

1. p039e01 - Expresa en radianes los siguientes ángulos, dados en grados:

(a) 45°

Sol: $\frac{\pi}{4}$

Sol: $\frac{5\pi}{12}$

Sol: $\frac{7\pi}{12}$

(b) 75°

(c) 105°

(d) 230°

Sol: $\frac{23\pi}{18}$

2. p039e02 - Expresa en grados los siguientes ángulos dados en radianes:

(a) $\frac{3\pi}{4}$

Sol: 135

Sol: 300

Sol: 810

(b) $\frac{5\pi}{3}$

(c) $\frac{3\pi}{2}$

Sol: 270

(e) $\frac{4\pi}{3}$

Sol: 240

(d) $\frac{9\pi}{2}$

3. p039e05y6 - Demostrar si son verdaderas o falsas las siguientes ecuaciones:

(a) $\sec^2 \alpha + \csc^2 \alpha = \sec^2 \alpha \cdot \csc^2 \alpha$

Sol: $\left[\frac{8}{-\cos(4\alpha)+1}, \frac{8}{-\cos(4\alpha)+1} \right] \rightarrow \text{True}$

(b) $\frac{\tan \alpha + \tan \beta}{\cot \alpha + \cot \beta} = \tan \alpha \cdot \tan \beta$

Sol: $[\tan(\alpha) \tan(\beta), \tan(\alpha) \tan(\beta)] \rightarrow \text{True}$

(c) $\frac{\sin \alpha \cdot \cos \alpha}{\cos^2 \alpha - \sin^2 \alpha} = \frac{\tan \alpha}{1 - \tan^2 \alpha}$

Sol: $\left[\frac{\tan(2\alpha)}{2}, \frac{\tan(2\alpha)}{2} \right] \rightarrow \text{True}$

(d) $\cot \alpha - \frac{\cot^2 \alpha - 1}{\cot \alpha} = \tan \alpha$

Sol: $[\tan(\alpha), \tan(\alpha)] \rightarrow \text{True}$

(e) $\frac{\sin \alpha + \cot \alpha}{\tan \alpha + \csc \alpha} = \cos \alpha$

Sol: $[\cos(\alpha), \cos(\alpha)] \rightarrow \text{True}$

(f) $\cot^2 \alpha - \cos^2 \alpha = \cot^2 \alpha \cdot \cos^2 \alpha$

$$\text{Sol: } [-\cos^2(\alpha) + \cot^2(\alpha), \cos^2(\alpha) \cot^2(\alpha)] \rightarrow \text{True}$$

(g) $\sin \alpha \cos \alpha \tan \alpha \cot \alpha \sec \alpha \csc \alpha = 1$

$$\text{Sol: } [1, -1] \rightarrow \text{True}$$

(h) $\frac{1+\tan \alpha}{1-\tan \alpha} = \frac{\cos \alpha + \sin \alpha}{\cos \alpha - \sin \alpha}$

$$\text{Sol: } \left[\frac{\tan(\alpha)+1}{-\tan(\alpha)+1}, \tan\left(\alpha + \frac{\pi}{4}\right) \right] \rightarrow \text{True}$$

(i) $\frac{1+\tan^2 \alpha}{\cot \alpha} = \frac{\tan \alpha}{\cos^2 \alpha}$

$$\text{Sol: } \left[\frac{\tan(\alpha)}{\cos^2(\alpha)}, \frac{\tan(\alpha)}{\cos^2(\alpha)} \right] \rightarrow \text{True}$$

4. p039e07 - Simplificar las siguientes expresiones:

