

Solving Quadratic Equations Review

Answer key Final answers only. Try first, then check.

CORE SKILLS

- K1**
- a) $x = 4$ or $x = -\frac{2}{3}$
 - b) $x = 0$ or $x = 6$
 - c) $x = 4$ or $x = -2$
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- K2**
- a) $x = -2$ or $x = 4$
 - b) $x = -1$ or $x = 3$
 - c) $k = 9$: one solution ($x = 1$); $k = 10$: no solutions
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- K3**
- a) $x = -5 \pm \sqrt{7}$
 - b) No real roots: $(x - 3)^2 = -5$
 - c) $x = 3 \pm \frac{\sqrt{22}}{2}$
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- K4**
- a) $x = 2 \pm \sqrt{10}$
 - b) $x = \frac{-1 \pm \sqrt{7}}{3}$
 - c) $x = \frac{5 \pm \sqrt{33}}{4}$; $x \approx 2.69$ or $x \approx -0.19$
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- K5**
- a) $D = 0$; one real root
 - b) $D = -44$; no real roots
 - c) $D = 41$; two real roots

REAL WORLD

- A1**
- a) $t \approx 2.56$ s (the other root, $t \approx -0.16$, is before the bump)
 - b) No: $5t^2 - 12t + 8 = 0$ has $D = -16 < 0$, so $h(t) = 10$ has no solution.
 - c) $t \approx 0.71$ s or $t \approx 1.69$ s. The ball hits the ceiling at about 0.71 s on the way up, so the model stops applying there: the landing at 2.56 s (and the 1.69 s root) never happens as predicted.
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- A2**
- a) $(20 - 2x)(12 - 2x) = 128$, so $x^2 - 16x + 28 = 0$
 - b) $x = 2$ or $x = 14$
 - c) $x = 2$: the path is 2 m wide and the bed is 16 m by 8 m. $x = 14$ is impossible: the bed's width would be $12 - 2(14) = -16$ m.
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- A3**
- a) $n = 200 - 5x$; $P(x) = (x - 10)(200 - 5x) = -5x^2 + 250x - 2000$
 - b) \$20 (100 mugs) or \$30 (50 mugs)
 - c) A loss of \$2000, but that needs $n = 200 - 5(50) = -50$ mugs sold, which is impossible. At \$50 no mugs sell, so the model only applies for $x \leq 40$.

THINK IT THROUGH

- T1**
- a) The expression equals -8 , not 0, so $-2 + \sqrt{3}$ is not a root.
 - b) Line 2: the 4 inside the bracket is multiplied by 3, so it should read $-5 - 12 = 0$. Line 5: a square root needs $\pm$ (and Line 3 becomes $3(x + 2)^2 = 17$).
 - c) $x = -2 \pm \frac{\sqrt{51}}{3}$; $x \approx 0.38$ or $x \approx -4.38$
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- T2**
- a) $2x^2 + 5x - 12 = 0$ (or any non-zero integer multiple)
 - b) $k = 6$ or $k = -6$
 - c) $k > 2$

BOSS LEVEL

- Boss**
- a) $u^2 - 2u - 8 = 0$, so $u = 4$ or $u = -2$
 - b) $x = -1, 1, 2$ or 4
 - c) $k = \frac{153}{16}$
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