This quiz reviews some basic trigonometry used in some soon-to-be-covered sections.

You may work this quiz either:

- (1) on your own paper, in which case, box your answer and show your work
- (2) on this paper, in which case, put your answer in the provided box and justify your answer by showing your work beneath the box.
- 1. We know that

1

&

 $\cos \theta$

&

 $\sin \theta$

satisfies the well-known equation

$$\cos^2\theta + \sin^2\theta = 1. (1)$$

DERIVE a similar equation (which you will need to know) relating

1

&

 $\tan \theta$

&

(one other trigometric function)(θ).

Answer:1

- **2.** Express $\arctan \sqrt{3}$ in radians. ANSWER:² $\arctan \sqrt{3} =$
- **3.** Express $\arctan(-\sqrt{3})$ in radians. ANSWER: $\arctan(-\sqrt{3}) =$

¹Justify your answer beneath the box. To Derive \neq to look up in a book. Start with the well-known equation in (1) and perform a few algebraic steps to quickly arrive at an equation involving tan. Would you rather memorize this need-to-know equation or just remember how to quickly derive it from the well-known equation (1)? Just for fun: in this problem replace tan with cot and give it a try.

²Justify your answer beneath the box, e.g., a properly marked reference triangle or an explanation of how you see it from a properly marked unit circle.

4. Let $x = 5 \sec \theta$ and $0 < \theta < \frac{\pi}{2}$.

Without using inverse trigonometric functions, express $\tan \theta$ as a function of x.

ANSWER: $\tan \theta =$

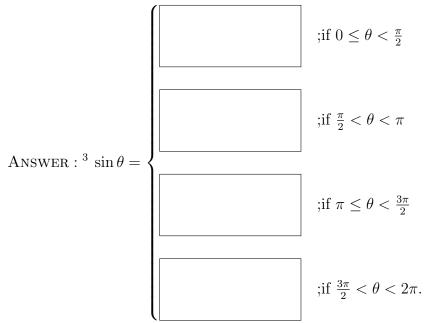
5. Let $x = 5 \sec \theta$ and $\frac{\pi}{2} < \theta < \pi$.

Without using inverse trigonometric functions, express $\tan \theta$ as a function of x.

ANSWER: $\tan \theta =$

 $^{^3}$ Justify your work either by some algebra or by a properly marked unit circle/reference triangle, along with a brief explanation of what you are thinking.

6. Let $u = 5 \tan \theta$. Without using inverse trigonometric functions, fill out the below chart to express $\sin \theta$ as a function of u.



Hint: For each quadant, compare the sign (i.e., positive or negative) of $\sin \theta$ with the sign of $\tan \theta$.