TRIGONOMETRY TOPIC TEST 2009 (ALPHA)

E IS NONE OF THESE

1. The terminal side of an angle in standard position passes through the point (-3, 4). Find the value of the secant of the angle.

   a) $-\frac{3}{5}$ 　　　　　　 b) $\frac{4}{5}$ 　　　　　　　 c) $-\frac{5}{3}$ 　　　　　　　 d) $\frac{5}{4}$

2. If $cos(\theta) = \frac{3}{8}$ and $270º \le \theta \le 360º$, find $tan(\theta)$.

   a) $\frac{3}{55}$ 　　　　　　 b) $-\frac{\sqrt{55}}{3}$ 　　　　　 c) $-\frac{\sqrt{55}}{8}$ 　　　　　 d) $\frac{\sqrt{73}}{8}$

3. Which of the following is equivalent to: $\frac{1+sec\theta}{tan\theta \,+sin\theta}$?

   a) $sec\theta + csc\theta$ 　　　 b) $csc\theta$ 　　　　　　 c) $cos\theta sin\theta$ 　　　　 d) $cot\theta$

4. A guy wire is attached to the top of a radio antenna and to a point on the level ground 40 meters from the base of the antenna. If the wire makes an angle of $60º$ with the ground, how tall is the tower?

   a) $40\sqrt{3}$ 　　　　　 b) $\frac{40\sqrt{3}}{3}$ 　　　　　 c) $40\sqrt{2}$ 　　　　　 d) 80

5. Find all the degree-measure of all the angles x *in* the interval $0º \le x \le 360º$
   for which $2(sin(x) + cos(x)) < \sqrt{1 + 2\sin(x)\cos(x)}$

   a) $225º < x < 315º$ 　　 b) $135º < x < 315º$ 　　　 c) $150º < x < 300º$ 　　 d) $120º < x < 300º$

6. Find the value of $sin\left(tan^{-1}\left(\frac{15}{8}\right) + cos^{-1}\left(\frac{4}{5}\right)\right).$

   a) $\frac{36}{85}$ 　　　　　 b) $\frac{77}{85}$ 　　　　　 c) $\frac{84}{85}$ 　　　　　 d) $\frac{33}{85}$

7. Find the sum of the solutions of: $3tan^2\mu - 1 = 0$ in the interval $0 \le \mu \le 2\pi$

   a) 4π 　　　　　　 b) 3π 　　　　　　 c) 2π 　　　　　　 d) π

8. Find $tan\,2A$ if $csc\,A = \frac{3}{2}$ and $\angle A$ is in the 2nd quadrant.

   a) $4\sqrt{5}$ 　　　　　 b) $\sqrt{5}$ 　　　　　 c) $-4\sqrt{5}$ 　　　　 d) $-\sqrt{5}$

9. Which of the following is equivalent to: $\frac{\cos\varphi}{1-\sin\varphi} - \frac{1-\sin\varphi}{\cos\varphi}$.

   a) $2sin\,\varphi$ 　　　　 b) $2cos\,\varphi$ 　　　　 c) $2tan\,\varphi$ 　　　　 d) 0
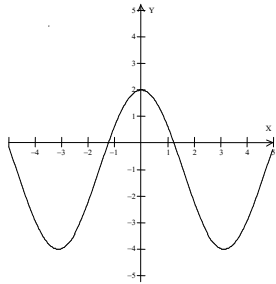
10. Find the value of $\left(cos\frac{11\pi}{6} + sin\frac{\pi}{6}\right)\left(tan\frac{\pi}{6} + cot\frac{4\pi}{3}\right)$.

a) $\frac{\sqrt{3}-1}{3}$ b) 0   c) $\frac{\sqrt{3}-3}{3}$ d) $\frac{\sqrt{3}+3}{3}$

11. Find the amplitude, period, and phase shift of the graph of $f(x) = 2cos\ 3x - 2sin\ 3x$.

a) Amp. =2, Period = $\frac{2\pi}{3}$, P.S. = $\frac{\pi}{4}$ b) Amp. =$2\sqrt{2}$, Period = $\frac{\pi}{3}$, P.S. = $\frac{\pi}{4}$

c) Amp. =$2\sqrt{2}$, Period = $\frac{2\pi}{3}$, P.S. = $\frac{\pi}{12}$ d) Amp. =2, Period = $\frac{2\pi}{3}$, P.S. = $\frac{\pi}{12}$

12.

