

SCORE: ____ / 20 POINTS

NO CALCULATORS ALLOWED

YOU MUST SHOW PROPER WORK TO RECEIVE FULL CREDIT

Using the fundamental identities, simplify $\sec(-m)\cos(\frac{\pi}{2}-m)$.

SCORE: ____ / 2 POINTS

$$\begin{aligned} &= \frac{1}{2} \boxed{\sec m} \boxed{\sin m} \frac{1}{2} \text{ OR } = \frac{1}{\cos(-m)} \sin m \\ &= \boxed{\frac{1}{\cos m} \cdot \sin m} \\ \text{OR } &= \boxed{\frac{\sin m}{\cos m}} = \boxed{\tan m} \frac{1}{2} \end{aligned}$$

Use the trigonometric substitution $x = 3 \sec \theta$

SCORE: ____ / 3 POINTS

to write the algebraic function $\sqrt{4x^2 - 36}$ as a trigonometric function. Simplify your answer. (Assume $0 \leq \theta < \frac{\pi}{2}$.)

$$\begin{aligned} &\sqrt{4(3 \sec \theta)^2 - 36} \\ &= \boxed{\sqrt{36 \sec^2 \theta - 36}} \\ &= 6 \sqrt{\sec^2 \theta - 1} \\ &= \frac{1}{2} \boxed{6 \sqrt{\tan^2 \theta}} = \boxed{6 \tan \theta} \frac{1}{2} \end{aligned}$$

Prove that $\tan x - \csc x \sec x = -\cot x$.

SCORE: ____ / 6 POINTS

$$\begin{aligned} &\downarrow \\ &= \boxed{\frac{\sin x}{\cos x}} - \boxed{\frac{1}{\sin x} \frac{1}{\cos x}} \\ &= \boxed{\frac{\sin^2 x - 1}{\sin x \cos x}} \\ &= \boxed{\frac{-\cos^2 x}{\sin x \cos x}} \\ &= \boxed{\frac{-\cos x}{\sin x}} \text{ OR JUST CANCEL COS } x \text{ IN PREVIOUS STEP} \\ &= -\cot x \end{aligned}$$

↖ - 1/2 IF FORGOTTEN



If $\cot x = \frac{3}{2}$ and $\csc x < 0$, find $\sin x$ using the fundamental identities (NOT TRIANGLES).

SCORE: ___ / 3 POINTS

$$\begin{aligned}\csc^2 x &= 1 + \cot^2 x \\ &= 1 + \left(\frac{3}{2}\right)^2 \\ &= \frac{13}{4}\end{aligned}$$

OR
 $\frac{1}{2}$

$$\csc x = -\frac{\sqrt{13}}{2}$$

$$\sin x = \frac{1}{\csc x} = -\frac{2}{\sqrt{13}}$$

$\frac{1}{2}$ $\frac{1}{2}$

Prove that $\frac{\cos x \cot x}{1 - \sin x} - 1 = \csc x$.

SCORE: ___ / 6 POINTS

$$\begin{aligned}&\downarrow \\ &= \frac{\cos x \cdot \frac{\cos x}{\sin x}}{1 - \sin x} - 1 \\ &= \frac{\cos^2 x}{\sin x (1 - \sin x)} - 1 \\ &= \frac{\cos^2 x - \sin x (1 - \sin x)}{\sin x (1 - \sin x)} \\ &= \frac{\cos^2 x - \sin x + \sin^2 x}{\sin x (1 - \sin x)} \\ &= \frac{\cos^2 x + \sin^2 x - \sin x}{\sin x (1 - \sin x)} \\ &= \frac{1 - \sin x}{\sin x (1 - \sin x)} \\ &= \frac{1}{\sin x} \\ &= \csc x \leftarrow -\frac{1}{2} \text{ IF FORGOTTEN}\end{aligned}$$