

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

(a)  $45^\circ$

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

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

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

(b)  $75^\circ$

(c)  $105^\circ$

(d)  $230^\circ$

**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:**  $\sin(\alpha)$