

Algebra 1: Solving Quadratic Equations & The Quadratic Formula



Use the matching sheet ID when checking answers.

Part A: Solve each quadratic equation below using factoring or the quadratic formula. Select the correct solution set.

1. Find the real roots of the quadratic equation by factoring: $x^2 - 5x - 24 = 0$

Answer: B. $x = 8$ and $x = -3$

Look for two numbers that multiply to -24 and add to -5. The factors are -8 and 3: $(x - 8)(x + 3) = 0$. Setting each factor to zero gives $x = 8$ or $x = -3$.

2. For the quadratic equation $2x^2 - 4x + 5 = 0$, what is the value of the discriminant $D = b^2 - 4ac$, and what does it reveal about the roots?

Answer: B. $D = -24$; no real roots (two complex conjugate roots)

Here $a = 2$, $b = -4$, $c = 5$. Discriminant $D = (-4)^2 - 4(2)(5) = 16 - 40 = -24$. Because $D < 0$, the equation has no real solutions (two complex roots).

3. A projectile's height in feet after t seconds is modeled by $h(t) = -16t^2 + 64t$. At what positive time t does the projectile strike the ground ($h = 0$)?

Answer: B. $t = 4$ seconds

Set $h(t) = 0$: $-16t^2 + 64t = 0 \Rightarrow -16t(t - 4) = 0$. The roots are $t = 0$ (launch) and $t = 4$ seconds (impact).

Part B: Quadratic Structure Fluency. Fill in the missing numerical coefficient or root for each step.

1. For $x^2 + 6x + 9 = 0$, the trinomial is a perfect square trinomial $(x + 3)^2$, yielding the single repeated root $x = -3$ where the discriminant equals 0.

2. To complete the square for $x^2 + 14x = 0$, add $(14 / 2)^2 = 49$ to both sides of the equation.

3. Factoring $2x^2 + 5x - 7 = 0$ into $(2x + 7)(x - 1) = 0$, one integer root is $x = 1$ and the other is $-7/2$.

4. In the standard quadratic formula $x = (-b \pm \sqrt{b^2 - 4ac}) / (2a)$, if $b = -4$ and $a = 1$, then the leading term $-b$ evaluates to $+4$, and the denominator is $2(1) = 2$ multiplied by -1 , equaling -2 .