

Unit 1 Test — Answer Key

Notation, Domain & Range, Composition, Transformations & Inverses

FOR TEACHER / SELF-CHECK USE

This test was written to cover Unit 1's topics (function notation, domain and range, rates of change, composition, transformations, and inverses). Every solution below has been independently verified.

1	$f(-2) = 2(4) - 3(-2) + 1 = 8 + 6 + 1$. Answer: A — 15
2	The expression under the square root must be ≥ 0: $x - 3 \geq 0$. Answer: A — $x \geq 3$
3	The denominator cannot equal 0: $x^2 - 9 \neq 0 \rightarrow x \neq \pm 3$. Answer: A — All real numbers except $x = 3$ and $x = -3$
4	$(f \circ g)(x) = f(g(x)) = f(2x-3) = (2x-3)^2 + 1 = 4x^2 - 12x + 9 + 1$. Answer: $4x^2 - 12x + 10$
5	Swap x and y: $x = 3y - 5$. Solve for y: $x+5 = 3y \rightarrow y = (x+5)/3$. Answer: A — $f^{-1}(x) = (x + 5)/3$
6	$(x-3)^2$ shifts the graph right 3; $+4$ shifts it up 4. Answer: A — Shift right 3, up 4
7	$f(4) = 16 - 8 = 8$. $f(1) = 1 - 2 = -1$. Average rate = $[f(4) - f(1)] / (4 - 1) = [8 - (-1)]/3 = 9/3$. Answer: 3
8	$f(-x) = (-x)^2 = x^2 = f(x)$, so $f(x) = x^2$ is even. The others fail this test. Answer: A — $f(x) = x^2$
9	$f(7) = \sqrt{9} = 3$. $g(f(7)) = g(3) = 3^2 - 1 = 8$. $g(7) = 49 - 1 = 48$. $f(g(7)) = f(48) = \sqrt{50} = 5\sqrt{2}$. Answer: $(g \circ f)(7) = 8$; $(f \circ g)(7) = 5\sqrt{2}$
10	The transformation $x-2$ shifts the domain right 2: $[-3+2, 5+2] = [-1, 7]$. The $+3$ shifts the range up 3: $[-2+3, 10+3] = [1, 13]$. Answer: Domain = $[-1, 7]$; Range = $[1, 13]$