

Trigonometric Identities Practice

Name: _____

Date: _____

Question 1

Factor and simplify

I. $(1 - \sin x)(1 + \sin x)$

II. $(\cos r - \sin r)^2$

III. $\sec t(\cot t + \sin t)$

IV. $\cos x \sin x(\sec x + \csc x)$

V. $(\sin t - \cos t)(\sec t + \csc t)$

Trigonometric Identities Practice

VI. $(1 + \tan t)^2$

VII. $(1 - \cos r)(1 + \cos r)$

VIII. $\sin x (\sec x \tan x + \csc x + \cot x)$

IX. $(\sin x + \csc x)(\sin^2 x + \csc^2 x - 1)$

Trigonometric Identities Practice

X. $\cos t - \cos t \sin^2 t$

XI. $\tan^2 r - \cot^2 r$

XII. $\sin^2 t + \sin^2 t \cot^2 t$

XIII. $\sin^4 r - \cos^4 r$

XIV. $4\sin^2 x + 8\sin x + 4$

XV. $\cos^3 r - 64$

XVI. $1 - 125 \tan^3 x$

XVII. $\frac{\sec(-t)}{\tan(-t)}$

Trigonometric Identities Practice

$$\text{XVIII.} \quad \frac{30\sin^3 m \cos m}{6\cos^2 m \sin m}$$

$$\text{XIX.} \quad \frac{\cos^2 m + 16\cos m + 64}{\cos m + 8}$$

$$\text{XX.} \quad \frac{4\tan n \sec n + 2 \sec n}{6\tan n \sec n + 2 \sec n}$$

$$\text{XXI.} \quad \frac{\sin^4 w - \cos^4 w}{\sin^2 w - \cos^2 w}$$

$$\text{XXII.} \quad \frac{4 \cos^3 p}{\sin^2 p} \cdot \left(\frac{\sin p}{4 \cos p} \right)^2$$

$$\text{XXIII.} \quad \frac{5 \cos x}{\sin^2 x} \cdot \frac{\sin^2 x - \sin x \cos x}{\sin^2 x - \cos^2 x}$$

Trigonometric Identities Practice

XXIV.

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

XXV.

$$\frac{9\cos^2 x - 25}{2\cos x - 2} \cdot \frac{\cos^2 x - 1}{6\cos x - 10}$$

Trigonometric Identities Practice

Question 2

Simplify

I. $\sqrt{\sin^2 p \cos p} \cdot \sqrt{\cos p}$

II. $\sqrt{\cos z \sin^2 z} - \sqrt{\cos^3 z}$

III. $\left(1 - \sqrt{\sin v} \right) \left(1 + \sqrt{\sin v} \right)$

IV. $\sqrt{\cos x} \left(-\sqrt{2\cos x} + \sqrt{\sin x \cos x} \right)$

Trigonometric Identities Practice

Question 3

Simplify

I. $\sqrt{4 + (2\tan z)^2}$

II. $\frac{\sin^2 z}{\sqrt{1 - \sin^2 z}}$

Question 4

Solve (calculator in radian mode)

I. $\sin \frac{\pi}{12}$

II. $\tan 105^\circ$

III. $\sin 75^\circ$

IV. $\cos 285^\circ$

Question 5

Solve (calculator)(round to four decimal places)

I. $\sin 37^\circ \cos 22^\circ + \cos 37^\circ \sin 22^\circ =$

II. $\frac{\tan 66^\circ + \tan 10^\circ}{1 - \tan 66^\circ \tan 10^\circ} =$

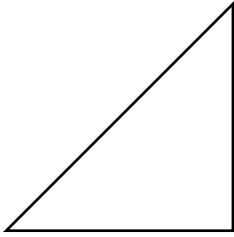
Trigonometric Identities Practice

Question 6

(assume a and b are in the first quadrant)

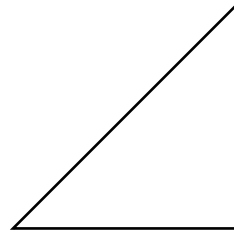
$$\sin a = \frac{3}{5} \quad \sin b = \frac{4}{5}$$

$$\sin a =$$



$$\sin b =$$

$$\cos b =$$



$$\tan a =$$

$$\tan b =$$

I. $\cos(a + b)$

II. $\tan(a - b)$

III. $\sin(a - b)$

Trigonometric Identities Practice

Question 7

Solve (calculator in radian mode)

