WORKSHEET 8: 18 points

Math 6B-030 Spring 2021

Due: Friday, May 28th, 11:59pm via Gradescope

Question 1 (5 points) Describe when a function has an inverse function and what it means to have an inverse. Include what kind of restriction can be made on a function so that it can have an inverse if it does not initially. Explain visually and verbally how this applies to $h(x) = \cos(x)$, $v(x) = \sin(x)$, $m(x) = \tan(x)$ (for x in radians and for x in degrees) and what the domain/range of their inverses are.

Question 2 (5 points) Assume θ is in **radians**. The angles requested are measured counter-clockwise from the positive x-axis to the ray corresponding to the given point. The 4 triangles depicted with one side on the x-axis are right triangles.

(a). (3 points) Fill-in the following table:

A:
Coordinate: (,)

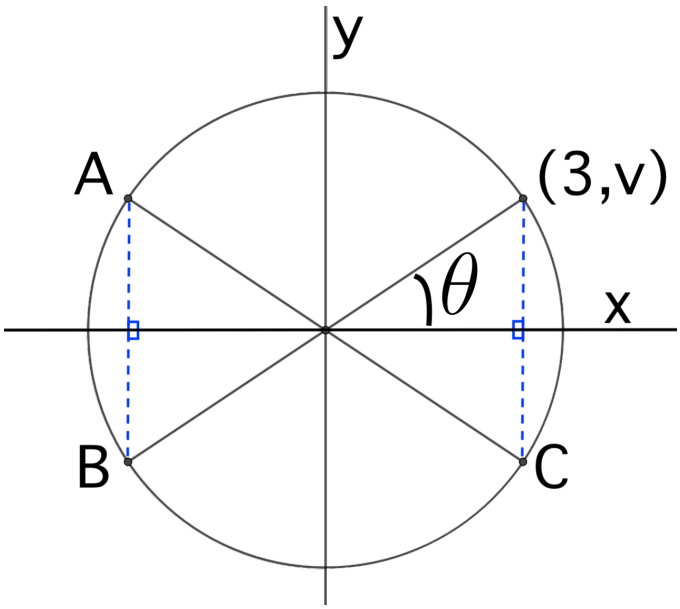
Angle: _____

B:
Coordinate: (,)

Angle: _____

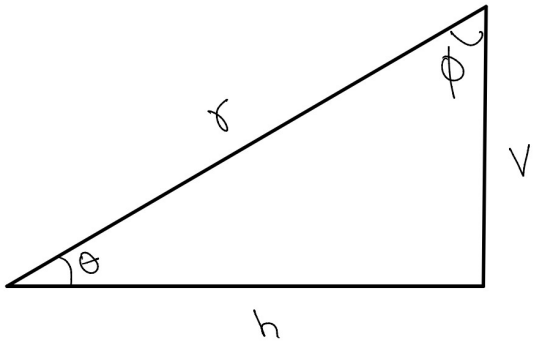
C:
Coordinate: (,)

Angle: _____



(b). (2 points) Write θ in terms of the other unknown quantity, v. $\theta =$_____

Question 3 (4 points) Determine all information about the following triangles without using a calculator. Each part is independent of the previous part. Here is a labeled right triangle:



(a). (2 points) Triangle A has 2 known side lengths: $h = 5$ cm and $v = 2$ cm. Determine Triangle A's hypotenuse r and angles, θ and ϕ in degrees. Draw a picture, carefully write out all your work, and include units. Your final answer may include unevaluated trig or inverse trig functions.

(b). (2 points) Triangle B has 1 known side length and 1 known angle: $r = 9$ cm and $\theta = 70°$. Determine Triangle B's angle, ϕ in degrees and each of its side lengths h and v. Draw a picture, carefully write out all your work, and include units. Your final answer may include unevaluated trig or inverse trig functions.

Question 4 (4 points) True or false: the following is an identity. Assume that θ is in radians. **JUSTIFY** your answers completely. A correct justification is necessary to receive any credit.

Recall: an identity is an equation that is ALWAYS true. If the statement is false, you can show this with one example where the equation does not hold. If the statement is true, you need to show that it is true for all values of θ. You may sometimes find it helpful to justify using graphs.

(a). (2 points) $\sin(\theta - \frac{\pi}{2}) = \cos(\theta)$

(b). (2 points) $\cos(-\theta) = \cos(\theta)$