Do Now: From Exercise Set A #s 9, 25, and 27

9. $(\tan\theta)(\csc\theta)$ is equivalent to

(1) $\sin\theta$ **(2)** $\cos\theta$ **(3)** $\csc\theta$ **(4)** $\sec\theta$

$$\frac{\sin\theta}{\cos\theta}\cdot\frac{1}{\sin\theta} = \frac{1}{\cos\theta} = \sec\theta$$

25. $\dfrac{2(1+\cos A)}{\sin^2 A+\cos A+\cos^2 A}$ is equivalent to

(1) 1 **(2)** 2 **(3)** $\dfrac{2}{\sin A}$ **(4)** $\dfrac{2}{\cos A}$

$$\frac{2(1+\cos A)}{1+\cos A} = 2$$

27. $\sin^4 B-\cos^4 B$ is equivalent to

(1) $1+\cos^2 B$ **(3)** $\sin^2 B+\cos^2 B$

(2) $1-\cos^2 B$ **(4)** $\sin^2 B-\cos^2 B$

think of x^4-y^4

$(x^2+y^2)(x^2-y^2)$

$(\sin^2 B+\cos^2 B)(\sin^2 B-\cos^2 B)$

$(1)(\sin^2 B-\cos^2 B)$

Classwork: From Exercise Set B

In 1–27, prove that the given statement is an identity for all values of the angle for which the expressions are defined.

1. $\sec\theta - \sin\theta\tan\theta = \cos\theta$

$\frac{1}{\cos\theta} - \sin\theta \cdot \frac{\sin\theta}{\cos\theta}$

$\frac{1}{\cos\theta} - \frac{\sin^2\theta}{\cos\theta}$

$\frac{1-\sin^2\theta}{\cos\theta}$

$\frac{\cos^2\theta}{\cos\theta}$

$\cos\theta = \cos\theta$

2. $\tan\theta + \cot\theta = \sec\theta\csc\theta$

$\frac{(\sin\theta)\sin\theta}{(\sin\theta)\cos\theta} + \frac{\cos\theta(\cos\theta)}{\sin\theta(\cos\theta)}$

$\frac{\sin^2\theta + \cos^2\theta}{\cos\theta\sin\theta}$

$\frac{1}{\cos\theta\sin\theta}$

from this point

or

$\frac{1}{\cos\theta\sin\theta}$

$\frac{1}{\cos\theta} \cdot \frac{1}{\sin\theta}$

$\sec\theta\csc\theta = \sec\theta\csc\theta$

$\frac{1}{\cos\theta} \cdot \frac{1}{\sin\theta} = \frac{1}{\cos\theta\sin\theta}$

5. $\dfrac{\tan A + \sin A}{\csc A + \cot A} = \sin A \tan A$ * you can not cross multiply

$\dfrac{\frac{\sin A}{\cos A} + \sin A}{\frac{1}{\sin A} + \frac{\cos A}{\sin A}}$ (sin A cos A, sin A cos A, sin A cos A)

$\dfrac{\sin^2 A + \sin^2 A \cos A}{\cos A + \cos^2 A}$

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

$\dfrac{\sin^2 A}{\cos A}$

$\sin A \cdot \dfrac{\sin A}{\cos A}$

$\sin A \tan A$

6. $\sin^2 x(1 + \tan^2 x) = \tan^2 x$

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

$\cos^2 x \dfrac{\sin^2 x}{\cos^2 x} + \dfrac{\sin^4 x}{\cos^2 x}$

$\dfrac{\cos^2 x \sin^2 x + \sin^4 x}{\cos^2 x}$

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

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

$\tan^2 x = \tan^2 x$

OR

use the other Pythagorean Identity $\tan^2\theta + 1 = \sec^2\theta$

$\sin^2 x(1 + \tan^2 x) = \tan^2 x$

$\sin^2 x \cdot \sec^2 x$

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

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

$\tan^2 x = \tan^2 x$

7. $\dfrac{1}{\tan x - \cot x} = \dfrac{\sin x \cos x}{2\sin^2 x - 1}$

$$\frac{1}{\frac{\sin x}{\cos x} - \frac{\cos x}{\sin x}} \qquad \cos x \sin x$$

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

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

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

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

Homework 03-14

Exercise Set A

In 1–29, for all values of the angle for which the expressions are defined, choose an equivalent expression.

