HW 4.1.2: Simplifying Trigonometric Expressions (More Practice)

Simplify each of the following trig expressions completely.

1.) $\dfrac{\tan^2\theta+1}{1+\cot^2\theta}$

2.) $\dfrac{1}{\sec\theta-\tan\theta}-\dfrac{1}{\sec\theta+\tan\theta}$

3.) $\sec\theta\cdot\tan\theta\cdot\cos\theta$

4.) $\sin^2\theta\cdot\cot\theta\cdot\csc\theta$

5.) $\dfrac{1-\cos^2\theta}{\sin^2\theta}$

6.) $\dfrac{\tan^2\theta}{1-\sec^2\theta}$

7.) $\tan^2\theta\left(\csc^2\theta-1\right)$

8.) $\dfrac{1-\cos^2\theta}{1+\cos\theta}$

9.) $\dfrac{\cos^2\theta}{1-\cos^2\theta}$

10.) $\dfrac{\sec^2\theta-1}{\tan\theta}$

11.) $\dfrac{\tan\theta+1}{\sec\theta}$

12.) $\dfrac{1+\cot\theta}{\csc\theta}$

13.) $\dfrac{\cos^2\theta-1}{\sin^2\theta-1}$

14.) $\cos\theta\cdot\csc\theta\cdot\left(\sec^2\theta-1\right)$

15.) $\dfrac{\sec\theta\cdot\tan\theta}{\tan^2\theta+1}$

16.) $\dfrac{\sin^2\theta\cdot\cot^2\theta}{1-\sin^2\theta}$

17.) $\dfrac{\cos^2\theta-1}{\cos^2\theta\cdot\tan^2\theta}$

18.) $\cos\theta\left(\sec\theta-\cos\theta\right)$

19.) $\cot\theta\left(\tan\theta+\cot\theta\right)$

20.) $\dfrac{\tan\theta+\cot\theta}{\cot\theta}$

21.) $\dfrac{\tan\theta}{\tan\theta+\cot\theta}$

22.) $\sec\theta\cot\theta-\cot\theta\cos\theta$

23.) $\sin\theta\tan\theta-\csc\theta\tan\theta$

24.) $\dfrac{\cot^2\theta\cdot\cos^2\theta}{\cot^2\theta-\cos^2\theta}$

25.) $\dfrac{\sin^2\theta-\tan^2\theta}{\tan^2\theta\cdot\sin^2\theta}$

26.) $\dfrac{(\sin\theta+\tan\theta)^2+\cos^2\theta-\sec^2\theta}{\tan\theta}$

27.) $\dfrac{2\sin\theta\cdot\cos\theta+(\sin\theta-\cos\theta)^2}{\sec\theta}$

28.) $\dfrac{\sin\theta(1+\sin\theta)}{1-\cos^2\theta}-1$

29.) $\dfrac{1-\tan^2\theta}{1+\tan^2\theta}+1$

30.) $\dfrac{\tan\theta-\tan\theta\cdot\sin^2\theta}{2\sin\theta\cdot\cos\theta}$

31.) $\dfrac{\sec\theta-\cos\theta}{3\tan\theta\sin\theta}$

32.) $\dfrac{\sin^3\theta+\cos^3\theta}{1-\sin\theta\cdot\cos\theta}$

33.) $\dfrac{\cos^3\theta+\sin^3\theta}{(\cos\theta+\sin\theta)^2}$

34.) $\dfrac{1+\tan^2\theta+\sec^2\theta\cdot\cot^2\theta}{\csc^2\theta+\cot^2\theta\csc^2\theta}$

35.) $\dfrac{\cot\theta\cdot\sec^2\theta-\cot\theta}{\sin\theta\cdot\tan\theta+\cos\theta}$

36.) $\dfrac{\cos\theta}{1+\sin\theta}+\dfrac{\cos\theta}{1-\sin\theta}$

37.) $\dfrac{\sin\theta}{1-\cos\theta}+\dfrac{1-\cos\theta}{\sin\theta}$

Answers:

1.) $\tan^2\theta$ 2.) $2\tan\theta$ 3.) $\tan\theta$ 4.) $\cos\theta$ 5.) 1

6.) -1 7.) 1 8.) $1-\cos\theta$ 9.) $\cot^2\theta$ 10.) $\tan\theta$

11.) $\sin\theta+\cos\theta$ 12.) $\sin\theta+\cos\theta$ 13.) $\tan^2\theta$ 14.) $\tan\theta$ 15.) $\sin\theta$

16.) 1 17.) -1 18.) $\sin^2\theta$ 19.) $\csc^2\theta$ 20.) $\sec^2\theta$

21.) $\sin^2\theta$ 22.) $\sin\theta$ 23.) $-\cos\theta$ 24.) 1 25.) -1

26.) $2\sin\theta$ 27.) $\cos\theta$ 28.) $\csc\theta$ 29.) $2\cos^2\theta$ 30.) $\frac{1}{2}$

31.) $\frac{1}{3}$ 32.) $\sin\theta+\cos\theta$ 33.) $\frac{1-\cos\theta\cdot\sin\theta}{\cos\theta+\sin\theta}$ 34.) $\tan^2\theta$ 35.) $\sin\theta$

36.) $2\sec\theta$ 37.) $2\csc\theta$