

EXAM 3 - MTH 122 SPRING 2011

MTH 122 (98 points + 2 free)
8 April, 2011

Name: _____

Read all of the following information before starting the exam:

- **On the next page, mark the 7 problems of the following 9 that you would like to receive credit for. If you mark nothing, I will grade problems 1-7. If you mark less than 7, I will grade those you mark and then n many more until I have graded 7 total problems, starting from problem 1.**
- Show all work, clearly and in order, if you want to get full credit. I reserve the right to take off points if I cannot see how you arrived at your answer (even if your final answer is correct).
- Justify your answers algebraically whenever possible to ensure full credit. When you do use your calculator, sketch all relevant graphs and explain all relevant mathematics.
- Circle or otherwise indicate your final answers.
- Please keep your written answers brief; be clear and to the point.
- Good luck!

Please mark the 7 problems you would like to receive credit for.

Problem Number	Grade?
1	
2	
3	
4	
5	
6	
7	
8	
9	

1. (14 points) Fill out the following table.

Function	Amplitude	Period	Vertical Translation	Phase Shift
$y = \cos(2x)$				
$y = 2 \sin(x - \pi)$				
$y = \sin(5x) + 2$				

2. (14 points) Write the first function in terms of the second function.

- a. (7 pts) $\sin(x)$; $\cos(x)$
b. (7 pts) $\cot(x)$; $\sin(x)$

3. (14 points) Write each expression in terms of sine and cosine, and simplify so that no quotients appear in the final expression.

- a. (7 pts) $\sec(\theta)\cot(\theta)\sin(\theta)$
b. (7 pts) $\cos(\theta)\csc(\theta)$

4. (14 points) Use fundamental identities to simplify each expression to a constant, a single function, or a power of a function.

a. (466 pts) $\tan(\theta)\cos(\theta)$

b. (466 pts) $\frac{\sin(\beta)\tan(\beta)}{\cos(\beta)}$

c. (466 pts) $\frac{\csc(\theta)\sec(\theta)}{\cot(\theta)}$

5. (14 points) Verify each trigonometric identity.

a. (7 pts) $\cos^2(\theta)(\tan^2(\theta) + 1)$

b. (7 pts) $\sin^2(\beta)(1 + \cot^2(\beta)) = 1$

6. (14 points) Find an angle θ that makes the statement true.

a. (14 pts) $\cos(\theta) = \sin(3\theta + 10^\circ)$

b. (14 pts) $\sin(3\theta - 15^\circ) = \cos(\theta + 25^\circ)$

7. (14 points) Find $\cos(s + t)$ and $\cos(s - t)$ when $\cos(s) = -\frac{1}{5}$ and $\sin(t) = \frac{3}{5}$, s and t in quadrant *II*.

8. (14 points) Verify the following identities.

a. (7 pts) $\sin(210^\circ + x) - \cos(120^\circ + x) = 0$

b. (7 pts) $\tan(x - y) - \tan(y - x) = \frac{2(\tan(x) - \tan(y))}{1 + \tan(x)\tan(y)}$

9. (14 points) Determine the remaining sides and angles of each triangle.

a. (7 pts) $A = 68.41^\circ$, $B = 54.23^\circ$, $a = 12.75$

b. (7 pts) $C = 74.08^\circ$, $B = 69.38^\circ$, $c = 45.38$