I. $\tan \frac{5\pi}{12}$

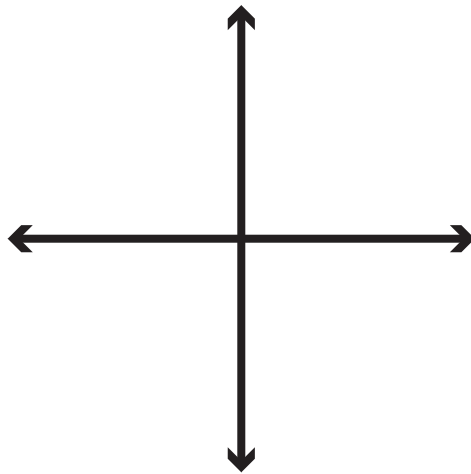
II. $\sec \frac{5\pi}{12}$

III. $\csc \frac{2\pi}{5}$

Question 8

Solve

$$\sin x = \frac{1}{3}$$



A. Six trigonometric functions

$$\sin x =$$

$$\csc x =$$

$$\cos x =$$

$$\sec x =$$

$$\tan x =$$

$$\cot x =$$

Trigonometric Identities Practice

B. Six trigonometric functions ($\pi/2 - x$)

$$\sin \left(\frac{\pi}{2} - x \right) =$$

$$\csc \left(\frac{\pi}{2} - x \right) =$$

$$\cos \left(\frac{\pi}{2} - x \right) =$$

$$\sec \left(\frac{\pi}{2} - x \right) =$$

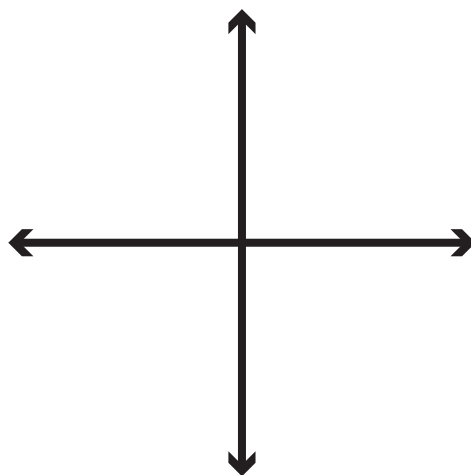
$$\tan \left(\frac{\pi}{2} - x \right) =$$

$$\cot \left(\frac{\pi}{2} - x \right) =$$

Question 9

Solve

$$\sin x = \frac{4}{5} \quad \cos x = \frac{3}{5} \quad \tan x = \frac{4}{3}$$



A. Find $\sin(2x)$, $\cos(2x)$, and $\tan(2x)$.

B. Determine the quadrant of $2x$.

$$\sin(2x) =$$

$$\cos(2x) =$$

$$\tan(2x) =$$

Trigonometric Identities Practice

Question 10

Solve (calculator)

I. $\cos 15^\circ$

II. $\tan 67.5^\circ$

III. $\sin 112.5^\circ$

Trigonometric Identities Practice

Question 11

Simplify

I. $\sin(7p) - \sin(4p)$

II. $\cos w - \cos(7w)$

III. $\cos(2x) \sin x$

IV. $7\cos(5x) \cos(7x)$

Trigonometric Identities Practice

Name: Key

Date: _____

Question 1

Factor and simplify

I. $(1 - \sin x)(1 + \sin x) \rightarrow 1 - \sin^2 x \rightarrow \cos^2 x$
factor pythagorean identities

II. $(\cos r - \sin r)^2 \rightarrow \cos^2 r - 2\cos r \sin r + \sin^2 r \rightarrow \sin^2 r + \cos^2 r - 2\cos r \sin r \rightarrow 1 - 2\cos r \sin r$
rearrange pythagorean identities

III. $\sec t(\cot t + \sin t) \rightarrow \frac{1}{\cos t} \left(\frac{\cos t}{\sin t} + \sin t \right) \rightarrow \frac{1}{\cancel{\cos t}} \cdot \frac{\cancel{\cos t}}{\sin t} + \frac{1}{\cos t} \cdot \sin t$
basic identities distribute