(a) $\sin \alpha \cdot \frac{1}{\tan \alpha}$

$$\text{Sol: } \cos(\alpha)$$

(b) $\sin^3 \alpha + \sin \alpha \cdot \cos^2 \alpha$

$$\text{Sol: } \sin(\alpha)$$

(c) $\sqrt{(1 - \sin \alpha) \cdot (1 + \sin \alpha)}$

$$\text{Sol: } \sqrt{\cos^2(\alpha)}$$

(d) $\sin^4 \alpha - \cos^4 \alpha$

$$\text{Sol: } -\cos(2\alpha)$$

(e) $\cos^3 \alpha + \cos^2 \alpha \cdot \sin \alpha + \cos \alpha \cdot \sin^2 \alpha + \sin^3 \alpha$

$$\text{Sol: } \sqrt{2} \sin\left(\alpha + \frac{\pi}{4}\right)$$

(f) $\sin \alpha \cdot \cos \alpha \cdot \left(\tan \alpha + \frac{1}{\tan \alpha}\right)$

$$\text{Sol: } 1$$

(g) $\frac{\cos^2 \alpha - \sin^2 \alpha}{\cos^4 \alpha - \sin^4 \alpha}$

Sol: 1

(h) $\frac{\sec^2 \alpha + \cos^2 \alpha}{\sec^2 \alpha - \cos^2 \alpha}$

Sol: $\frac{(-\cos^2(\alpha)+1)^2 + 2\cos^2(\alpha)}{-\cos^4(\alpha)+1}$

(i) $\frac{\cos^2 \alpha}{1 - \sin \alpha}$

Sol: $\sin(\alpha) + 1$

(j) $\frac{\csc \alpha}{1 + \cot^2 \alpha}$

Sol: $\sin(\alpha)$

5. p039e08 - Calcular las restantes razones trigonométricas de α , conocida:

(a) $\cos \alpha = \frac{4}{5} \wedge \alpha \in I$

Sol: $\left[36,86989764584401, \frac{3}{5}, \frac{4}{5}, \frac{3}{4}\right]$

(b) $\sin \alpha = \frac{3}{5} \wedge \alpha \in II$

Sol: $\left[36,86989764584402, \frac{3}{5}, -\frac{4}{5}, -\frac{3}{4}\right]$

(c) $\tan \alpha = -\frac{3}{4} \wedge \alpha \in II$

Sol: $\left[36,86989764584402, \frac{3}{5}, -\frac{4}{5}, -\frac{3}{4}\right]$

(d) $\sec \alpha = 2 \wedge \alpha \in IV$

Sol: $\left[60,0, -\frac{\sqrt{3}}{2}, \frac{1}{2}, -\sqrt{3}\right]$

(e) $\csc \alpha = -2 \wedge \alpha \in III$

Sol: $\left[30,0, -\frac{1}{2}, -\frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{3}\right]$

(f) $\cot \alpha = -2 \wedge \alpha \in IV$

Sol: $\left[26,56505117707799, -\frac{\sqrt{5}}{5}, \frac{2\sqrt{5}}{5}, -\frac{1}{2}\right]$

6. p039e09 - Expresa las siguientes razones trigonométricas en función de ángulos del primer cuadrante:

(a) $\sin(-120)$

Sol: $\left[60, -\frac{\sqrt{3}}{2}\right]$

(g) $\cot(-150)$

Sol: $\left[30, \sqrt{3}\right]$

(b) $\sin(2700)$

Sol: $[0, 0]$

(h) $\cot(4500)$

Sol: $[0, \infty]$

(c) $\cos(-30)$

Sol: $\left[30, \frac{\sqrt{3}}{2}\right]$

(i) $\sec(-25)$

Sol: $\left[25, \sec\left(\frac{5\pi}{36}\right)\right]$

(d) $\cos(3000)$

Sol: $\left[60, -\frac{1}{2}\right]$

(j) $\sec(745)$

Sol: $\left[25, \sec\left(\frac{149\pi}{36}\right)\right]$

(e) $\tan(-275)$

Sol: $\left[\frac{180 \operatorname{atan}\left(\frac{\cos\left(\frac{\pi}{18}\right)+1}{\cos\left(\frac{4\pi}{9}\right)}\right)}{\pi}, \frac{\cos\left(\frac{\pi}{18}\right)+1}{\cos\left(\frac{4\pi}{9}\right)}\right]$

(k) $\csc(-155)$

Sol: $\left[25, -\csc\left(\frac{5\pi}{36}\right)\right]$

(f) $\tan(10330)$

Sol: $\left[70, \tan\left(\frac{7\pi}{18}\right)\right]$

(l) $\csc(4420)$

Sol: $\left[80, \csc\left(\frac{4\pi}{9}\right)\right]$