5.3: (Trigonometric Functions of Angles)

If $\cot\theta = \frac{1}{2}, \pi < \theta < \frac{3\pi}{2}$, then $\sin\theta + \cos\theta =$

(a) $\frac{-3}{\sqrt{5}}$

(b) 3

(c) $\frac{-1}{\sqrt{5}}$

(d) $\frac{3}{\sqrt{5}}$

(e) $\frac{1}{\sqrt{5}}$

If $\tan x = \frac{12}{5}$ for all x is in the third quadrant, then $\cos x =$

(a) $-\frac{5}{13}$

(b) $\frac{5}{13}$

(c) $-\frac{12}{13}$

(d) $\frac{12}{13}$

(e) $\frac{13}{5}$

If $\cos\theta = -\frac{1}{2}$ and $\sin\theta > 0$, then $\cot\theta + \csc\theta =$

A) $\frac{\sqrt{3}}{3}$

B) $\frac{1}{2}$

C) $-\frac{\sqrt{3}}{2}$

D) $-\sqrt{3}$

E) $\sqrt{3}$

If $\sec\theta = -5$ and $\sin\theta > 0$, then $\tan\theta - \sin\theta =$

A) $\frac{8\sqrt{6}}{5}$

B) $12\sqrt{6}$

C) $-\frac{12\sqrt{6}}{5}$

D) $-2\sqrt{6}$

E) $-\frac{8\sqrt{6}}{5}$

If θ is in quadrant IV and $\sec\theta = \frac{x+4}{x}$, where $x > 0$, then $\tan\theta =$

A) $-\frac{2\sqrt{2x+4}}{x}$

B) $-\frac{\sqrt{2x+4}}{2x}$

C) $\frac{2\sqrt{x+1}}{x}$

D) $-\frac{4\sqrt{x+4}}{x}$

E) $\frac{4\sqrt{x+4}}{x}$

If x is in the third quadrant, then $\cot x$ in terms of $\sin x$ is

(a) $-\frac{\sqrt{1-\sin^2 x}}{\sin x}$

(b) $\frac{\sqrt{1-\sin^2 x}}{\sin x}$

(c) $-\frac{\sin x}{\sqrt{1+\sin^2 x}}$

(d) $\frac{\sin x}{\sqrt{1+\sin^2 x}}$

(e) $-\frac{\sqrt{1-\sin x}}{\sin x}$

If x is in the third quadrant, then $\cot x$ in terms of $\sec x$ is

A) $\frac{\sqrt{\sec^2 x-1}}{\sec^2 x-1}$

B) $-\frac{\sqrt{\sec^2 x-1}}{\sec^2 x-1}$

C) $-\frac{\sqrt{\sec^2 x+1}}{\sec^2 x-1}$

D) $\frac{\sqrt{\sec^2 x-1}}{\sec^2 x+1}$

E) $-\frac{1}{\sec^2 x-1}$

If $\csc\theta = \frac{x+1}{x}, x > 0$, then $\cot\theta =$

A) $\frac{\sqrt{1+2x}}{x}$

B) $\frac{\sqrt{2x-1}}{x}$

C) $\frac{\sqrt{x^2+2x}}{x}$

D) $\frac{\sqrt{2x^2+2x+1}}{x}$

E) $\frac{1}{x}$

If $\cot\theta = u$ and θ is in the third quadrant, then $\cot\theta\sec\theta =$

A) $-\sqrt{1+u^2}$

B) $\sqrt{1+u^2}$

C) $\sqrt{1-u^2}$

D) $-\sqrt{1-u^2}$

E) $\sqrt{u^2-1}$

If $\cot\theta = m$, where $\pi < \theta < \frac{3\pi}{2}$, then $\cos\theta$ is equal to

