ALEKS® Take Home Test #3 #1

PreCalculus / Mat146 ***SPRING 2013*** (Prof. Porter)

Student Name/ID:

1. Prove the identity.

$$\left(1 - \cos^2 x\right)\cot x = \sin x \cos x$$

2. Complete the proof of the identity by choosing the Rule that justifies each step.

$$\left(1 - \sin^2 x\right)\csc x$$

$$= \cos^2 x \csc x$$

$$= \cos^2 x \left(\frac{1}{\sin x}\right)$$

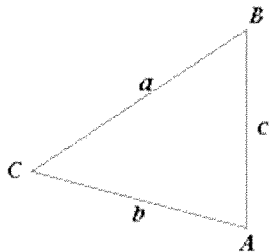$$= \cos x \left(\frac{\cos x}{\sin x}\right)$$

$$= \cos x \cot x$$

3. Find the amplitude, period, and phase shift of the function.

$$y = 2 + 2\cos\left(\pi x + \frac{\pi}{3}\right)$$

Give the exact values, not decimal approximations.

4. Consider a triangle ABC like the one below. Suppose that $B = 25°$, $C = 106°$, and $a = 7$. (The figure is not drawn to scale.) Solve the triangle.
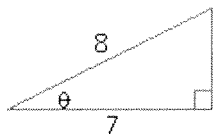
Round your answers to the nearest tenth.

5.

Let θ be an angle in quadrant III such that $\tan\theta = \dfrac{7}{2}$.

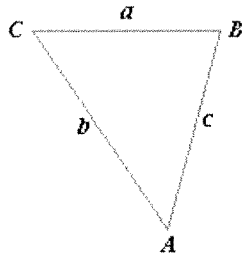Find the exact values of $\cos\theta$ and $\csc\theta$.

6. Find $\tan\theta$, $\cos\theta$, and $\csc\theta$, where θ is the angle shown in the figure.

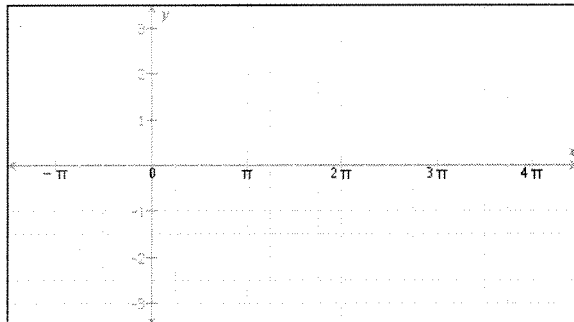Give exact values, not decimal approximations.

7. Consider a triangle ABC like the one below. Suppose that $a = 61$, $b = 51$, and $c = 27$. (The figure is not drawn to scale.) Solve the triangle.

Carry your intermediate computations to at least four decimal places, and round your answers to the nearest tenth.

8.
Graph the function $y = \dfrac{3}{2} \cos\left(\dfrac{2}{3} x - \dfrac{\pi}{3}\right)$.
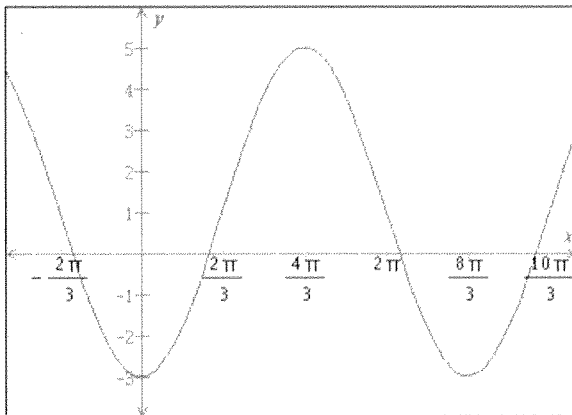

9. Find all solutions of the equation in the interval $[0, 2\pi)$.

$$\cos\theta - 1 = -1$$

Write your answer in radians in terms of π.
If there is more than one solution, separate them with commas.

10. Write the equation of a sine or cosine function to describe the graph.

11.

Find the exact value of $\sin^{-1}\left(-\dfrac{1}{2}\right)$.

Write your answer in radians in terms of π .

12. Determine the quadrant in which the terminal side of θ lies.

(a) $\sin \theta < 0$ and $\tan \theta > 0$
quadrant {I, II, III, IV}
(b) $\sin \theta < 0$ and $\cos \theta < 0$
quadrant {I, II, III, IV}

Take Home Test #3 #1 Answers for class PreCalculus / Mat146 ***SPRING 2013***

1.

Statement	Rule
$\left(1-\cos^2 x\right)\cot x$	
$\sin^2 x \cot x$	Pythagorean
$\sin^2 x \left(\dfrac{\cos x}{\sin x}\right)$	Quotient
$\sin x \cos x$	Algebra

2.