$\downarrow$

$\csc t + \tan t \leftarrow \frac{1}{\sin t} + \frac{\sin t}{\cos t}$
basic identities

IV. $\cos x \sin x (\sec x + \csc x) \rightarrow \cos x \sin x \left(\frac{1}{\cos x} + \frac{1}{\sin x} \right)$
basic identities

$\downarrow$

$\sin x + \cos x \leftarrow \cancel{\cos x} \sin x \cdot \frac{1}{\cancel{\cos x}} + \cos x \cancel{\sin x} \cdot \frac{1}{\cancel{\sin x}}$
distribute

V. $(\sin t - \cos t)(\sec t + \csc t) \rightarrow \sin t \sec t + \sin t \csc t - \cos t \sec t - \cos t \csc t$
distribute

$\downarrow$

$\frac{\sin t}{\cos t} + 1 - 1 - \frac{\cos t}{\sin t} \leftarrow \sin t \frac{1}{\cos t} + \cancel{\sin t} \frac{1}{\cancel{\sin t}} - \cancel{\cos t} \frac{1}{\cancel{\cos t}} - \cos t \frac{1}{\sin t}$
basic identities

$\downarrow$

$\tan t - \cot t$
basic identities

Trigonometric Identities Practice

$$\text{VI. } (1 + \tan t)^2 \rightarrow 1 + 2\tan t + \tan^2 t \rightarrow 1 + \tan^2 t + 2\tan t \rightarrow \sec^2 t + 2\tan t$$

rearrange

pythagorean identities

$$\text{VII. } (1 - \cos r)(1 + \cos r) \rightarrow 1 + \cos r - \cos r - \cos^2 r \rightarrow 1 - \cos^2 r \rightarrow \sin^2 r$$

pythagorean identities

$$\text{VIII. } \sin x (\sec x \tan x + \csc x + \cot x) \rightarrow \sin x \left(\frac{1}{\cos x} \cdot \frac{\sin x}{\cos x} + \frac{1}{\sin x} + \frac{\cos x}{\sin x} \right)$$

basic identities

$$\downarrow$$

$$\sin x \left(\frac{\sin x}{\cos^2 x} + \frac{1}{\sin x} + \frac{\cos x}{\sin x} \right)$$

$$\downarrow$$

$$\sin x \cdot \frac{\sin x}{\cos^2 x} + \cancel{\sin x} \cdot \frac{1}{\cancel{\sin x}} + \cancel{\sin x} \frac{\cos x}{\cancel{\sin x}}$$

$$\downarrow$$

$$\sec^2 x + \cos x \leftarrow \tan^2 x + 1 + \cos x \leftarrow \frac{\sin^2 x}{\cos^2 x} + 1 + \cos x$$

pythagorean identities

$$\text{IX. } (\sin x + \csc x)(\sin^2 x + \csc^2 x - 1) \rightarrow \sin^3 x + \csc^3 x$$

$\sin x \cdot \csc x = 1$

sum of cubes

Trigonometric Identities Practice

X. $\cos t - \cos t \sin^2 t \rightarrow \cos t(1 - \sin^2 t) \rightarrow \cos t \cos^2 t \rightarrow \cos^3 t$
factor pythagorean identities

XI. $\tan^2 r - \cot^2 r \rightarrow (\tan r + \cot r)(\tan r - \cot r)$
factor

XII. $\sin^2 t + \sin^2 t \cot^2 t \rightarrow \sin^2 t(1 + \cot^2 t) \rightarrow \sin^2 t \csc^2 t \rightarrow \cancel{\sin^2 t} \cdot \frac{1}{\cancel{\sin^2 t}} \rightarrow 1$
factor pythagorean identities basic identities

XIII. $\sin^4 r - \cos^4 r \rightarrow (\sin^2 r + \cos^2 r)(\sin^2 r - \cos^2 r) \rightarrow 1(\sin^2 r - \cos^2 r) \rightarrow (\sin^2 r - \cos^2 r)$
factor pythagorean identities
 $\downarrow$
 $(\sin r + \cos r)(\sin r - \cos r)$
factor