1. $\frac{-1}{\cos A}$ is equivalent to
(1) $\sec A$ (2) $-\sec A$ (3) $\sin A$ (4) $-\sin A$

2. $\frac{\cot\theta}{\csc\theta}$ is equivalent to
(1) $\sec\theta$ (2) $\sin\theta$ (3) $\cos\theta$ (4) $\csc\theta$

3. $\frac{\sec\theta}{\csc\theta}$ is equivalent to
(1) $\sin\theta$ (2) $\cos\theta$ (3) $\tan\theta$ (4) $\cot\theta$

4. $\frac{\sin\theta}{\tan\theta}$ is equivalent to
(1) $-\cos\theta$ (3) $1-\cos\theta$
(2) $\cos\theta$ (4) $1+\cos\theta$

5. $\frac{\sin^2 A}{\tan A}$ is equivalent to
(1) $\frac{\sin A}{\cos A}$ (3) $\frac{1}{\sin A\cos A}$
(2) $\sin A\cos A$ (4) $\frac{\cos A}{\sin A}$

6. $\sin\theta$ is equivalent to
(1) $\frac{\tan\theta}{\sec\theta}$ (2) $\frac{1}{\sec\theta}$ (3) $\sec\theta$ (4) $\frac{\sec\theta}{\tan\theta}$

7. The expression $\frac{\tan x}{\sec^2 x}$ is equivalent to
(1) $\sin x$ (3) $\frac{\sin^3 x}{\cos x}$
(2) $\sin x\cos x$ (4) $\frac{\cos^3 x}{\sin x}$

8. $\sqrt{\frac{2\cos^2\theta}{\sin^2\theta}}$ is equivalent to
(1) $2\tan\theta$ (3) $2\cot\theta$
(2) $\sqrt{2}\tan\theta$ (4) $\sqrt{2}\cot\theta$

9. $(\tan\theta)(\csc\theta)$ is equivalent to
(1) $\sin\theta$ (2) $\cos\theta$ (3) $\csc\theta$ (4) $\sec\theta$

10. $(\cot\theta)(\sec\theta)$ is equivalent to
(1) $\tan\theta$ (2) $\cos\theta$ (3) $\cot\theta$ (4) $\csc\theta$

11. $\tan A\cdot\cos A\cdot\csc A$ is equivalent to
(1) 1 (2) $\frac{1}{2}$ (3) $\sin A$ (4) $\frac{1}{\sin A}$

12. $\csc y+1$ is equivalent to
(1) $\frac{\cot y}{\csc y-1}$ (3) $\cot y$
(2) $\frac{\sin y+1}{\sin y}$ (4) $\frac{1+\cos y}{\cos y}$

13. $\sec x-\tan x$ is equivalent to
(1) 1 (3) $\frac{1-\sin x}{\cos x}$
(2) $\cos x-\cot x$ (4) $\frac{\cos x-\sin^2 x}{\sin x\cos x}$

14. $\sin\theta(\csc\theta-\sin\theta)$ is equivalent to
(1) 1 (3) $\tan\theta-1$
(2) $\cos\theta$ (4) $\cos^2\theta$

15. $\cos y(\csc y-\sec y)$ is equivalent to
(1) $\cot y-1$ (3) $1-\tan y$
(2) $\tan y-1$ (4) $-\cos y$

16. $\cot^2\theta$ is equivalent to
(1) $\frac{1}{\sin^2\theta}$ (3) $1-\cos^2\theta$
(2) $\cos^2\theta$ (4) $\frac{\cos^2\theta}{1-\cos^2\theta}$

17. $\frac{\sin^2 x+\cos^2 x}{\cos x}$ is equivalent to
(1) $\sin x\cos x$ (3) $\csc x$
(2) $\tan x\cos x$ (4) $\sec x$

18. $\cos A+\frac{\sin^2 A}{\cos A}$ is equivalent to
(1) 1 (2) $\sec A$ (3) $\csc A$ (4) $\cos A$

19. $4+\cos^2 A$ is equivalent to
(1) $5-\sec^2 A$ (3) $\frac{5}{\sec^2 A}$
(2) $5-\sin^2 A$ (4) $5+\sin^2 A$

20. $\frac{1}{\sin^2 A}-1$ is equivalent to
(1) $\cot^2 A$ (3) $\sec^2 A-1$
(2) $\cos^2 A$ (4) $\frac{\sin^2 A-1}{\sin^2 A}$

21. $\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}$ is equivalent to
(1) 1 (2) $\sec\theta$ (3) $\frac{1}{\csc\theta}$ (4) $\frac{1}{\sin\theta\cos\theta}$

22. $\frac{\cot^2 x}{1-\sin^2 x}$ is equivalent to
(1) $\cos^2 x$ (3) $\frac{1}{\sin^2 x}$
(2) $\tan^2 x$ (4) $1-\sin^2 x$

23. $\frac{\cos x-\frac{\sin^2 x}{\cos x}}{1+\frac{\sin x}{\cos x}}$ is equivalent to
(1) $\cos x+\sin x$ (3) $\frac{1}{\cos x+\sin x}$
(2) $\cos x-\sin x$ (4) $\frac{1}{\cos x-\sin x}$

24. $\sin\theta\left(\frac{1}{\sin\theta}-\sin\theta\right)$ is equivalent to
(1) $-\cos^2\theta$ (3) $1-\cos^2\theta$
(2) $\cos^2\theta$ (4) $1+\cos^2\theta$