A) $-\frac{m\sqrt{1+m^2}}{1+m^2}$

B) $-\frac{m\sqrt{1-m^2}}{1-m^2}$

C) $\frac{-\sqrt{1-m^2}}{1-m^2}$

D) $\frac{-\sqrt{1+m^2}}{1+m^2}$

E) $\sqrt{1-m^2}$

If $\cos\theta = -\frac{2}{3}, \sin\theta < 0$, then $\csc\theta + \tan\theta$

A) $-\frac{\sqrt{5}}{10}$

B) $\frac{11\sqrt{5}}{10}$

C) $-\frac{\sqrt{13}}{10}$

D) $\frac{3\sqrt{5}}{10}$

E) $-\frac{7\sqrt{5}}{10}$

If $\tan\theta = \frac{3}{4}$, where θ is in the third quadrant, then $\csc\theta =$

A) $-\frac{5}{3}$

B) $\frac{5}{3}$

C) $-\frac{13}{5}$

D) $-\frac{5}{4}$

E) $\frac{5}{4}$

Which one of the following statements is possible?

A) $\tan\theta = -\frac{\sqrt{3}}{2}$ and $\sec\theta = \frac{\sqrt{7}}{2}$

B) $\sin\theta = \frac{\pi}{2}$

C) $\csc\theta = -\frac{1}{2}$ and $\sin\theta = -2$

D) $\cos\theta = -\frac{3}{2}$ and $\sec\theta = -\frac{2}{3}$

E) $\sec\theta = 0$

If $\cot\theta = \frac{1}{2}$ where $\pi < \theta < \frac{3\pi}{2}$, then $\sin\theta - \cos\theta =$

A) $-\frac{\sqrt{5}}{5}$

B) $-\frac{2\sqrt{5}}{5}$

C) $\frac{3\sqrt{5}}{5}$

D) $\frac{2\sqrt{5}}{5}$

E) $-\frac{3\sqrt{5}}{5}$

Which one of the following statements is FALSE for any angle α in the domain of the functions?

A) $\sin\alpha + \cos\alpha = 1$

B) $-1 \leq \sin\alpha \leq 1$

C) $1 \leq |\sec\alpha|$

D) $1 \leq |\csc\alpha|$

E) $-\infty < \tan\alpha < \infty$

If $\tan\theta = -\frac{5}{3}$ and θ is in the second quadrant, then $\frac{\csc\theta - \cot\theta}{\cos\theta} =$

A) $-\frac{34+3\sqrt{34}}{15}$

B) $\frac{3+\sqrt{34}}{15}$

C) $-\frac{\sqrt{34}}{15}$

D) $\frac{3\sqrt{34}-34}{34}$

E) $\frac{34}{9} - \frac{\sqrt{34}}{5}$

The exact value of $-\tan(780^\circ)\sin(570^\circ) - \sec(-585^\circ)$ is

A) $\frac{\sqrt{3}+2\sqrt{2}}{2}$

B) $\frac{\sqrt{3}-2\sqrt{2}}{2}$

C) $\frac{2\sqrt{3}-3\sqrt{2}}{2}$

D) $\frac{\sqrt{3}-\sqrt{2}}{2}$

E) $\frac{\sqrt{3}+\sqrt{2}}{2}$

Which one of the following statements is TRUE?

A) If $\tan\theta = \sqrt{3}$ and θ is in Quadrant III, then $\cos\theta = -\frac{1}{2}$.

B) If $\cot\theta = 2$, then $\sin\theta = 2$ and $\cos\theta = 1$.

C) If $\sec\theta > 0$ and $\csc\theta > 0$, then θ lies in Quadrant II.

D) If $90^\circ < \theta < 180^\circ$, then $\sin(2\theta)$ is positive.

E) If $\sec\theta = \frac{10}{3}$, then $\sin\theta = \frac{3}{10}$.

