M4 | 4-4 Practice ANSWERS

C Problems

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

2.) $= \frac{1}{\cos x} \cdot \sin x$
$= \tan x$ ✓

3.) $= \frac{\tan^2 x}{\tan x}$
$= \tan x$ ✓

4.) $= \frac{1}{\cos x} \cdot \sin x \cdot \frac{\cos x}{\sin x}$
$= 1$ ✓

5.) $= (1 - \sin^2 x) - \sin^2 x$
$= 1 - 2\sin^2 x$ ✓

6.) $= \frac{1}{\tan x} + \frac{\tan x}{\tan x}$
$= \cot x + 1$ ✓

7.) $= \frac{\cos x}{\tan y} + \frac{\frac{\sin x}{\cos x}}{\sin x}$ ⟶ $= \frac{\sin x}{\cos x} \cdot \frac{1}{\sin x}$
$= \cot x + \frac{1}{\cos x}$
$= \boxed{\cot x + \sec x}$

8.) $= 1 - \sin x \cdot \cos x \cdot \frac{\sin x}{\cos x}$
$= 1 - \sin^2 x$
$= \cos^2 x$ ✓

9.) $= 1 - 2(1 - \cos^2 x)$
$= 1 - 2 + 2\cos^2 x$
$= -1 + 2\cos^2 x$
$= 2\cos^2 x - 1$ ✓

10.) $= \frac{\sin x \cot x}{\sin x} + \frac{\cos x}{\sin x}$
$= \cot x + \cot x$
$= 2\cot x$ ✓

B Problems

11.) $= \frac{\frac{\sin x}{\cos x}}{\sec^2 x}$
$= \frac{\sin x}{\cos x} \cdot \frac{\cos^2 x}{1}$
$\frac{\cancel{}}{\cos x}$
$= \sin x \cdot \cos x$ ✓

12.) $= \sin x \cdot \frac{\sin x}{\cos x} + \cos x \cdot \frac{\cos x}{\cos x}$
$= \frac{\sin^2 x}{\cos x} + \frac{\cos^2 x}{\cos x}$
$= \frac{\sin^2 x + \cos^2 x}{\cos x}$
$= \frac{1}{\cos x}$
$= \sec x$ ✓

⟶

B Problems (cont'd)

13.) $= \dfrac{\cos x (1 + \sin x)}{(1 - \sin x)(1 + \sin x)}$

$= \dfrac{\cos x (1 + \sin x)}{(1 - \sin^2 x)}$

$= \dfrac{\cos x (1 + \sin x)}{\cos^2 x}$

$= \dfrac{1 + \sin x}{\cos x}$ ✓

14.) $= \cos^2 x - (1 - \cos^2 x)$

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

$= 2\cos^2 x - 1$ ✓

15.) $\dfrac{1 + \sin x}{(1 - \sin x)(1 + \sin x)} - \dfrac{1 - \sin x}{(1 - \sin x)(1 + \sin x)}$

$= \dfrac{1 + \sin x}{1 - \sin^2 x} - \dfrac{1 - \sin x}{1 - \sin^2 x}$

$= \dfrac{1 + \sin x - (1 - \sin x)}{\cos^2 x}$

$= \dfrac{2 \sin x}{\cos^2 x}$

$= 2 \cdot \dfrac{\sin x}{\cos x} \cdot \dfrac{1}{\cos x}$

$= 2\tan x \cdot \sec x$ ✓

A Problems

16.) $= \left(1 + \dfrac{1}{\sin x} \right)(1 - \sin x)$

$= 1 - \sin x + \dfrac{1}{\sin x} - 1$

$= \dfrac{1}{\sin x} - \sin x \cdot \dfrac{(\sin x)}{(\sin x)}$

$= \dfrac{1}{\sin x} - \dfrac{\sin^2 x}{\sin x}$

$= \dfrac{1 - \sin^2 x}{\sin x}$

$= \dfrac{\cos^2 x}{\sin x}$

$= \dfrac{\cos x}{\sin x} \cdot \cos x$

$= \cot x \cdot \cos x$ ✓

17.) $= \dfrac{1 + \dfrac{1}{\cos x}}{\dfrac{\sin x}{\cos x} + \sin x}$

$= \dfrac{1 + \dfrac{1}{\cos x}}{\sin x \left(\dfrac{1}{\cos x} + 1 \right)}$

$= \dfrac{1}{\sin x}$

$= \csc x$ ✓

A Problems (cont'd.)

