

Algebra 1 · Solving Quadratic Equations · Test Answer Key

Common Core A-REI.B.4a, A-REI.B.4b, A-APR.B.3, A-CED.A.1 · mathovore.fr

This key gives a full solution and a scoring guide for every question. Award partial credit as described, and accept any valid method, including factoring in place of the formula when it works.

Algebra 1 Common Core: A-REI.B.4a · A-REI.B.4b · A-APR.B.3 · A-CED.A.1

Question 1: Square roots (2 points)

- a. $x^2 = 16$, so $x = \pm 4$.
b. $x+1 = \pm 5$, so $x = 4$ or $x = -6$. $x = 4$ **or** $x = -6$.

Scoring: 1 point for each part; in (a) both signs are needed, in (b) both solutions are needed.

Question 2: Factoring (2 points)

- a. $(x+8)(x-5) = 0$. $x = -8$ **or** $x = 5$.
b. $(3x+2)(x-1) = 0$. $x = -\frac{2}{3}$ **or** $x = 1$.

Scoring: 1 point for each part, awarded for both solutions.

Question 3: Complete the square (3 points)

$x^2 + 6x = 2$. Add $3^2 = 9$: $(x+3)^2 = 11$. Then $x+3 = \pm\sqrt{11}$.

Exact: $x = -3 \pm \sqrt{11}$. Rounded: $x \approx 0.32$ or $x \approx -6.32$.

Scoring: 1 point for adding 9 to both sides; 1 point for $(x+3)^2 = 11$ and the exact solutions; 1 point for the rounded values.

Question 4: Quadratic formula (3 points)

$a = 2$, $b = -3$, $c = -4$. $b^2 - 4ac = 9 + 32 = 41$.

$x = \frac{3 \pm \sqrt{41}}{4}$. Rounded: $x \approx 2.35$ or $x \approx -0.85$.

Scoring: 1 point for the correct discriminant; 1 point for the exact solutions; 1 point for the rounded values.

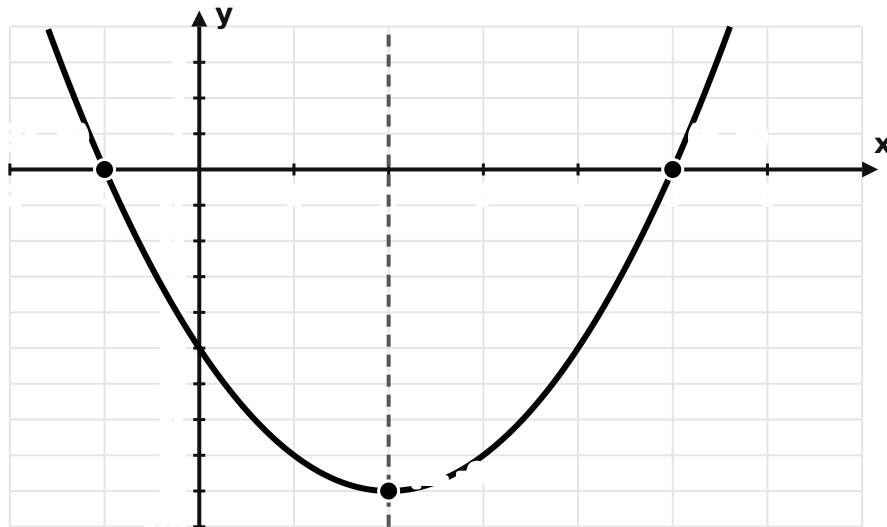
Question 5: Discriminant (2 points)

- a. $(-6)^2 - 4(3)(4) = 36 - 48 = -12$. It is negative, so there are **no real solutions**.
- b. $64 - 4k = 0$, so $k = 16$.

Scoring: 1 point for each part; in (a) the value and the conclusion are both needed.

Question 6: Use a graph (3 points)

- a. The x-intercepts give $x = -1$ **and** $x = 5$. Check: $(x-5)(x+1) = x^2 - 4x - 5$.
- b. Vertex $(2, -9)$; axis $x = 2$.
- c. The graph is below the axis between the zeros: $-1 < x < 5$.

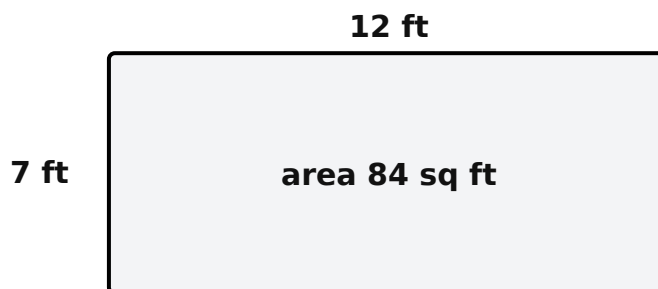


Graph of $y = x^2 - 4x - 5$.

Scoring: 1 point for each part.

Question 7: Rectangle (2 points)

$w(w+5) = 84$, so $w^2 + 5w - 84 = 0$ and $(w+12)(w-7) = 0$. The solution $w = -12$ is rejected, so the width is **7 ft** and the length is **12 ft**. Check: $7 \times 12 = 84$.

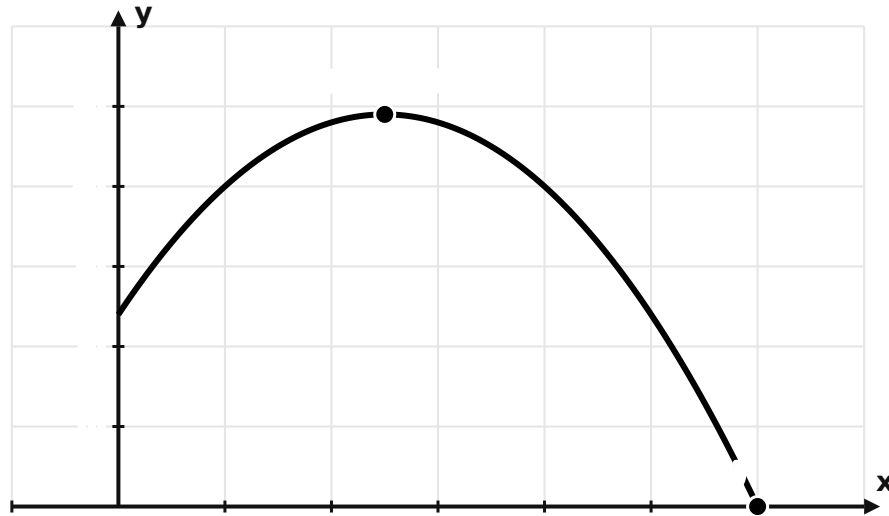


Rectangle model for the problem.

Scoring: 1 point for the equation and its solutions; 1 point for rejecting -12 and giving both dimensions.

Question 8: Ball flight (2 points)

- a. $-16t^2 + 40t + 24 = 0$ gives $-8(2t+1)(t-3) = 0$, so $t = -\frac{1}{2}$ or $t = 3$. The ball lands after **3 seconds**.
- b. $t = -\frac{1}{2}$ is before the ball was hit, and time cannot be negative.



Height of a ball (feet) against time (seconds).

Scoring: 1 point for solving correctly and giving 3 seconds; 1 point for a valid reason to reject $t = -\frac{1}{2}$.

Question 9: No real solution (1 point)

Squaring any real number gives a result that is zero or positive. $3^2 = 9$ and $(-3)^2 = 9$, not -9 . So $x^2 = -9$ **has no real solutions**.

Scoring: 1 point for stating that no real number squares to a negative value (or checking that $3^2 = 9$).

Total
20 points