If $\cot\theta = \frac{2}{\sqrt{5}}, \sec\theta < 0$, then $\sin\theta\cos\theta =$

A) $\frac{2\sqrt{5}}{9}$

B) $2\sqrt{5}$

C) $-\frac{2\sqrt{5}}{9}$

D) $\frac{\sqrt{5}}{3}$

E) $-\frac{\sqrt{5}}{9}$

$$\sec\left(-\frac{23\pi}{6}\right)\cot\left(\frac{16\pi}{3}\right) =$$

A) $\frac{2}{3}$

B) $-\frac{2}{3}$

C) 2

D) $-\frac{3}{2}$

E) -3

The exact value of $\tan\left(-\frac{7\pi}{6}\right) + \sec\left(-\frac{\pi}{6}\right)$ is equal to

(a) $\frac{\sqrt{3}}{3}$

(b) $-\frac{\sqrt{3}}{3}$

(c) $-\frac{3\sqrt{3}}{2}$

(d) $-\frac{2\sqrt{3}}{3}$

(e) $\frac{\sqrt{3}}{2}$

The value of $\cot\left(-\frac{17\pi}{3}\right) + \sin\left(\frac{11\pi}{6}\right) =$

A) $\frac{2\sqrt{3}-3}{6}$

B) $\frac{2\sqrt{3}+1}{3}$

C) $\frac{\sqrt{3}-3}{3}$

D) $\frac{2\sqrt{3}-1}{6}$

E) $\frac{\sqrt{3}+2}{2}$

$\tan(570°) + \csc(-1020°) =$

A) $\sqrt{3}$

B) $-\sqrt{3}$

C) $-\frac{\sqrt{3}}{3}$

D) $\frac{\sqrt{3}}{3}$

E) $\sqrt{3} + 2$

If $u = \sin 780°$ and $v = \cot(-950°) + \tan 220°$, then $4(u^2 + v) =$

A) 3

B) $\sqrt{3}$

C) $3 + 4\cot 40°$

D) $\sqrt{3} + 4\tan 40°$

E) -1

If $\tan\theta = -\frac{2\sqrt{5}}{5}$ and $\sec\theta = -\frac{3\sqrt{5}}{5}$ then, $12\csc\theta =$

A) 18

B) 8

C) -18

D) -8

E) $-3\sqrt{5}$

$\sqrt{3}\tan(750°) + 2\sec(-300°) =$

A) 5

B) -3

C) 7

D) -1

E) 2

If $\cos 160^\circ = A$, then $\cos 340^\circ + \sec 200^\circ$ equals to

A) $\frac{1-A^2}{A}$

B) $\frac{1+A^2}{A}$

C) $\frac{A^2-1}{A}$

D) $\frac{1}{A}$

E) $A^2 + 1$

The exact value of $\sec(-480^\circ) - \cot\frac{3\pi}{4}$ is

A) - 1

B) -3

C) $\frac{3-2\sqrt{3}}{3}$

D) 3

E) $\frac{3+2\sqrt{3}}{3}$

$$\sec\frac{25\pi}{6} - \tan(-510°) =$$

A) $\frac{\sqrt{3}}{3}$

B) $\frac{2\sqrt{3}}{3}$

C) $\sqrt{3}$

D) $-\frac{\sqrt{3}}{3}$

E) $-\frac{2\sqrt{3}}{3}$

$$\tan\left(\frac{23\pi}{6}\right) + \csc\left(\frac{11\pi}{6}\right) =$$

A) $\frac{-\sqrt{3}-6}{3}$

B) $\frac{-\sqrt{3}+6}{3}$

C) $\frac{-2\sqrt{3}-3}{6}$

D) $\frac{\sqrt{3}+2}{3}$

E) $\frac{\sqrt{3}-2}{3}$

If α is the reference angle of $-30°$ and β is the smallest positive coterminal angle of $-670°$, then $\alpha + \beta =$

A) $80°$

B) $380°$

C) $110°$

D) $200°$

E) $20°$

If $\alpha = 475°$ and $\beta = -\frac{11\pi}{6}$ are two angles in standard position, $2\alpha + \beta$ is in the

A) third quadrant

B) first quadrant

C) second quadrant

D) fourth quadrant

E) quadrantal angle

If $\pi < \theta < \frac{3\pi}{2}$ and $\cot\theta = \frac{3\sqrt{7}}{7}$, then $\cos\theta =$

