Fundamental Identities Day

1. Evaluate without using a calculator. Find $\tan\theta$ and $\cot\theta$ if $\sec\theta = \frac{8}{5}$ and $\sin\theta < 0$

2. If $\sin\theta = 0.44$, find $\sin(-\theta)$

Choose the correct answer for simplifying.

A. $\cos\alpha$ B. $\tan\alpha$ C. $\csc\alpha$ D. 1 E. $\sec\alpha$ F. -1 G. $-\sin\alpha$ H. $\sin\alpha$

3. $\sec\alpha \sin\left(\frac{\pi}{2} - \alpha\right)$

4. $\frac{1-\cos^2\alpha}{\sin\alpha}$

5. $\cos(-\alpha)\cdot\tan(-\alpha)$

6. $\csc(-\alpha)\cos\left(\frac{\pi}{2} - \alpha\right)$

7. $\frac{\tan\left(\frac{\pi}{2} - \alpha\right)\csc\alpha}{\csc^2\alpha}$

8. $\sec\alpha\sin\alpha$

9. $\sin\alpha + \sin\alpha\cot^2\alpha$

10. $\frac{\tan\alpha\cot\alpha}{\cos\alpha}$

Use the basic identities to change the expression to one involving only sines and cosines. Then simplify to a basic trig function.

11. $\sin\theta\cot\theta - \cos\theta\tan\theta$

12. $\frac{\sec\alpha}{\cos\alpha} - \frac{\sin\alpha}{\csc\alpha\cos^2\alpha}$

Combine the fractions and simplify to a multiple of a power of a basic trig function (e.g., $3\tan^2 x$)

13. $\frac{1}{\sin^2 x} + \frac{\sec^2 x}{\tan^2 x}$

14. $\frac{1}{1-\sin x} + \frac{1}{1+\sin x}$

15. $\frac{\sec\alpha}{\sin\alpha} - \frac{\sin\alpha}{\cos\alpha}$

16. $\frac{\sin}{1-\cos x} + \frac{1-\cos x}{\sin x}$

Rewriting the expression so that it is not in fractional form. (Hint: use conjugates)

17. $\dfrac{\sin^2 y}{1-\cos y}$

18. $\dfrac{3}{\sec x - \tan x}$

Use the trig substitution to write the algebraic expression as a trig function of , θ where $0 < \theta < \dfrac{\pi}{2}$.

19. $\sqrt{64-16x^2}, \quad x = 2\cos\theta$

20. $\sqrt{49-x^2}, \quad x = 7\sin\theta$

Rewrite the expression as a single logarithm and simplfy the result.

21. $\ln|\cos\theta| - \ln|\sin\theta|$

22. $\ln|\cot\theta| + \ln(1+\tan^2\theta)$