

Midterm Exam — Answer Key

Cumulative Review: Functions through Trigonometry Foundations

FOR TEACHER / SELF-CHECK USE

This midterm exam was written to cumulatively cover Units 1 through 5. Every solution below has been independently verified.

1	$f(-1) = 2(1) - 3(-1) + 1 = 2 + 3 + 1$. Answer: A — 6
2	The radicand must be ≥ 0 : $x - 5 \geq 0$. Answer: A — $x \geq 5$
3	$g(2) = 3(2) = 6$. $f(6) = 6 - 4$. Answer: 2
4	Slope = $(11-2)/(4-1) = 9/3$. Answer: A — 3
5	Point-slope: $y - 5 = -1(x - 2) \rightarrow y = -x + 2 + 5$. Answer: A — $y = -x + 7$
6	Cost = $20 + 5(8) = 20 + 40$. Answer: \$60
7	Factor: $(x-2)(x-3) = 0 \rightarrow x = 2, 3$. Answer: A — 2, 3
8	The denominator is zero when $x - 4 = 0$. Answer: A — $x = 4$
9	Factor the denominator: $x^2 - 1 = (x-1)(x+1)$. Domain excludes $x = 1$ and $x = -1$. Answer: All real numbers except $x = 1$ and $x = -1$
10	$16 = 2^4$, so $2^x = 2^4$ means $x = 4$. Answer: A — 4
11	$\log_3(x) = 2$ means $x = 3^2$. Answer: A — 9
12	$1000 = 10^3$, so $\log(1000) = 3$. Answer: 3
13	This is a standard exact value from the 45-45-90 triangle / unit circle. Answer: A — $\sqrt{2}/2$
14	300° is in Quadrant IV. Reference angle = $360^\circ - 300^\circ$. Answer: A — 60°

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- 15** 120° is in Quadrant II, where cosine is negative. Reference angle = $180^\circ - 120^\circ = 60^\circ$. $\cos(120^\circ) = -\cos(60^\circ) = -1/2$.

Answer: $-1/2$

- 16** $\sin(\theta) = \text{opposite/hypotenuse} = 5/13$.
Adjacent = $\sqrt{13^2 - 5^2} = \sqrt{169 - 25} = \sqrt{144} = 12$.
 $\cos(\theta) = \text{adjacent/hypotenuse} = 12/13$.

Answer: $\sin(\theta) = 5/13$, $\cos(\theta) = 12/13$