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MATH 127 FINAL EXAM SAMPLE

NOTE: The actual exam will only have 13 questions. The different parts of each question (part A, B, etc.) are variations. Know how to do all the variations on this exam.

1A.) (4 pts) Find the exact value: $1 + \tan^2\left(\frac{\pi}{6}\right) - \csc^2\left(\frac{\pi}{4}\right)$

1A. _____

1B.) (4 pts) Find the exact value: $3 \cot^2\left(\frac{\pi}{3}\right) + 2 \cos\left(\frac{\pi}{6}\right)$

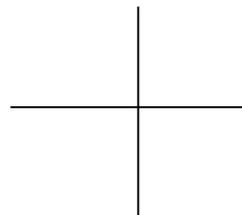
1B. _____

2A.) (5 pts) Find the exact value of $\csc\left(\frac{10\pi}{3}\right)$ using reference angles.

Indicate the ref. angle and draw in standard position.

2A. _____

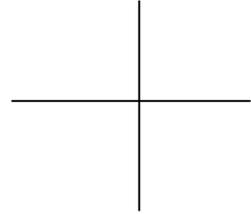
Ref. angle: _____
(Express in radians)



2B.) (5 pts) Find the exact value of $\sec(480^\circ)$ using reference angles.
Indicate the ref. angle and draw in standard position.

2B. _____

Ref. angle: _____
(Express in degrees)



3A.) (5 pts) Find the following given:
 $\cot \theta = 5$ and $180^\circ < \theta < 270^\circ$.

$\cos \theta$: _____ $\sec \theta$: _____

$\sin \theta$: _____ $\csc \theta$: _____

$\tan \theta$: _____

3B.) (5 pts) Find the following given:
 $\sin \theta = \frac{7}{25}$ and $\tan \theta < 0$.

$\cos \theta$: _____ $\sec \theta$: _____

$\sin \theta$: _____ $\csc \theta$: _____

$\tan \theta$: _____

4A.) (5 points) Use the following equation to answer the questions: $y = -2 \cos\left(\frac{1}{2}x - \frac{\pi}{2}\right)$

i.) Find the period. 4i. _____

ii.) Find the amplitude. 4ii. _____

iii.) Find the phase shift. 4iii. _____

iv.) Graph the function over one period.

4B.) (5 points) Use the following equation to answer the questions: $y = 3 \sin\left(\frac{5}{4}x + \frac{\pi}{4}\right)$

i.) Find the period. 4i. _____

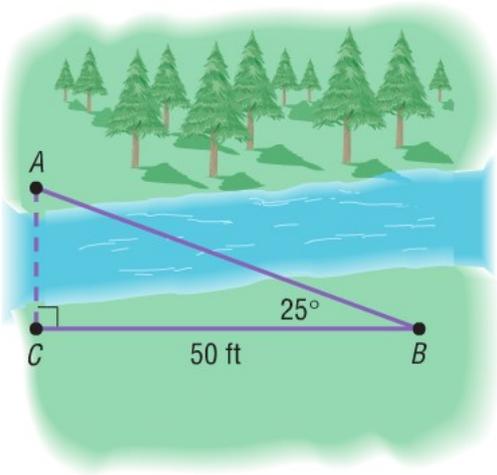
ii.) Find the amplitude. 4ii. _____

iii.) Find the phase shift. 4iii. _____

iv.) Graph the function over one period.

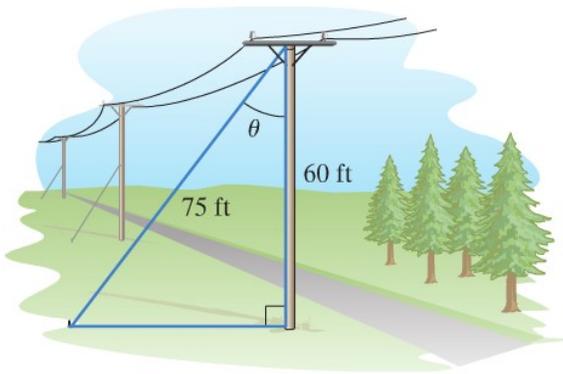
5A.) (4 pts) Find the distance from **A to C** in the figure below:

5A. _____



5B.) (4 pts) Find the angle between the wire and the pole to the nearest degree.

5B. _____



6A.) (4 pts) At 10:00 AM on April 26, 2005, a building 300 feet high casts a shadow 50 feet long. What is the angle of elevation of the Sun?

6A. _____

6B.) (4 pts) From an airplane at an altitude (height) of 1200m, the angle of depression to a rock on the ground measures 28° . Find the distance from the plane to the rock.

