Hustle 2009

Trigonometry

1. How many times will the graph of $y = sin4x$ intersect the x-axis on the interval $[0,4\pi]$?

2. A 16-foot ladder leans against a wall making a 60^o angle with the ground. Exactly how high will the ladder
reach on the wall?

3. What is the name of the figure obtained when $r = 3 + 3cos\theta$ is graphed?

4. Evaluate: $sin\frac{\pi}{6} + cos\frac{\pi}{2} - tan\frac{\pi}{4} + sin\frac{3\pi}{2}$

5. If $sec\,\theta = 2$, then what values of θ on $[0, 2\pi)$ are solutions?

6. Which quadrant contains an angle that measures 4 radians?

7. Solve for θ where $0 \le \theta < 2\pi$. $2\,cos^2\theta - cos\,\theta - 1 = 0$

8. What is the period of $y = 3 - 4\,sin\,(3x - \pi)$?

9. Find the value of $cos\,2\theta$ if θ is in quadrant 1 and $\cos\,\theta = \frac{5}{13}$.

10. Express in rectangular form: $5(cos\,30^o + \boldsymbol{i}\,sin\,30^o)$

11. What is the phase shift of the trigonometric function $y = -4sin\left(3x - \frac{\pi}{4}\right) - 2$?

12. Find the perimeter of triangle MAT if $m = 10$, $a = 8$, and $T = 120^o$.

13. $Arc\,sin\,(tan\,(Arc\,cos\,(-1)))$ = ?

14. If $0 \le \theta \le \frac{\pi}{2}$ and $cos\,\theta = \frac{7}{25}$, then $csc\,\theta$ = ?

15. $sin\frac{7\pi}{6} + cos\frac{11\pi}{3}$ = ?

16. The vectors $< g, 5 >$ and $< 3, -2 >$ are orthogonal. The vectors $< m, -3 >$ and $< 6, 2 >$ are parallel.
Find $g \div m$.

17. How many petals are in the graph of the rose $r = -3\,sin\,(5\theta)$?

18. If $3\,sin^2 x\,(cos^2 x - 1) = A\,sin^B x$, then find $A + B$.

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19. State the maximum value of the function: $y = -3 \sin(4x - 3) - 5$

20. Express 62.485° in DMS (degrees, minutes, seconds) form.

21. Find the radian measure of the angle on the interval $[0, 2\pi)$ that is coterminal with the angle in standard position measuring 2009°.

22. $\tan x = \frac{-3}{4}$ and $\angle x$ lies in Quadrant II, $\sec y = \frac{-13}{12}$ and $\angle y$ lies in Quadrant III. Find $\cos(x + y)$.

23. In ΔBHS, $\angle B = 60^\circ$, $\angle S = 45^\circ$, and $s = 8$ cm. What is the measure of side b?

24. If $\sin 6x - \sin 2x = R \sin Px \cos Qx$, find $R \cdot P \cdot Q$.

25. Let $f(x) = 2 \sin^2 \theta \cos \theta$. Determine the **least value** obtained when the following expressions are evaluated:

$\left\{ f\left(\frac{\pi}{6}\right),\ f\left(\frac{\pi}{2}\right),\ f\left(\frac{2\pi}{3}\right),\ f\left(\frac{5\pi}{4}\right) \right\}$