 5 = 0$

(n) $\sqrt{2}x^2 - 3x + \sqrt{2} = 0$

(o) $\sqrt{2(x+1)} - x = 0$

(p) $x^3 - 6x^2 + 7x = 0$

(q) $9x^3 = 6x^2 + 2x$

(r) $x^3 + 16x^2 + 11x = 0$

(s) $5x^4 + 10x^3 = -6x^2$

(t) $(x^2 - 75)(3x^2 + 4x - 6) = 0$

(u) $x^3 + x^2 - 5x - 5 = 0$ (Hint: factor by grouping)

④ Use the discriminant to determine the type(s) of solution(s) for each quadratic equation:

(a) $11x^2 - 10x - 9 = 0$

(b) $42x^2 + 117x + 66 = 0$

(c) $81x^2 - 198x + 121 = 0$

(d) $17x^2 - 25x + 10 = 0$

⑤ Show that the equation $x^3 - 8 = 0$ has only one real solution. What is that real solution?

⑥ Find a quadratic equation with the given solutions:

(a) $\pm\sqrt{5}$

(b) $3 \pm \sqrt{5}$

(c) $\frac{1 \pm \sqrt{5}}{2}$

⑦ Find k such that:

(a) $-1 + \sqrt{5}$ is a solution of $x^2 + 2x + k = 0$.

(b) $1 - \sqrt{2}$ is a solution of $x^2 + kx - 1 = 0$.

⑧ Find the greatest value of k such that $2x^2 - 5x + k = 0$.

SOLVING QUADRATIC EQUATIONS (CONTINUED) - EXERCISES - ANSWERS

- 1 (a) $\pm\sqrt{5}$ (b) $\pm 3\sqrt{2}$ (c) No sol'n. (d) $\pm\sqrt{6}$ (e) $\pm 2\sqrt{3}$ (f) $-1, 7$ (g) $1 \pm \sqrt{6}$
 (h) $5 \pm \sqrt{3}$ (i) $-5 \pm \sqrt{7}$ (j) No sol'n. (k) $-3 \pm \sqrt{2}$ (l) $4 \pm \sqrt{5}$ (m) $\frac{5 \pm 6\sqrt{5}}{2}$
 (n) $-\frac{1}{3}, \frac{7}{3}$ (o) $-10 \pm 4\sqrt{3}$ (p) $\frac{1 \pm \sqrt{5}}{3}$ (q) $42, 43$ (r) $-4.48, 0.20$ (s) $\pm\sqrt{6}$
 (t) $-7 \pm \sqrt{31}$ (u) $\frac{-5 \pm \sqrt{10}}{2}$
- 2 (a) $1 \pm \sqrt{3}$ (b) $\frac{-3 \pm 3\sqrt{5}}{2}$ (c) $2 \pm \sqrt{7}$ (d) $5 \pm \sqrt{3}$ (e) $\frac{5 \pm \sqrt{17}}{4}$ (f) $\frac{2 \pm \sqrt{10}}{3}$
 (g) $\frac{-1 \pm 2\sqrt{2}}{2}$ (h) No sol'n. (i) $1 \pm \sqrt{13}$ (j) $-\frac{1}{2}, 5$ (k) $\frac{5}{2}$ (l) $-1 \pm \sqrt{9}$
 (m) $6 \pm \sqrt{11}$ (n) $5 \pm \sqrt{30}$ (o) $\frac{3 \pm \sqrt{3}}{3}$ (p) $\frac{-1 \pm \sqrt{33}}{2}$ (q) $\frac{3 \pm 2\sqrt{6}}{3}$ (r) $\frac{-3 \pm \sqrt{13}}{2}$
 (s) $\frac{1 \pm \sqrt{11}}{2}$ (t) $5 \pm \sqrt{13}$ (u) $\frac{-3 \pm \sqrt{5}}{2}$ (v) $1 \pm \sqrt{7}$ (w) $-2 \pm \sqrt{2}$ (x) $6 \pm \sqrt{3}$
- 3 (a) $\pm 2\sqrt{3}$ (b) $\pm 3\sqrt{5}$ (c) $\pm 3, \pm \sqrt{5}$ (d) $0, \pm 3\sqrt{2}$ (e) $\pm 4\sqrt{3}$ (f) $0, \frac{-3 \pm \sqrt{5}}{12}$
 (g) $\frac{2 \pm \sqrt{10}}{2}$ (h) $-1 \pm \sqrt{5}$ (i) $\frac{-3 \pm \sqrt{57}}{2}$ (j) $\frac{-1 \pm \sqrt{3}}{4}$ (k) $0.5, 0.1$ (l) $-0.65, 4.98$
 (m) $\frac{-3\sqrt{2} \pm \sqrt{36}}{2}$ (n) $\sqrt{2}, \frac{\sqrt{2}}{2}$ (o) $1 + \sqrt{3}$ only (p) $0, 3 \pm \sqrt{2}$ (q) $0, \frac{1 \pm \sqrt{3}}{2}$
 (r) $0, \frac{-4 \pm \sqrt{5}}{2}$ (s) 0 only (t) $\pm 5\sqrt{3}, \frac{-2 \pm \sqrt{22}}{3}$ (u) $-1, \pm \sqrt{5}$
- 4 (a) 2 irrational (b) 2 rational (c) 1 rational (d) no real
- 5 consider $x^3 - 8 = (x-2)(x^2 + 2x + 4)$ and real sol'n. is 2
- 6 (a) $x^2 - 5 = 0$ (b) $x^2 - 6x + 4 = 0$ (c) $x^2 - x - 1 = 0$ (7) (a) -4 (b) -2
- 8 $2\frac{5}{8}$ (9) $\frac{4 \pm \sqrt{13}}{3}$ (10) (a) 22.4 cm (b) 5.29 m (11) 1.58 sec (12) 0.38
- 13 4.47 cm (14) (a) 13.42 m (b) 2.79 cm (15) 1.56 (16) 81.12 cm²
- 17 45.12 cm by 4.88 cm (18) 23.53 km (19) 4.81 sec.