6B. _____

7A.) (4 pts) Use a right triangle to write $\sec\left(\sin^{-1}\left(\frac{x}{\sqrt{x^2+4}}\right)\right)$ as an algebraic expression. Assume that x is positive and that the given inverse trigonometric function is defined for the expression in x .

7A. _____

7B.) (4 pts) Use a right triangle to write $\sin(\cos^{-1}(2x))$ as an algebraic expression. Assume that x is positive and that the given inverse trigonometric function is defined for the expression in x .

7B. _____

8A.) (5 pts) Verify the identity: $\cos x \cot x + \sin x = \csc x$

8B.) (5 pts) Verify the identity: $\frac{1 + \sin \theta}{1 - \sin \theta} - \frac{1 - \sin \theta}{1 + \sin \theta} = 4 \tan \theta \sec \theta$

9A.) (5 pts) Verify the identity: $\cos\left(\theta - \frac{3\pi}{2}\right) = -\sin \theta$

9B.) (5 pts) Verify the identity: $\frac{\sin\left(x + \frac{3\pi}{2}\right)}{\cos(\pi - x)} = 1$

10A.) (5 pts) Verify the identity: $\sec(2\theta) = \frac{\sec^2 \theta}{2 - \sec^2 \theta}$

10B.) (5 pts) Verify the identity: $\cot x = \frac{1 + \cos 2x}{\sin 2x}$

11A.) (5 pts) Solve for θ on the interval $[0, 2\pi]$:

$$(2 \cos \theta - \sqrt{3})(\sin^2 \theta - 1) = 0$$

11A. _____

11B.) (5 pts) Solve for θ on the interval $[0, 360^\circ]$:

$$\sin x + 2 \sin x \cos x = 0$$

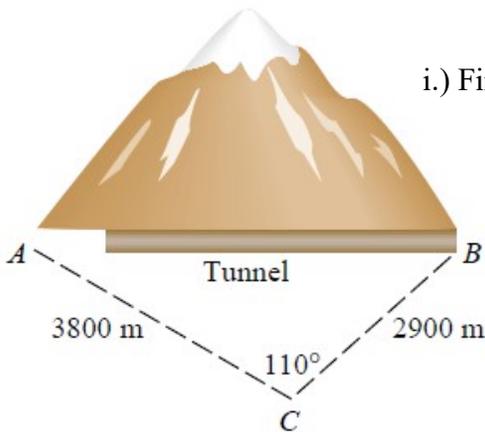
11B. _____

12A.) (4 pts) Convert the rectangular equation $x^2y = 4$ into a **polar** equation that expresses r in terms of θ .

$r =$ _____

12B.) (4 pts) Convert the rectangular equation $(x-2)^2 + y^2 = 4$ into a **polar** equation that expresses r in terms of θ . $r =$ _____

13A.) (5 points) To measure the distance through a mountain for a proposed tunnel, a point C is chosen that can be reached from each end of the tunnel (see figure). Given: $AC = 3800$ meters, $BC = 2900$ meters, and angle C is 110° . Round all answers to two decimal places.

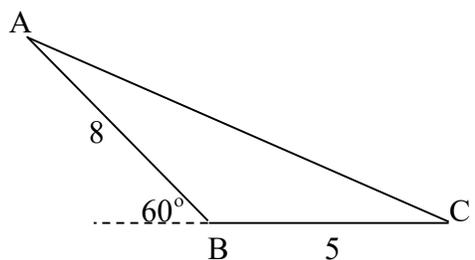


i.) Find the length of the tunnel. i. _____

ii.) Find $m\angle B$. ii. _____

13B.) (5 pts) In the figure below, find AC and the measure of angle C.
Round your answers to the nearest hundredth.

AC: _____



$m\angle C$: _____

MATH 127 FINAL REVIEW PROBS

<u>Section</u>	<u>Problems</u>
4.2	#95 – 98
4.3	#33 – 38, 55, 56
4.4	#31 – 54, 63 – 74
4.5	#39 – 44
4.7	#71 – 76
5.1	#37 – 52, 75 – 78, 81, 82
5.2	#41 – 52
5.3	#21 – 32
5.5	#33 – 47, 56, 69, 70, 74
6.3	#5 – 22 (Triangle will be drawn or picture provided)
7.1	#45 – 56

The final exam will be closed-book, but you may use ONE 3 by 5 card (both sides). The exam will be constructed by using similar problems listed above and from this sample test. If a section we covered does not appear on the above list, then it won't be on the final.