XIV. $4\sin^2 x + 8\sin x + 4 \rightarrow 4(\sin^2 x + 2\sin x + 1) \rightarrow 4(\sin x + 1)^2$
factor factor

XV. $\cos^3 r - 64 \rightarrow \cos^3 r - 4^3 \rightarrow (\cos r - 4)(\cos^2 r + 4\cos r + 16)$
difference of cubes

XVI. $1 - 125 \tan^3 x \rightarrow 1^3 - (5 \tan x)^3 \rightarrow (1 - 5 \tan x)(1 + 5 \tan x + 25 \tan^2 x)$
difference of cubes

XVII. $\frac{\sec(-t)}{\tan(-t)} \rightarrow \frac{\sec(t)}{-\tan(t)} \rightarrow \frac{\frac{1}{\cos(t)}}{\frac{-\sin(t)}{\cos(t)}} \rightarrow \frac{1}{\cancel{\cos(t)}} \cdot \frac{\cancel{\cos(t)}}{-\sin(t)} \rightarrow \frac{1}{-\sin(t)} \rightarrow -\csc(t)$
basic identities

Trigonometric Identities Practice

XVIII.
$$\frac{30\sin^3 m \cos m}{6\cos^2 m \sin m} \rightarrow \frac{30\sin^2 m \cancel{\cos m}}{6\cos^2 m \cancel{\sin m}} \rightarrow \frac{5\sin^2 m}{\cos m}$$

XIX.
$$\frac{\cos^2 m + 16\cos m + 64}{\cos m + 8} \rightarrow \frac{(\cancel{\cos m + 8})(\cos m + 8)}{\cancel{\cos m + 8}}$$

factor

$$\downarrow$$

$$\cos m + 8$$

XX.
$$\frac{4\tan n \sec n + 2 \sec n}{6\tan n \sec n + 2 \sec n} \rightarrow \frac{\cancel{2\sec n}(2\tan n + 1)}{\cancel{2\sec n}(3\tan n + 1)} \rightarrow \frac{2\tan n + 1}{3\tan n + 1}$$

factor

XXI.
$$\frac{\sin^4 w - \cos^4 w}{\sin^2 w - \cos^2 w} \rightarrow \frac{(\cancel{\sin^2 w - \cos^2 w})(\sin^2 w + \cos^2 w)}{\cancel{\sin^2 w - \cos^2 w}} \rightarrow \sin^2 w + \cos^2 w \rightarrow 1$$

factor pythagorean identities

XXII.
$$\frac{4\cos^3 p}{\sin^2 p} \cdot \left(\frac{\sin p}{4\cos p} \right)^2 \rightarrow \frac{4\cos^3 p \cancel{\sin^2 p}}{16\cancel{\sin^2 p} \cos^2 p} \rightarrow \frac{\cos p}{4}$$

XXIII.
$$\frac{5\cos x}{\sin^2 x} \cdot \frac{\sin^2 x - \sin x \cos x}{\sin^2 x - \cos^2 x} \rightarrow \frac{5\cos x}{\sin^2 x} \cdot \frac{\sin x(\cancel{\sin x - \cos x})}{(\cancel{\sin x - \cos x})(\sin x + \cos x)}$$

$$\downarrow$$

$$\frac{5\cot x}{\sin x + \cos x} \leftarrow \frac{5\cos x}{\sin x(\sin x + \cos x)} \leftarrow \frac{5\cancel{\cos x} \sin x}{\cancel{\sin^2 x}(\sin x + \cos x)}$$

basic identities

Trigonometric Identities Practice

XXIV.

$$\begin{aligned}
 & \frac{1}{\sin^2 t - \cos^2 t} - \frac{2}{\cos t - \sin t} \rightarrow \frac{1}{\sin^2 t - \cos^2 t} - \frac{2}{-(-\cos t + \sin t)} \\
 & \qquad \qquad \qquad \downarrow \\
 & \frac{1}{\sin^2 t - \cos^2 t} + \frac{2}{\sin t - \cos t} \leftarrow \frac{1}{\sin^2 t - \cos^2 t} + \frac{2}{-\cos t + \sin t} \\
 & \qquad \qquad \text{rearrange} \\
 & \qquad \qquad \downarrow \\
 & \frac{1}{\sin^2 t - \cos^2 t} + \frac{2}{\sin t - \cos t} \cdot \frac{\sin t + \cos t}{\sin t + \cos t} \rightarrow \frac{1 + 2\sin t + 2\cos t}{\sin^2 t - \cos^2 t}
 \end{aligned}$$