18.)
$$= \frac{1}{\frac{\cos x}{\sin x} - \frac{\sin x}{\cos x}}$$

$$= \frac{1}{\frac{\cos^2 x}{\sin x \cos x} - \frac{\sin^2 x}{\sin x \cos x}} \cdot \frac{\sin x \cos x}{\sin x \cdot \cos x}$$

$$= \frac{\sin x \cdot \cos x}{\cos^2 x - \sin^2 x}$$

$$= \frac{\sin x \cos x}{(1 - \sin^2 x) - \sin^2 x}$$

$$= \frac{\sin x \cos x}{1 - 2\sin^2 x} \checkmark$$

19.)
$$= \sec^2 x \sin^2 x + \sin^2 x + 2\sin x \cos x + \cos^2 x - \sec^2 x$$
$$ \overset{=1}{\underbrace{\qquad}}$$
$$= \sec^2 x \cdot \sin^2 x - \sec^2 x + 2\sin x \cos x + 1$$
$$= \sec^2 x (\sin^2 x - 1) + 2\sin x \cos x + 1$$
$$= \sec^2 x (-\cos^2 x) + 2\sin x \cos x + 1$$
$$= -1 + 2\sin x \cos x + 1$$
$$= 2\sin x \cos x \checkmark$$

20.)
$$= \frac{1 + \frac{1}{\cos x}}{\frac{\sin x}{\cos x} + \frac{\sin x}{1}} \cdot \frac{\cos x}{\cos x}$$

$$= \frac{\cos x + 1}{\sin x + \sin x \cos x}$$

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

$$= \frac{1}{\sin x}$$

$$= \csc x \checkmark$$

A Problems (cont'd.)

21.) $(csc^2x - cot^2x)(csc^2x + cot^2x)$

$= (csc^2x + (csc^2x - 1))$

$= csc^2x + csc^2x - 1$

$= 2csc^2x - 1$ ✓

22.) $= \dfrac{1 + 2\sin x \cos x}{\sin x + \cos x} \cdot \dfrac{(\sin x + \cos x)}{(\sin x + \cos x)}$

$= \dfrac{(1 + 2\sin x \cos x)(\sin x + \cos x)}{\sin^2x + 2\sin x \cos x + \cos^2x}$

$= \dfrac{(1 + 2\sin x \cos x)(\sin x + \cos x)}{1 + 2\sin x \cos x}$

$= \sin x + \cos x$ ✓

23.) $= \dfrac{(1 - \sin^2x) + 3\sin x - 1}{(1 - \sin^2x) + 2\sin x + 2}$

$= \dfrac{-\sin^2x + 3\sin x}{-\sin^2x + 2\sin x + 3}$

$= \dfrac{-\sin x(\sin x - 3)}{-(\sin x - 3)(\sin x + 1)}$

$= \dfrac{\sin x}{\sin x + 1} \cdot \dfrac{csc x}{csc x}$

$= \dfrac{1}{1 + csc x}$ ✓

24.) $= \dfrac{1}{\sec x - \tan x} \cdot \dfrac{(\sec x + \tan x)}{(\sec x + \tan x)}$

$= \dfrac{\sec x + \tan x}{\sec^2x - \tan^2x}$

$= \dfrac{\sec x + \tan x}{1}$

$= \sec x + \tan x$ ✓