

Worksheet 10

MATH 006B - Schmidt

Winter 2021

Instructions:

- Show ALL your work to receive credit! Cross off anything you do not wish to be graded.
- Leave all answers in exact form. Some answers may involve trigonometric functions or their inverses.
- Simplify your answers as much as possible. For instance, evaluate 2^2 , but not $\sqrt{2}$.
- Work with your group on the following exercises. Each of you will turn in your own work via Gradescope.
- Your group may ask the TA questions, which the TA will answer with leading questions (not answers) to help guide you to the answer.

1. (6 points) Rigorously verify each identity. $\csc \rightarrow \frac{1}{\sin}$ $\sec \rightarrow \frac{1}{\cos}$

(a) (3 points) $\frac{\sin(x)}{\csc(x)} + \frac{\cos(x)}{\sec(x)} = 1$

$$\sin^2 x + \cos^2 x = 1$$

$$\frac{\sin(x)}{\csc(x)} + \frac{\cos(x)}{\sec(x)} = 1$$

$$\frac{\sin}{\frac{1}{\sin}} + \frac{\cos}{\frac{1}{\cos}} = 1 \rightarrow \sin x \cdot \frac{\sin(x)}{1} + \cos(x)$$

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(b) (3 points) $\tan(x) + \cot(x) = \sec(x) \csc(x)$

$$\tan(x) + \cot(x) = \sec(x) \csc(x)$$

$$\frac{\sin(x)}{\cos(x)} + \frac{1}{\tan(x)} = \frac{1}{\cos} \cdot \frac{1}{\sin}$$

$$\frac{\sin(x)}{\cos(x)} + \frac{\cos(x)}{\sin(x)} = \frac{1}{\cos} \cdot \frac{1}{\sin}$$

$$\sec(x) \csc(x)$$

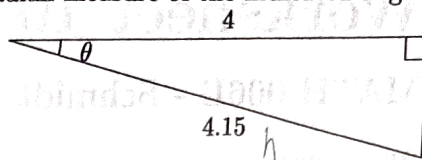
$$\frac{\sin(\sin)}{\cos(\cos)} + \frac{\cos(\sin)}{\sin(\cos)} = \frac{\sin^2 + \cos^2}{\cos \sin} = \sec(x) \csc(x)$$

2. (3 points) Consider the right triangle below. Assume θ is the radian measure of the indicated angle.

(a) (1 point) Find $\cos(\theta)$.

$$\cos(\theta) = \frac{x}{4.15}$$

(b) (1 point) Find θ .



(c) (1 point) Find the length of the unlabeled side.

Don't use the Pythagorean Theorem ($a^2 + b^2 = c^2$) or the tangent function in your work.

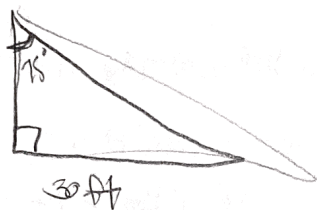
$$a^2 + b^2 = c^2$$

$$4.15 \sin(\cos^{-1}(4/4.15))$$

$$4.15 \cdot \sin(\cos^{-1}(4/4.15)) = \frac{x}{4.15} \cdot 4.15$$

3. (5 points) A state trooper is parked 30 feet from a highway. A truck passes the state trooper. The state trooper's angle of viewing from where the truck passed the trooper to where the truck is after 2 seconds is 75° . Let d be the distance (in feet) the truck traveled in two seconds.

(a) (2 points) Draw a picture and label it carefully with all given quantities (including d).



(b) (2 points) How many feet did the truck travel in those 2 seconds after passing the state trooper?
Show your work.

(c) (1 point) What was the truck's average speed (in feet per second) over those 2 seconds?

4. (1 point) Participation – no submission