Statement	Rule
$\left(1-\sin^2 x\right)\csc x$	
$\cos^2 x \csc x$	Pythagorean
$\cos^2 x \left(\dfrac{1}{\sin x}\right)$	Reciprocal
$\cos x \left(\dfrac{\cos x}{\sin x}\right)$	Algebra
$\cos x \cot x$	Quotient

3. Amplitude: 2

Period: 2

Phase shift: $-\dfrac{1}{3}$

4. $A = 49°$, $b = 3.9$, $c = 8.9$
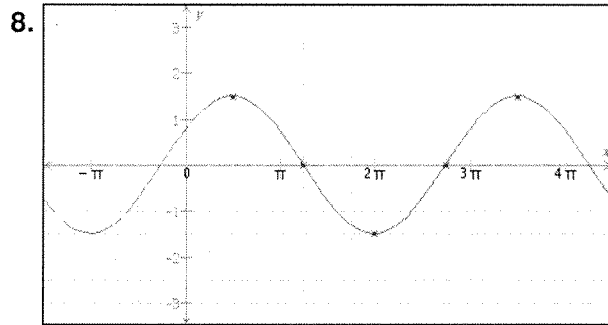
5.

$$\cos\theta = -\frac{2\sqrt{53}}{53}$$

$$\csc\theta = -\frac{\sqrt{53}}{7}$$

6.

$$\tan \theta = \frac{\sqrt{15}}{7}$$

$$\cos \theta = \frac{7}{8}$$

$$\csc \theta = \frac{8}{\sqrt{15}}$$

7. $A = 98.2°$, $B = 55.9°$, $C = 26.0°$

8.

9. $\theta = \frac{\pi}{2}, \frac{3\pi}{2}$

10. $y = -4\cos\left(\frac{3}{4}x\right) + 1$

11. $-\frac{\pi}{6}$

12.

(a) $\sin \theta < 0$ and $\tan \theta > 0$	quadrant III
(b) $\sin \theta < 0$ and $\cos \theta < 0$	quadrant III

Part #2 is the following:

Given the data (100,30),(200,15),(300,30),(400,45),(500,30),

(a) Find: The sine regression.

(b) Give the period, amplitude, and phase shift.

(c) Graph one period.

(d) Predict what y will be when x is 15420

(e) Tell me for ALL x when y will be 40.

Graph the Conics:

(f) $\dfrac{(y-4)^2}{16} - \dfrac{(x+3)^2}{9} = 1$

(g) $\dfrac{(x-1)^2}{16} + \dfrac{(y+7)^2}{9} = 1$

Where are the centers $(4,-3)$, $(1,-7)$

$(-3,8)(-3,0)$ $(1,-10),(1,-3)$

Give the vertices: _____ $(5,-7)(-3,-7)$

Is the following equation a circle, ellipse, hyperbola, parabola, none of these?

y^2 + x -3y -23 = 0 ANSWER: __Parabola__

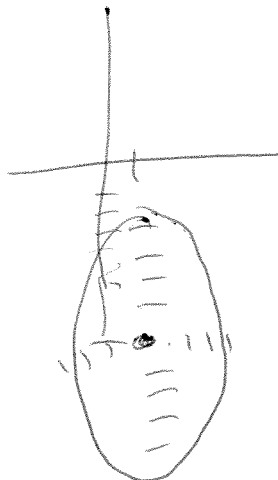x^2 + y^2 - 3x + 2y - 23 = 0 ANSWER: __Circle__

3x^2 - y^2 - 3x + 2y - 23 = 0 ANSWER: __Hyp.__

3x^2 + y^2 - 3x - 23 = 0 ANSWER: __Ellipse__

(g)

STAT EDIT

L1	L2
100	30
200	15
300	30
400	45
500	30

STAT CALC C: Sinreg

(a)
$a = 15$
$b = .015...$
$c = 1.57... = \pi b$
$d = 30.$

$\text{Period} = \dfrac{2\pi}{b} = \dfrac{2\pi}{.015}$
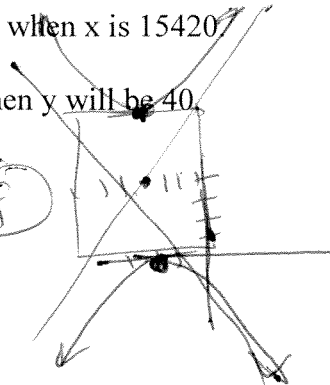
(b)
$\boxed{\text{Period} = 400}$
$\boxed{\text{Amp.} = a = 15}$
$\boxed{P.S = -c/B = -100}$

$Y_1 = VARS \; 5: 77$
zoom stat.

(c)
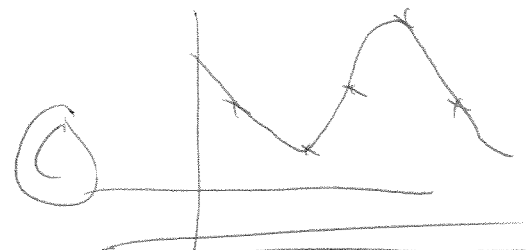
(d) $Y_1(15420) = 15.73.$
Evaluate

$Y_2 = 40$
calc 5: Intersect

(e) Solve Intersect
$X = 346.45... + 400n$
$X = 453.54... + 400n$