

Test #3 (Part 2, Calculator Okay)

Math 150, Prof. Beydler

Name: _____

Thursday, May 18, 2017

Directions: Show all work. No books or notes. A **scientific calculator** is allowed. Your desk and lap must be clear (no phones, no smart watches, etc.). Write your answers in the indicated places, or box your answers. Good luck!

1. (3 points) Verify that the following equation is an identity.

$$2 \tan x \csc 2x - \tan^2 x = 1$$

2. (3 points) Find the exact value of $\cos \frac{7\pi}{12}$. Be sure to show your work here.

Answer: _____

3. (3 points) Find the exact value of $\sin 2\theta$ given that $\sin \theta = -\frac{\sqrt{5}}{7}$ and $\cos \theta > 0$.

Answer: _____

4. (3 points) Given $\cos x = -\frac{5}{12}$ and $\pi < x < \frac{3\pi}{2}$, find the exact value of $\cos \frac{x}{2}$.

Answer: _____

5. (4 points) Write $\tan(2 \cos^{-1} x)$ as an algebraic expression in x only, where $-1 \leq x \leq 1$.

Answer: _____

6. (4 points) Solve $\cos 2x = \cos x$ over the interval $[0, 2\pi)$.

Answer: _____

7. (3 points) Solve $2 \tan^2 x \sin x = \tan^2 x$ over the interval $[0, 2\pi)$.

Answer: _____

8. (4 points) Find all solutions of $3 \tan 3x = \sqrt{3}$. Then list the solutions in the interval $[0, 2\pi)$. Be sure your solutions are exact and in radians.

All solutions: _____

Solutions in $[0, 2\pi)$: _____

9. (3 points) Solve triangle ABC if $A = 37^\circ$, $B = 48^\circ$, $c = 18$ m.

Angle C : _____

Side a : _____

Side b : _____

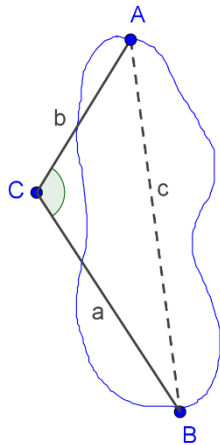
10. (3 points) The bearing of a lighthouse from a ship was found to be $N 25^\circ E$. After the ship sailed 1.5 mi due south, the new bearing was $N 17^\circ E$. Find the distance between the ship and the lighthouse at each location.

Distance when bearing $N 25^\circ E$: _____

Distance when bearing $N 17^\circ E$: _____

11. (5 points) Solve triangle ABC if $B = 32^\circ$, $b = 6.1$ ft, $c = 11$ ft.

12. (2 points) A surveyor wishes to find the distance between two inaccessible points A and B on opposite sides of a lake. While standing at point C, she finds that $b = 153$ m, $a = 102$ m, and angle ACB measures 135° . Find the distance from A to B.



Answer: _____

13. (3 points) Solve triangle ABC if $a = 7$ ft, $b = 11$ ft, and $c = 15$ ft. Write your angles in degrees.

Angle A: _____

Angle B: _____

Angle C: _____

Please double check your work.

Also, remember to turn in your homework and extra credit review exercises! ☺

Formulas given (if you need them):

$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

$$\tan \frac{A}{2} = \pm \sqrt{\frac{1 - \cos A}{1 + \cos A}}$$

$$\tan \frac{A}{2} = \frac{\sin A}{1 + \cos A}$$

$$\tan \frac{A}{2} = \frac{1 - \cos A}{\sin A}$$