

**FOR TEACHER / SELF-CHECK USE**

This test was written to cover Unit 8's topics (graphing parabolas, and solving quadratic equations by factoring, completing the square, and the quadratic formula). Every solution below has been independently verified.

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| <b>1</b>  | Need two numbers multiplying to 6 and adding to $-5$ : $-2$ and $-3$ . $(x-2)(x-3) = 0$ .<br><b>Answer: A — <math>x = 2</math> or <math>x = 3</math></b>                                                                                                                   |
| <b>2</b>  | Need two numbers multiplying to $-10$ and adding to $-3$ : $-5$ and $2$ . $(x-5)(x+2) = 0$ .<br><b>Answer: A — <math>x = -2</math> or <math>x = 5</math></b>                                                                                                               |
| <b>3</b>  | $a=2$ , $b=3$ , $c=-2$ . $x = [-3 \pm \sqrt{(9+16)}] / 4 = [-3 \pm 5] / 4$ .<br><b>Answer: <math>x = 1/2</math> or <math>x = -2</math></b>                                                                                                                                 |
| <b>4</b>  | In vertex form $y = a(x-h)^2 + k$ , the vertex is $(h, k) = (3, 4)$ .<br><b>Answer: A — <math>(3, 4)</math></b>                                                                                                                                                            |
| <b>5</b>  | Half of $-6$ is $-3$ ; $(-3)^2 = 9$ . $x^2 - 6x + 9 - 9 + 5 = (x-3)^2 - 4$ .<br><b>Answer: A — <math>y = (x - 3)^2 - 4</math></b>                                                                                                                                          |
| <b>6</b>  | $x^2 + 4x = 5$ . Add $(4/2)^2 = 4$ to both sides: $x^2 + 4x + 4 = 9 \rightarrow (x+2)^2 = 9$ .<br>$x+2 = \pm 3 \rightarrow x = 1$ or $x = -5$ .<br><b>Answer: <math>x = 1</math> or <math>x = -5</math></b>                                                                |
| <b>7</b>  | A negative discriminant means the quadratic formula requires the square root of a negative number, giving two complex conjugate roots.<br><b>Answer: C — Two complex (non-real) solutions</b>                                                                              |
| <b>8</b>  | Axis of symmetry: $x = -b/(2a) = -(-8)/(2 \cdot 2) = 8/4$ .<br><b>Answer: A — <math>x = 2</math></b>                                                                                                                                                                       |
| <b>9</b>  | Vertex time: $t = -b/(2a) = -32/(2 \cdot -16) = 1$ .<br>Maximum height: $h(1) = -16(1)^2 + 32(1) + 5 = -16 + 32 + 5$ .<br><b>Answer: Maximum height of 21 feet at <math>t = 1</math> second</b>                                                                            |
| <b>10</b> | Let $w$ = width; length = $w+4$ . Area: $w(w+4) = 96 \rightarrow w^2 + 4w - 96 = 0$ .<br>Discriminant = $16 + 384 = 400$ , $\sqrt{400} = 20$ . $w = (-4 + 20)/2 = 8$ (reject the negative root).<br>Length = $8 + 4 = 12$ .<br><b>Answer: Width = 8 ft, Length = 12 ft</b> |