

Exam 3
Chapters 4,5 and 6

Answer the following questions. *Answers without proper evidence of knowledge will not be given credit.* Make sure to make reasonable simplifications. Do not approximate answers. Give exact answers. **No calculators are allowed on this exam.**

True or False (2 points each)

_____ 1. Two angles are coterminal if they differ by a multiple of 2π radians.

_____ 2. $\sin x = \cos(\pi/2 - x)$

_____ 3. $\ln(MN) = \ln(M) \cdot \ln(N)$

_____ 4. $e^{x+y} = e^x \cdot e^y$

Matching Graphs

Label each graph below with the appropriate trigonometric function. (2 points each)

Show your work!

1. Solve the following equations.(3 points each)

a) $\log_3(27) = y$

b) $\ln(1) = x$

c) $4^x = 1/16$

2. Evaluate the following functions. Remember the range of the inverse trigonometric functions.
(3 points each)

a) $\tan(3\pi/4)$

b) $\arcsin(-\sqrt{3}/2)$

c) $\cos(14\pi/3)$

3. Evaluate the following functions. (3 points each)

a) $\arccos(1/2)$

b) $\arcsin(\cos(2\pi/3))$

c) $\sec(\arcsin(1/\sqrt{2}))$

d) $\tan(2 \arcsin(-1/2))$

4. Use the sum,difference, double-angle and/or half-angle formulas to evaluate **two** of the following. Clearly indicate which two you would like graded. (10 points each)

a) $\cos(7\pi/12)$

b) $\tan(3\pi/8)$

c) $\sin(285^\circ)\cos(15^\circ) - \cos(285^\circ)\sin(15^\circ)$

5. Determine if the following pairs of angle are coterminal. (5 points each)

a) $\alpha = 750^\circ$ and $\beta = -30^\circ$

b) $\gamma = 5\pi/2$ and $\theta = -3\pi/2$

6. Use the sum-to-product and product-to-sum identities to evaluate each of the following functions. (5 points each)

a) $\cos(5\pi/24) \sin(-\pi/24)$

b) $\sin(285^\circ) - \sin(15^\circ)$

7. Verify the following identities.

a) $1 + \sec x \sin x \tan x = \sec^2 x$ (3 points)

b) $\frac{\sec x}{\tan x} - \frac{\tan x}{\sec x} = \cos x \cot x$ (7 points)

Extra Credit

EC 1. From a highway overpass, 15 meters above the road, the angle of depression of an oncoming car is measured at 30° . How far is the car from the point on the highway directly below the observer? (5 points)

EC 2. Solve for x in the equation $\log_5(x) - \log_5(x - 2) = 3$.