Trigonometry Test

1. Find the numerical value of the product $\cos(45°)\sin(45°)\tan(45°)$.

    (A) -1 (B) 0 (C) $1/2$ (D) $1/\sqrt{2}$ (E) None of the above.

2. One side of a right triangle has length 5 and the hypotenuse has length 11. What is the cosine of the angle opposite the side of length 5?

    (A) $\dfrac{4\sqrt{6}}{11}$ (B) $\dfrac{5}{11}$ (C) $\dfrac{11}{96}$ (D) $\dfrac{5}{4\sqrt{6}}$ (E) None of the above.

3. One side of a right triangle has length 5 and the hypotenuse has length 11. What is the tangent of the angle opposite the side of length 5?

    (A) $\dfrac{4\sqrt{6}}{11}$ (B) $\dfrac{5}{11}$ (C) $\dfrac{11}{96}$ (D) $\dfrac{5}{4\sqrt{6}}$ (E) None of the above.

4. If $\tan\theta$ and $\sec\theta$ are both negative, which quadrant does θ lie in?

    (A) I   (B) II   (C) III   (D) IV   (E) None of the above.

5. How many solutions does the equation $2\sin(3\alpha) = 1$ have if $0 \le \alpha \le 2\pi$?

    (A) 0 (B) 2 (C) 4 or $3\pi/2$ (D) 6 (E) None of the above.

6. Rewriting the expression

$$\frac{\tan^3(x)\sin(x)\cos^2(x)\csc^2(x)}{\sec^3(x)\cot^2(x)}$$

in terms of $\sin x$ and $\cos x$ results in which of the following?

(A) $\cos x/\sin x$ (B) $\sin^2 x$ (C) $\cos^3 x$ (D) $\sin^4 x$ (E) None of the above.

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7. If the radian measure of an angle is $5\pi/9$ then its degree measure is

(A) $(\pi^2/324)^\circ$ (B) 200° (C) 324° (D) 100° (E) None of the above.

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8. What is the radian measure of the angle whose degree measure is 54°?

(A) $54/\pi$ (B) $3\pi/5$ (C) $3\pi/10$ (D) $3\pi/20$ (E) None of the above.

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9. Suppose that $\tan\theta = \frac{12}{5}$ and that $0 < \theta < \pi/2$. What does $\sec\theta$ equal?

(A) $\dfrac{\sqrt{119}}{5}$ (B) $\dfrac{13}{5}$ (C) $\dfrac{\sqrt{5}}{12}$ (D) $\dfrac{13}{12}$ (E) None of the above.

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10. Find $\sin(u - v)$ if $\sin u = -3/5$ and $\tan v = 12/5$ where u is in Quadrant IV and v is in Quadrant III.

(A) $\dfrac{63}{65}$ (B) $-\dfrac{33}{65}$ (C) $\dfrac{56}{65}$ (D) $\dfrac{16}{65}$ (E) None of the above.

11. Evaluate $\sin(\pi/6) + \cos(\pi/6) + \tan(\pi/6) + \cot(\pi/6) + \sec(\pi/6) + \csc(\pi/6)$.

(A) $5(1 + \sqrt{3})/2$ (B) $1 + 5/\sqrt{3}$ (C) $(3 + 5\sqrt{3})/6$ (D) 0 (E) None of the above.

12. Simplify $\tan(\pi - \theta) + \tan(\theta)$

(A) $2\tan(\theta)$ (B) 0 (C) $-2\tan(\theta)$ (D) $\cot(\theta) - \tan(\theta)$ (E) None of the above.

13. An observer standing at the same elevation 100 feet from the base of a tree measure an angle of $60°$ between the horizontal and the line of sight of the top of the tree. How tall is the tree?

(A) 50 ft   (B) 200 ft   (C) 60 ft   (D) 160 ft   (E) None of the above.

14. On a circle whose radius is 16 what is the length of an arc intercepted by a central angle of $70°$?

(A) $32\cos(36°)$ (B) $28\pi/9$ (C) $56\pi/9$ (D) 32π (E) None of the above.

15. If $\cos(x) = 2/3$ then the value of $\cos(2x)$ is

(A) $-\dfrac{1}{9}$ (B) $-\dfrac{5}{9}$ (C) $\dfrac{5}{9}$ (D) $\dfrac{1}{9}$ (E) None of the above.

16. Which of the following equals $\sin(2\theta)$ for all angles θ?

(A) $2\sin(\theta)\cos(\theta)$ (B) $(1+\cos(x))/2$ (C) $2\cos^2(x) - 1$ (D) $2\sin(x)$ (E) None of the above.

17. If $\sin(\alpha) = 3/4$ and $0 \le \alpha \le \pi/2$ then what is the value of $\tan(\alpha)$?

(A) 3   (B) 3/5   (C) $3/\sqrt{7}$ (D) 4/5   (E) None of the above.

18. If $\sin(\alpha) = 3/4$ and $0 \le \alpha \le \pi/2$ then what is the value of $\tan(2\alpha)$?

(A) $3/\sqrt{7}$ (B) $\sqrt{7}$ (C) 6/5   (D) $-3\sqrt{7}/2$ (E) None of the above.

19. How many solutions does the equation $\cos\theta = \tan\theta$ have in the interval $0 \le \theta \le 2\pi$?

(A) infinitely many   (B) 0   (C) 1   (D) 2   (E) None of the above.

20. Find all solutions to the equation $\sin^2(t) - \sin(t) - 2 = 0$ if t is between 0 and 2π.

(A) $t = 3\pi/2$ (B) $t = \pi/2$ (C) $t = \pi/2$ or $3\pi/2$ (D) $t = 3\pi/4$ (E) None of the above.

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