XXV.

$$\begin{aligned}
 & \frac{9\cos^2 x - 25}{2\cos x - 2} \cdot \frac{\cos^2 x - 1}{6\cos x - 10} \rightarrow \frac{(3\cos x + 5)(3\cos x - 5)(\cos x + 1)(\cos x - 1)}{2(\cos x - 1)2(3\cos x - 5)} \\
 & \qquad \qquad \qquad \text{factor} \\
 & \qquad \qquad \qquad \downarrow \\
 & \qquad \qquad \qquad \frac{(3\cos x + 5)(\cos x + 1)}{4}
 \end{aligned}$$

Trigonometric Identities Practice

Question 2

Simplify

$$I. \quad \sqrt{\sin^2 p \cos p} \cdot \sqrt{\cos p} \rightarrow \sqrt{\sin^2 p \cos^2 p} \rightarrow \sin p \cos p$$

$$II. \quad \sqrt{\cos z \sin^2 z} - \sqrt{\cos^3 z} \rightarrow \sin z \sqrt{\cos z} - \cos z \sqrt{\cos z}$$

$$\downarrow$$

$$(\sin z - \cos z) \sqrt{\cos z}$$

$$III. \quad \left(1 - \sqrt{\sin v} \right) \left(1 + \sqrt{\sin v} \right) \rightarrow 1 - \sin v$$

$$IV. \quad \sqrt{\cos x} \left(\sqrt{2\cos x} + \sqrt{\sin x \cos x} \right)$$

$$\downarrow$$

$$\sqrt{2\cos^2 x} + \sqrt{\sin x \cos^2 x}$$

$$\downarrow$$

$$\cos x \sqrt{2} + \cos x \sqrt{\sin x}$$

$$\downarrow$$

$$\cos x \left(\sqrt{2} + \sqrt{\sin x} \right)$$

Trigonometric Identities Practice

Question 3

Simplify

$$\begin{aligned}
 \text{I. } \sqrt{4 + (2\tan z)^2} &\rightarrow \sqrt{4 + 4\tan^2 z} \rightarrow \sqrt{4(1 + \tan^2 z)} \\
 &\quad \downarrow \\
 2\sec z &\leftarrow 2\sqrt{\sec^2 z} \leftarrow 2\sqrt{(1 + \tan^2 z)} \\
 &\quad \text{pythagorean identities}
 \end{aligned}$$

$$\begin{aligned}
 \text{II. } \frac{\sin^2 z}{\sqrt{1 - \sin^2 z}} &\rightarrow \frac{\sin^2 z}{\sqrt{\cos^2 z}} \rightarrow \frac{\sin^2 z}{\cos z} \rightarrow \sin z \frac{\sin z}{\cos z} \rightarrow \sin z \tan z \\
 &\quad \text{pythagorean identities} \qquad \qquad \qquad \text{basic identities}
 \end{aligned}$$

Question 4

Solve (calculator in radian mode)

$$\begin{aligned}
 \text{I. } \sin \frac{\pi}{12} &\rightarrow \frac{\sqrt{6} - \sqrt{2}}{4} \\
 \text{II. } \tan 105^\circ &\rightarrow \tan \frac{7\pi}{12} \rightarrow -2 - \sqrt{3} \\
 \text{III. } \sin 75^\circ &\rightarrow \sin \frac{5\pi}{12} \rightarrow \frac{\sqrt{6} + \sqrt{2}}{4} \\
 \text{IV. } \cos 285^\circ &\rightarrow \cos \frac{19\pi}{12} \rightarrow \frac{\sqrt{6} - \sqrt{2}}{4}
 \end{aligned}$$

Question 5

Solve (calculator)(round to four decimal places)

$$\begin{aligned}
 \text{I. } \sin 37^\circ \cos 22^\circ + \cos 37^\circ \sin 22^\circ &= 0.8572 \\
 \text{II. } \frac{\tan 66^\circ + \tan 10^\circ}{1 - \tan 66^\circ \tan 10^\circ} &= 4.0108
 \end{aligned}$$

