Unit Five   **Precalculus Practice Test**   **Trigonometric Identities**

Name:_____Period:____Date:_____

NON-CALCULATOR SECTION

Short Answer:

1. Write the half-angle identities for sine and cosine.

2. For each type of triangle, name the law (Sine or Cosine) you would use to solve it.
   SSS –   AAS –

   ASA –   SAS –

3. Write the sum and difference identities for tangent.

Review:

4. State the amplitude, period, phase shift, vertical translation, domain and range for the
   sinusoid. $y = 3\sin\left(\dfrac{1}{2}x - \pi\right) - 3$

   _____   _____   _____   _____   _____   _____

5. Evaluate the following logarithms.

   A. $\log_2 32$ B. $\log_5 \dfrac{1}{25}$ C. $\log 10000$ D. $\ln \dfrac{1}{\sqrt[3]{e}}$

6. Write an equation for the quadratic function whose graph contains the vertex $(3, -2)$
   and point $(1, 4)$.

Problems:
Be sure to show all work used to obtain your answer. Circle or box in the final answer.

7. Use the fundamental identities to find $\tan\theta$ if $\sec\theta = 4$ and $\sin\theta < 0$.

8. Simplify the expression: $\dfrac{\tan x}{\csc^2 x} + \dfrac{\tan x}{\sec^2 x}$

9. Simplify the expression: $\dfrac{\sin x}{1-\cos x} + \dfrac{1-\cos x}{\sin x}$

10. Write the expression in factored form involving one trigonometric function only:
$\cos x - 2\sin^2 x + 1$

11. Find all solutions of the equation $\sin^2 x - 2\sin x - 3 = 0$ on the interval $[0, 2\pi)$.

12. Use the sum or difference identity to find the exact value of $\tan 15°$.

13. Use a half-angle identity to find the exact value of $\tan 195°$.

14. Prove the identities:

a. $\cos 3x = 4\cos^3 x - 3\cos x$

b. $\cos\left(x - \dfrac{\pi}{2}\right) = \sin x$

c. $\tan\left(\theta - \dfrac{3\pi}{2}\right) = -\cot\theta$

d. $\left(1 - \tan x\right)^2 = \sec^2 x - 2\tan x$

e. $\tan^2\theta - \sin^2\theta = \tan^2\theta\sin^2\theta$

15. Prove the identities:

a. $\dfrac{\tan x}{1-\cot x}+\dfrac{\cot x}{1-\tan x}=1+\sec x\csc x$

b. $\left(\cos t-\sin t\right)^2+\left(\cos t+\sin t\right)^2=2$

16. Find all solutions to the equation in the interval $[0,2\pi)$.

a. $\cos 2x+\cos 4x=0$

b. $\sin 3x=\sin x$

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CALCULATOR SECTION

In problems 17-21, consider the triangle ABC. Express your answers as decimals rounded to the nearest hundredth. If more than one triangle is possible, give all possible answers. If no triangle can be made, write "No triangle possible".

17. If $A = 33°$, $B = 70°$, and $b = 7$, find a.

18. If $a = 3$, $b = 5$, and $c = 8$, find A.

19. If $a = 19$, $c = 18$, and $C = 68°$, find A and B.

20. If $b = 12$, $c = 7$, and $A = 55°$, find a.

21. If $a = 5$, $b = 9$, and $c = 7$, find B.

22. If $a = 17$, $c = 16$, and $C = 36°$, how many triangles are determined?

23. Tony must find the distance between points A and B on opposite sides of a lake. He locates a point C that is 860 ft from A and 175 ft from B. If the angle at C is $78°$, what is the distance AB?

24. Find the area of a triangle with sides 23, 19, and 12.

25. Find the area of the triangle: $a = 10$, $c = 22$, and $B = 101°$