

TRIGONOMETRIC IDENTITIES

Equation: a statement that two expressions are equal for certain values of the variable. eg. $2x^2 + 3 = 11$

Identity: an equation that is true for every value of the variable.
eg. $(x+1)^2 = x^2 + 2x + 1$

Verify Identities

- verify is not the same as prove!

Algebraically

Verify for certain value...

eg. $\tan \theta = \frac{\sin \theta}{\cos \theta}$ for $\theta = \frac{\pi}{4}$

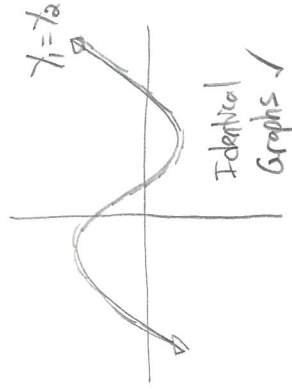
$$\tan \frac{\pi}{4} = \frac{\sin \frac{\pi}{4}}{\cos \frac{\pi}{4}}$$

$$1 = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}}$$

$$1 = 1 \checkmark$$

Graphically

$$Y_1 = 15 \quad Y_2 = RS$$



6.1: 5, 6, 8, 13

6.2: 6, 12ab

Verifying Handout

Non-permissible Values

Consider: ① Division by 0

② Trig Functions with Restrictions
($\tan \theta$, $\sec \theta$, $\csc \theta$, $\cot \theta$)

6.1: 1, 2 + ?'s throughout chapter

Prove Identities

Algebraically prove for all permissible values...

eg. Prove $\sin x \cot x = \cos x$

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

$$\cos x = \cos x \checkmark$$

Strategies

- ① Use known identities from formula sheet
- ② Write everything as $\sin x$ and $\cos x$
- ③ $+/-$ Fractions (Common Denominator)
- ④ $\frac{A}{B} = \frac{A \cdot D}{B \cdot D}$
- ⑤ Factor/Expand
- ⑥ Multiply by conjugate

6.1: 3, 4, 7, 10-12, 14, 16

6.2: 5, 7, 10, 15, 16

6.3: 1-8, 10-18

Trigonometric Proofs Handout / Row Game

Exact Value(s) of Trig Ratios

Use sum, difference and double angle identities to determine exact values.

eg. $\sin(15^\circ) = \sin(60^\circ - 45^\circ)$

$$= \sin 60^\circ \cos 45^\circ - \cos 60^\circ \sin 45^\circ$$

$$= \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) - \left(\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right)$$

$$= \frac{\sqrt{6} - \sqrt{2}}{4}$$

eg. $\cos(2\theta) = ?$ if $\sin \theta = \frac{5}{13}$ in quadrant II

6.2: 8, 11, 17, 19, 20