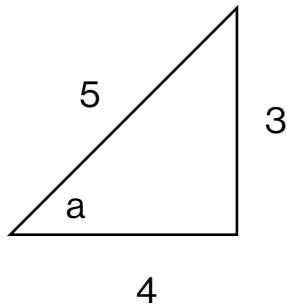
Trigonometric Identities Practice

Question 6

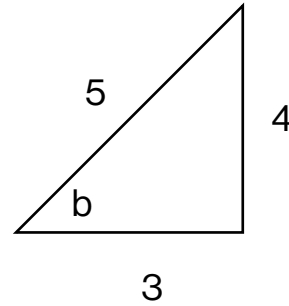
(assume a and b are in the first quadrant)

$$\sin a = \frac{3}{5} \quad \sin b = \frac{4}{5}$$

$$\sin a = \frac{3}{5}$$



$$\sin b = \frac{4}{5}$$



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

$$\cos b = \frac{3}{5}$$

$$\tan a = \frac{3}{4}$$

$$\tan b = \frac{4}{3}$$

I. $\cos(a+b)$

$$\frac{4}{5} \cdot \frac{3}{5} - \frac{3}{5} \cdot \frac{4}{5} \rightarrow 0$$

II. $\tan(a-b)$

$$\frac{\frac{3}{4} - \frac{4}{3}}{1 + \frac{3}{4} \cdot \frac{4}{3}} \rightarrow \frac{-7}{24}$$

III. $\sin(a-b)$

$$\frac{3}{5} \cdot \frac{3}{5} - \frac{4}{5} \cdot \frac{4}{5} \rightarrow \frac{-7}{25}$$

Trigonometric Identities Practice

Question 7

Solve (calculator in radian mode)

I. $\tan \frac{5\pi}{12} \rightarrow 2 + \sqrt{3}$

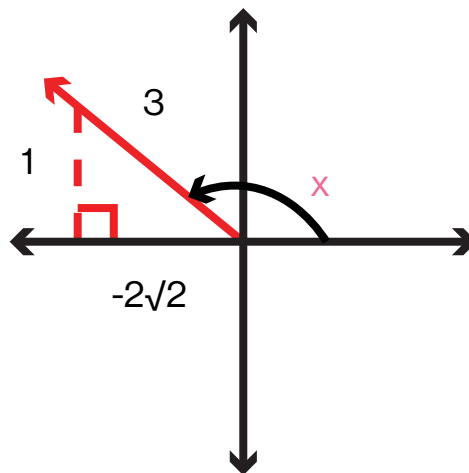
II. $\sec \frac{5\pi}{12} \rightarrow \frac{1}{\cos \frac{5\pi}{12}} \rightarrow \sqrt{6} + \sqrt{2}$

III. $\csc \frac{2\pi}{5} \rightarrow \frac{1}{\sin \frac{2\pi}{5}} \rightarrow 1.0515$

Question 8

Solve

$$\sin x = \frac{1}{3}$$



A. Six trigonometric functions

$$\sin x = \frac{1}{3}$$

$$\csc x = 3$$

$$\cos x = \frac{-2\sqrt{2}}{3}$$

$$\sec x = \frac{3}{-2\sqrt{2}} \rightarrow \frac{3\sqrt{2}}{-4}$$

$$\tan x = \frac{1}{-2\sqrt{2}} \rightarrow \frac{\sqrt{2}}{-4}$$

$$\cot x = -2\sqrt{2}$$

Trigonometric Identities Practice

B. Six trigonometric functions ($\pi/2 - x$)

$$\sin\left(\frac{\pi}{2} - x\right) = \cos x = \frac{-2\sqrt{2}}{3} \quad \csc\left(\frac{\pi}{2} - x\right) = \sec x = \frac{3\sqrt{2}}{-4}$$

