10.3: Verifying Trigonometric Identities (Page 628)

Reciprocal Identities

$\frac{1}{\sin\theta} = \csc\theta$ [5 more . . .]

$\sin^2\theta = (\sin\theta)^2$

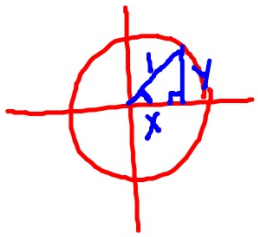
$\sin^2\theta \neq \sin(\theta^2)$

Quotient Identities

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

Pythagorean Identity

$\sin^2\theta + \cos^2\theta = 1$



$x^2 + y^2 = 1$

Even/Odd Identities

odd 1. $\sin(-\theta) = -\sin\theta$

even 2. $\cos(-\theta) = \cos\theta$

odd 3. $\tan(-\theta) = -\tan\theta$

odd 4. $\csc(-\theta) = -\csc\theta$

even 5. $\sec(-\theta) = \sec\theta$

odd 6. $\cot(-\theta) = -\cot\theta$

$\overset{III}{\cos(-135^\circ)} = \overset{II}{\cos(135^\circ)}$

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

Verifying strategies

$$\frac{x+5}{6} = \frac{x}{6} + \frac{5}{6}$$

1) identities
2) factor
3) distribute
4) add fractions
5) split fractions
6) rewrite in terms of sine/cosine

When verifying, you do NOT solve. You do NOT move terms from one side to another.

1 $\tan x \sin x = \sec(-x) - \cos(-x)$

#8

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

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

$\sin^2 x + \cos^2 x = 1$

$\sin^2 x = 1 - \cos^2 x$

$$= \frac{1}{\cos x} - \frac{\cos x}{1} \cdot \frac{\cos x}{\cos x}$$

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

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

2

#11

$$\frac{\tan x}{\sin x \sec x} = 1$$

$$\frac{\tan x}{\sin x \cdot \frac{1}{\cos x}} = 1$$

$$\frac{\frac{\sin x}{\cos x}}{\frac{\sin x}{\cos x}} = 1$$

$$1 = 1 \checkmark$$

$$\frac{\tan x}{\sin x \cdot \frac{1}{\cos x}} = 1$$

$$\frac{\tan x}{\tan x} = 1$$

$$1 = 1 \checkmark$$

3

#3

$$\cos^2 x\,(\sec^2 x - 1) = \sin^2 x$$

$$\cos^2 x \cdot \sec^2 x - \cos^2 x$$

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

$$1 - \cos^2 x =$$

$$\sin^2 x = \sin^2 x \checkmark$$

$\sin^2 x + \cos^2 x = 1$

$\sin^2 x = 1 - \cos^2 x$

$\cos^2 x = 1 - \sin^2 x$

4

#9

$$\frac{\sin x - \cos x}{\sin x} = 1 - \cot x$$

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

$$1 - \cot x = 1 - \cot x \checkmark$$

4

#9

$$\frac{\sin x - \cos x}{\sin x} = 1 - \cot x$$

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

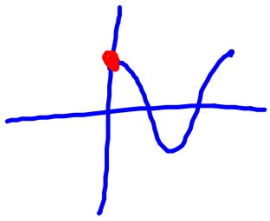
$$\frac{\sin x - \cos x}{\sin x} = \frac{\sin x - \cos x}{\sin x}$$

17: factor out gcf

19. factor : $x^3 + y^3 = (x+y)(x^2 - xy + y^2)$

20. rationalize

② $y = 5\cos(4x) + 2$

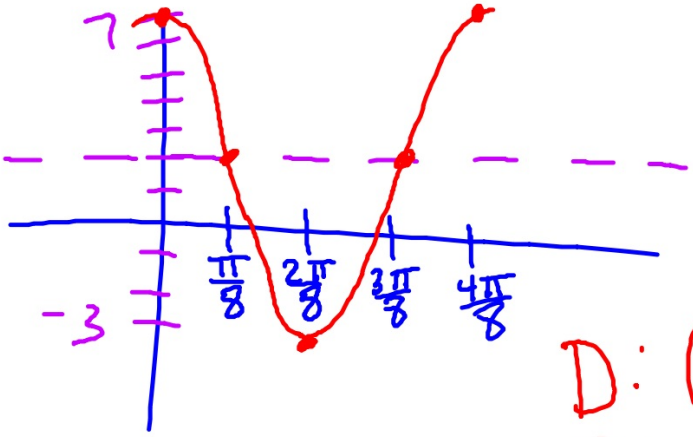


Amp: 5

period: $\frac{2\pi}{4} = \frac{\pi}{2}$

$\uparrow$ 2

inc.: $\frac{\frac{\pi}{2}}{4} = \frac{\pi}{8}$



D: $(-\infty, \infty)$

R: $[-3, 7]$