

Unit 5 Test — Answer Key

Unit Circle, Right Triangles, Reference Angles & Exact Values

FOR TEACHER / SELF-CHECK USE

This test was written to cover Unit 5's topics (the unit circle, right-triangle trigonometry, reference angles, and exact trigonometric values). Every solution below has been independently verified.

1	This is a standard exact value from the 30-60-90 triangle / unit circle. Answer: A — $1/2$
2	Adjacent = $\sqrt{5^2 - 3^2} = \sqrt{25-9} = \sqrt{16} = 4$. $\cos(\theta) = \text{adjacent/hypotenuse} = 4/5$. Answer: A — $4/5$
3	210° is in Quadrant III. Reference angle = $210^\circ - 180^\circ$. Answer: 30°
4	This is a standard exact value from the 30-60-90 triangle / unit circle. Answer: A — $1/2$
5	This is a standard exact value from the 45-45-90 triangle / unit circle. Answer: A — 1
6	120° is in Quadrant II, where sine is positive. Reference angle = $180^\circ - 120^\circ = 60^\circ$. $\sin(120^\circ) = \sin(60^\circ)$. Answer: $\sqrt{3}/2$
7	$5\pi/6 = 150^\circ$, which lies between 90° and 180° . Answer: A — Quadrant II
8	$\csc(\pi/3) = 1/\sin(\pi/3) = 1/(\sqrt{3}/2) = 2/\sqrt{3}$, rationalized to $2\sqrt{3}/3$. Answer: A — $2\sqrt{3}/3$
9	The height reached is the side opposite the 60° angle, with the ladder as hypotenuse: height = $20 \cdot \sin(60^\circ) = 20 \cdot (\sqrt{3}/2) = 10\sqrt{3}$. $10\sqrt{3} \approx 17.32$ feet. Answer: Height = $10\sqrt{3} \approx 17.32$ feet
10	$7\pi/6 = 210^\circ$, which is in Quadrant III (reference angle 30°). In QIII, sine and cosine are negative, tangent is positive. $\sin(210^\circ) = -\sin(30^\circ) = -1/2$. $\cos(210^\circ) = -\cos(30^\circ) = -\sqrt{3}/2$. $\tan(210^\circ) = \sin/\cos = (-1/2)/(-\sqrt{3}/2) = 1/\sqrt{3} = \sqrt{3}/3$. Answer: $\sin(\theta) = -1/2$, $\cos(\theta) = -\sqrt{3}/2$, $\tan(\theta) = \sqrt{3}/3$