Which of the following functions is represented in the graph at the left? (Each mark is 1 unit)

a) $f(x) = 3sin\ x - 1$ b) $f(x) = 3cos\ x - 1$
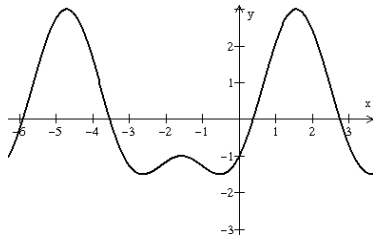
c) $f(x) = 3sin\ (x - 1)$ d) $f(x) = 3cos\ x + 1$

13. If $sin\ A = \frac{2}{3}$ and $cos\ B = \frac{\sqrt{10}}{5}$, find $3cos\ A + 5sin\ B$. ($\angle A$ and $\angle B$ are acute angles)

a) $2 + \sqrt{10}$ b) $\frac{5\sqrt{5}+3\sqrt{15}}{15}$ c) $\sqrt{5} + \sqrt{15}$ d) $\frac{\sqrt{5}+\sqrt{15}}{15}$

14. Which of the following equivalent to $sin\ 3t - sin\ 7t$.

a) $2sin(5t)sin(2t)$ b) $2cos(5t)sin(2t)$ c) $-2sin(5t)sin(2t)$ d) $-2cos(5t)sin(2t)$

15. Which of the following is closest to the <u>approximate</u> value of the amplitude and period of the following graph?
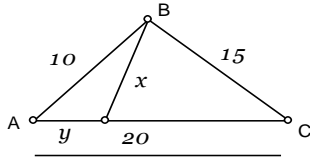

a) A = 3, Period = 4.3

b) A = 2.25, Period = 6.2

c)   A = 1.5, Period = 5

d)   A = 3, Period = 5.9

16. In ΔPQR, $cos\ Q = \frac{\sqrt{3}}{2}$, $cos\ R = -\frac{2}{3}$, and $q = 6$. Find the value of r.

a) $-\frac{2\sqrt{3}}{3}$ b) $-2\sqrt{5}$ c) $2\sqrt{5}$ d) $4\sqrt{5}$

17. Find the area of $\triangle ABC$

   a) $\dfrac{25\sqrt{15}}{4}$ b) $\dfrac{75\sqrt{15}}{16}$

   c) $\dfrac{75\sqrt{15}}{4}$ d) $\dfrac{55\sqrt{15}}{4}$

18. In figure #17, if $y = 5$, find the value of x.

   a) $\dfrac{5\sqrt{58}}{4}$ b) $\dfrac{5\sqrt{15}}{8}$ c) $\dfrac{5\sqrt{14}}{7}$ d) $\dfrac{15}{2}$

19. Which of the following is a solution to $\dfrac{16^{\sin x}}{2^{\cos 2x}} = 2 \cdot 2^{\sin^2 x}$.

   a) $\dfrac{\pi}{3}$ b) $\dfrac{5\pi}{6}$ c) $\dfrac{\pi}{4}$ d) $\dfrac{11\pi}{6}$

20. In $\triangle PQR$, $\cos Q = \dfrac{\sqrt{7}}{4}$, $\cos R = -\dfrac{2}{3}$. and $q = 6$. Find the value of r.

   a) $\dfrac{8\sqrt{5}}{3}$ b) $\dfrac{3\sqrt{5}}{2}$ c) $\dfrac{18\sqrt{7}}{7}$ d) $\dfrac{4\sqrt{5}}{5}$

21. Evaluate: $\cos[Tan^{-1}\left(-\dfrac{\sqrt{3}}{3}\right)]$.

   a) $-\dfrac{\sqrt{3}}{2}$ b) ½   c) $\dfrac{\sqrt{3}}{2}$ d) −½

22. If $0° < x < 180°$, which of the following degree measure of an angle x satisfies the equation: $\sin(6x) + \cos(4x) = 0$.

