

Question 9

Let

$$f(x) = \tan^2(x) + \sec^2(x)$$

- (a) Differentiate $f(x)$ using the standard differentiation formulas for trigonometric functions.
- (b) Simplify your answer.

Question 9 - Solution**(a) Differentiate $f(x)$:**

We are given:

$$f(x) = \tan^2(x) + \sec^2(x)$$

We apply the chain rule and known derivatives:

$$\frac{d}{dx}[\tan^2(x)] = 2 \tan(x) \sec^2(x) \text{ (using chain rule)}$$

$$\frac{d}{dx}[\sec^2(x)] = 2 \sec^2(x) \tan(x) \text{ (using chain rule)}$$

So:

$$f'(x) = 2 \tan(x) \sec^2(x) + 2 \sec^2(x) \tan(x)$$

(b) Simplify:

Both terms are the same:

$$f'(x) = 4 \tan(x) \sec^2(x)$$

Final Answer:

$f'(x) = 4 \tan(x) \sec^2(x)$
