

DAY 1 FUNDAMENTALS
ODD EXAMPLES

1. Use PYTHAG ID FOR TAN :

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$\left(\frac{3}{4}\right)^2 + 1 = \sec^2 \theta$$

$$\frac{9}{16} + 1 = \sec^2 \theta$$

$$\frac{25}{16} = \sec^2 \theta$$

$$\pm \frac{5}{4} = \sec \theta$$

SINCE $\sin \theta > 0$, THEN
 $\cos \theta > 0$ B/C $\tan \theta > 0$

$$\cos \theta = \frac{4}{5}$$

TO FIND $\sin \theta$, USE
QUOTIENT ID

$$\rightarrow \frac{\sin \theta}{\frac{4}{5}} = \frac{\frac{3}{4}}{1}$$

CROSS MULT.

$$\rightarrow \sin \theta = \frac{3}{4} \cdot \frac{4}{5}$$
$$\sin \theta = \frac{3}{5}$$

3. Use PYTHAG ID FOR SEC :

$$\tan^2 \theta + 1 = \sec^2 \theta$$

TO FIND $\tan \theta$

$$\tan^2 \theta = (4)^2 + 1$$

$$\tan^2 \theta = 17$$

$$\tan \theta = \pm \sqrt{17}$$

SINCE $\sin \theta < 0$, THEN :

TAN θ IS NEGATIVE

$$\tan \theta = -\sqrt{17}$$

Use RECIPROCAL ID :

$$\cot \theta = -\frac{1}{\sqrt{17}}$$

FOR $\cot \theta$

5. Use QUOTIENT ID FOR $\frac{\sin \theta}{\cos \theta}$

$$\frac{\sin \theta}{\cos \theta} = \tan \theta$$
$$\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \tan \theta$$

MULTIPLY BY RECIPROCAL

$$\frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \tan \theta$$

$$\frac{1}{\sqrt{3}} = \tan \theta$$

Use RECIPROCAL IDS: $\csc \theta = 2$ $\sec \theta = \frac{2}{\sqrt{3}}$ $\cot \theta = \sqrt{3}$

7. Use QUOTIENT ID FOR $\cot \theta$:

$$\frac{\cos \theta}{\sin \theta} = \cot \theta$$

$$\frac{\cos \theta}{\frac{\sqrt{10}}{10}} = \frac{-3}{1}$$

CROSS MULTIPLY

CROSS MULTIPLY :

$$\cos \theta = \frac{-3\sqrt{10}}{10}$$

Use RECIPROCAL IDS: $\tan \theta = -\frac{1}{3}$ $\csc \theta = \frac{10}{\sqrt{10}}$ $\sec \theta = \frac{-10}{3\sqrt{10}}$

9. Use $\sec x \cos x$
 $\frac{1}{\cos x} \cdot \frac{\cos x}{1}$
1 (D)

Use RECIPROCAL ID FOR \sec
MULTIPLY

11. $\cot^2 x - \csc^2 x$
 $\frac{\cos^2 x}{\sin^2 x} - \frac{1}{\sin^2 x}$

CHANGE TO \sin & \cos
USING ID

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

$$= \frac{\sin^2 x}{\sin^2 x}$$

$$= -1 \quad (B)$$

COMBINE FRAC

Use PYT ID $\sin^2 x + \cos^2 x = 1$
 $\cos^2 x - 1 = -\sin^2 x$

13. Use Neg Angle IDs : $\frac{\sin(-x)}{\cos(-x)}$

Quotient ID : $-\frac{\sin x}{\cos x}$

: $-\tan x (E)$

15. Quotient ID : : $\tan x \cos x$

Multiply : $\frac{\sin x}{\cos x} \cdot \cos x$

$\sin x$

17. Pythag ID : $\frac{1 + \tan^2 x}{\csc^2 x}$

Reduce : $\frac{\csc^2 x}{\csc^2 x}$

1

19. Factor : $\cos x - \cos^2 x$

$\cos x (1 - \cos x)$

21. FACTOR : $\tan^2 x - \tan^2 x \sin^2 x$
 PYTHAG ID : $\tan^2 x (1 - \sin^2 x)$
 QUOTIENT ID : $\tan^2 x \cos^2 x$
 MULTIPLY : $\frac{\sin^2 x}{\cos^2 x} \cdot \cos^2 x$
 $\sin^2 x$

23. FACTOR : $\tan^4 x + 2 \tan^2 x + 1$
 $\tan^4 x + \tan^2 x + \tan^2 x + 1$
 $\tan^2 x (\tan^2 x + 1) + 1 (\tan^2 x + 1)$
 PYTHAG ID : $(\tan^2 x + 1) (\tan^2 x + 1)$
 MULTIPLY : $\sec^2 x \cdot \sec^2 x$
 $\sec^4 x$

25. FIND LCD : $\frac{\cos x}{1 + \sin x} + \frac{1 + \sin x}{\cos x}$

MULT OUT NUMERATOR : $\frac{\cos x (\cos x) + (1 + \sin x) (1 + \sin x)}{(1 + \sin x) \cos x}$

PYTHAG ID = 1 : $\frac{\cos^2 x + 1 + \sin x + \sin x + \sin^2 x}{(1 + \sin x) \cos x}$

FACTOR NUMERATOR : $\frac{2 + 2 \sin x}{(1 + \sin x) \cos x}$

REDUCE : $\frac{2(1 + \sin x)}{(1 + \sin x) \cos x}$

RECIPROCAL ID : $\frac{2}{\cos x}$
 $2 \sec x$