   a) 26°   b) 58°   c) 99°   d) 170°

23. Which of the following is equivalent to $(1 - i)^5$?

   a) $-4\sqrt{2}\left(\cos\left(\dfrac{5\pi}{4}\right) - i\sin\left(\dfrac{5\pi}{4}\right)\right)$ b) $4\sqrt{2}\left(\cos\left(\dfrac{5\pi}{4}\right) - i\sin\left(\dfrac{5\pi}{4}\right)\right)$

   c) $-4\sqrt{2}\left(\cos\left(\dfrac{5\pi}{4}\right) + i\sin\left(\dfrac{5\pi}{4}\right)\right)$ d) $4\sqrt{2}\left(\cos\left(\dfrac{\pi}{4}\right) - i\sin\left(\dfrac{\pi}{4}\right)\right)$

24. Find the distance between the points: $A(4; 30°)$ and $B(-6; 60°)$ in the polar plane.

   a) $2\sqrt{12 + 3\sqrt{3}}$ b) $2\sqrt{13 - 4\sqrt{3}}$ c) $2\sqrt{-3 + 6\sqrt{3}}$ d) $2\sqrt{13 + 6\sqrt{3}}$

25. If $sin\ 2x = \frac{24}{25}$, find the value of $sin^4x + cos^4x$.

    a) $\frac{581}{625}$ b) $\frac{144}{625}$ c) $\frac{288}{625}$ d) $\frac{337}{625}$

26. Which of the following is the least positive value of $x + y$ (in degrees) for which $2\ sec\ 2x = tan\ y + cot\ y$?

    a) 30   b) 45   c) 60   d) 90

27. If $0 < x < \frac{\pi}{4}$, and $cos\ x + sin\ x = \frac{5}{4}$, find the numerical value for $cos\ x - sin\ x$.

    a) $\frac{5\sqrt{7}}{4}$ b) $\frac{\sqrt{5}}{16}$.   c) $\frac{\sqrt{7}}{4}$ d) $\frac{9}{16}$

28. How many times does the graph of $y = 2cos(3x - \frac{\pi}{2})$ cross the x – axis in the interval $[0, \pi]$?
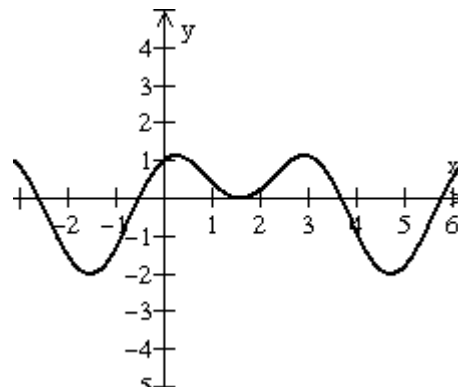
    a) 3   b) 4   c) 5   d) 6

29. Find all solutions in the interval $[0, \pi)$ for $sin\ 2x\ tan\ 2x + sin\ 2x = 0$.

    a) $0, \frac{\pi}{2}, \frac{5\pi}{8}$ b) $\frac{\pi}{2}, \frac{5\pi}{8}$ c) $\frac{\pi}{2}, \pi, \frac{5\pi}{8}$ d) $0, \frac{\pi}{2}, \frac{5\pi}{8}, \frac{7\pi}{8}$

30. Which of the following equations is represented in the graph?

    a) $y = cos\ 2x - sin\ x$

    b) $y = sin\ 2x + cos\ x$

    c) $y = cos\ 2x + sin\ x$

    d) $y = cos\ 2x + sin\ 2x$

Tie-Breakers:

1. Given $cos\ 2A = \frac{\sqrt{3}}{4}$, and $0 \le A \le \frac{\pi}{2}$, find the value of $csc\ A$.

2. Find the area of $\triangle ABC$ if $a = 5$, $c = 6$ and $cos\ B = 120°$.

3. Change: $\dfrac{sec\ A}{sin\ A} - \dfrac{sin\ A}{cos\ A}$ to a single trigonometric function.