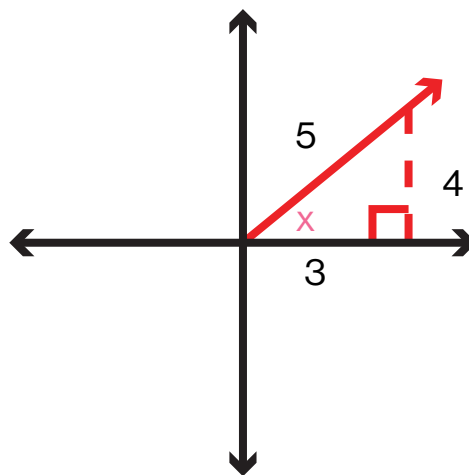
$$\cos\left(\frac{\pi}{2} - x\right) = \sin x = \frac{1}{3} \quad \sec\left(\frac{\pi}{2} - x\right) = \csc x = 3$$

$$\tan\left(\frac{\pi}{2} - x\right) = \cot x = -2\sqrt{2} \quad \cot\left(\frac{\pi}{2} - x\right) = \tan x = \frac{\sqrt{2}}{-4}$$

Question 9

Solve

$$\sin x = \frac{4}{5} \quad \cos x = \frac{3}{5} \quad \tan x = \frac{4}{3}$$



A. Find $\sin(2x)$, $\cos(2x)$, and $\tan(2x)$.

$$\sin(2x) = 2\sin x \cos x = 2 \cdot \frac{4}{5} \cdot \frac{3}{5} = \frac{24}{25}$$

$$\cos(2x) = \cos^2 x - \sin^2 x = \left(\frac{3}{5}\right)^2 - \left(\frac{4}{5}\right)^2 = \frac{-7}{25}$$

$$\tan(2x) = \frac{\sin(2x)}{\cos(2x)} = \frac{24}{25} \cdot \frac{25}{-7} = \frac{-24}{7}$$

B. Determine the quadrant of $2x$

$\sin(2x)$ = positive

$\cos(2x)$ = negative

$2x$ is in quadrant II

Trigonometric Identities Practice

Question 10

Solve (calculator)

I. $\cos 15^\circ \rightarrow \sqrt{\frac{1 + \cos 30^\circ}{2}} \rightarrow \frac{\sqrt{6 + \sqrt{2}}}{4}$

II. $\tan 67.5^\circ \rightarrow \sqrt{\frac{1 - \cos 135^\circ}{1 + \cos 135^\circ}} \rightarrow 1 + \sqrt{2}$

III. $\sin 112.5^\circ \rightarrow \sqrt{\frac{1 - \cos 225^\circ}{2}} \rightarrow \sqrt{\frac{1 - (-\sqrt{2}/2)}{2}} \rightarrow \sqrt{\frac{1 + \sqrt{2}/2}{2}}$

calculator unable to completely solve

$$\sqrt{\frac{2 + \sqrt{2}}{4}}$$

↓

$$\frac{\sqrt{2 + \sqrt{2}}}{2}$$

←

$$\sqrt{\frac{\frac{2 + \sqrt{2}}{2}}{2}}$$

←

$$\sqrt{\frac{2/2 + \sqrt{2}/2}{2}}$$

↓

Trigonometric Identities Practice

Question 11

Simplify

$$I. \quad \sin(7p) - \sin(4p) \rightarrow 2\cos\left(\frac{7p+4p}{2}\right)\sin\left(\frac{7p-4p}{2}\right) \rightarrow 2\cos\left(\frac{11p}{2}\right)\sin\left(\frac{3p}{2}\right)$$

$$II. \quad \cos w - \cos(7w) \rightarrow 2\sin\left(\frac{7p+1p}{2}\right)\sin\left(\frac{7p-1p}{2}\right) \rightarrow 2\sin\left(\frac{8p}{2}\right)\sin\left(\frac{6p}{2}\right)$$

↓

$$2\sin(4p)\sin(3p)$$

$$III. \quad \cos(2x)\sin x \rightarrow \frac{1}{2}[\sin(2x+x) - \sin(2x-x)] \rightarrow \frac{1}{2}[\sin(3x) - \sin(x)]$$

$$IV. \quad 7\cos(5x)\cos(7x) \rightarrow \frac{7}{2}[\cos(5x-7x) + \cos(5x+7x)] \rightarrow \frac{7}{2}[\cos(-2x) + \cos(12x)]$$

↓

$$\frac{7}{2}[\cos(2x) + \cos(12x)]$$

basic identities