

SOLVING QUADRATIC EQUATIONS (CONTINUED) - EXERCISES

③ Solve for x :

Ⓐ $39 = 3(x^2 + 1)$

Ⓑ $(x+3)^2 + (x-3)^2 = 3(x^2 - 9)$

Ⓒ $(x^2 - 7)^2 = 4$

Ⓓ $x(2x^2 - 36) = 0$

Ⓔ $\sqrt{x^2 + 1} - 7 = 0$

Ⓕ $x^2[9(x+4)^2 - 5] = 0$

Ⓖ $2x(x-2) - 3 = 0$

Ⓗ $\sqrt{x(x+2)} - 2 = 0$

Ⓖ $3x^3 + 4x^2 = 9x$

Ⓙ $5x^2 = k(x+k)$

Ⓚ $x^2 - 0.6x + 0.05 = 0$

Ⓛ $1.2x^2 - 5.2x - 3.9 = 0$

Ⓜ $x^2 + 3\sqrt{2}x - 5 = 0$

Ⓝ $\sqrt{2}x^2 - 3x + \sqrt{2} = 0$

Ⓞ $\sqrt{2(x+1)} - x = 0$

Ⓟ $x^3 - 6x^2 + 7x = 0$

Ⓠ $9x^3 = 6x^2 + 2x$

Ⓡ $x^3 + 16x^2 + 11x = 0$

Ⓢ $5x^4 + 10x^3 = -6x^2$

Ⓣ $(x^2 - 75)(3x^2 + 4x - 6) = 0$

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

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

Ⓐ $11x^2 - 10x - 9 = 0$

Ⓑ $42x^2 + 117x + 66 = 0$

Ⓒ $81x^2 - 198x + 121 = 0$

Ⓓ $17x^2 - 25x + 10 = 0$

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:

Ⓐ $\pm\sqrt{5}$

Ⓑ $3 \pm \sqrt{5}$

Ⓒ $\frac{1 \pm \sqrt{5}}{2}$

⑦ Find k such that:

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

Ⓑ $1 - \sqrt{2}$ 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) $-1 \pm \sqrt{5}$
 (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) $\frac{-3 \pm \sqrt{13}}{2}$

- 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) $0, -2 \pm \sqrt{13}$ (j) $\frac{1 \pm \sqrt{21}}{10}$ (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 $x^2 - 8 = (x-2)(x^2 + 2x + 4)$ and real sol'n. at 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 4.68 cm (18) 23.53 km (19) 4.81 sec.