A) $-\frac{3}{4}$

B) $-\frac{4}{3}$

C) $\frac{\sqrt{7}}{4}$

D) $-\frac{\sqrt{7}}{3}$

E) $\frac{3}{4}$

The exact value of $\tan(675°)\cos(-240°) - \csc(495°)$ is

A) $\frac{1-2\sqrt{2}}{2}$

B) $\frac{1+2\sqrt{2}}{2}$

C) $\frac{-1-2\sqrt{2}}{2}$

D) $\frac{1-\sqrt{2}}{2}$

E) $\frac{1+\sqrt{2}}{2}$

$\tan\left(-\frac{5\pi}{3}\right) + \csc\left(\frac{23\pi}{6}\right) =$

A) $\sqrt{3} - 2$

B) $\sqrt{3} + 2$

C) $2 - \sqrt{3}$

D) $\frac{\sqrt{3}+2}{2}$

E) $\frac{\sqrt{3}-2}{2}$

The exact value of $\sec\left(-\frac{19\pi}{4}\right) \cdot \tan\left(\frac{17\pi}{3}\right) + \csc\left(\frac{11\pi}{6}\right)$ is equal to

A) $\sqrt{6} - 2$

B) $\frac{\sqrt{6}-6}{3}$

C) $\frac{2\sqrt{6}-1}{2}$

D) $-\sqrt{6} + 2$

E) $-\sqrt{6} - 2$

Which one of the following statements is TRUE for $-90° < \theta < 90°$.

A) $\sec(\theta - 180°)$ is negative

B) $\cos\frac{\theta}{2}$ is negative

C) $\cos(\theta + 180°)$ is positive

D) $\sin(\theta - 90°)$ is positive

E) $\sec(-\theta)$ is negative

$\sec(480°) =$

A) $-\frac{2\sqrt{3}}{3}$

B) 2

C) $\frac{2\sqrt{3}}{3}$

D) -2

E) -1

$4\sin(-870^\circ) + \tan 143^\circ + \cot 53^\circ =$

A) -2

B) 2

C) $2\sqrt{3}$

D) $-2\sqrt{3}$

E) $2\sqrt{2}$

$4\sin(-510^\circ)\cos 300^\circ + \cot 199^\circ - \tan 251^\circ =$

A) -1

B) 1

C) $1 - 2\sqrt{3}$

D) $-1 + 2\sqrt{3}$

E) $-1 - 2\sqrt{3}$

Which one of the following statements is TRUE?

A) $\sec(-89)^\circ > 0$

B) $\cot(-100)^\circ < 0$

C) $\cos 178^\circ > 0$

D) $\tan 340^\circ > 0$

E) $\sin 370^\circ < 0$

Which one of the following statements is FALSE?

A) $(\sin\theta + \cos\theta)^2 = 1$ for all angles θ.

B) If $90^\circ < \theta < 180^\circ$, then $\cot\left(\frac{\theta}{2}\right)$ is positive

C) If $\sec\theta < 0$ and $\csc\theta < 0$, then θ lies in Quadrant III.

D) If $\tan\theta < 0$ and $\cot\theta < 0$, then θ lies in Quadrant II or IV.

E) If $\csc\theta = 2$ and θ in quadrant II, then $\cos\theta = -\frac{\sqrt{3}}{2}$

$$\cos\left(\frac{7\pi}{4}\right)\tan\left(\frac{4\pi}{3}\right) + \cos\left(\frac{7\pi}{6}\right) =$$

A) $\frac{\sqrt{6}-\sqrt{3}}{2}$

B) $\frac{\sqrt{6}+\sqrt{3}}{2}$

C) $\frac{\sqrt{2}+\sqrt{3}}{2}$

D) $\frac{\sqrt{2}-\sqrt{3}}{2}$

E) $\frac{\sqrt{6}-\sqrt{3}}{4}$

The exact value of $\sec(-480°) + \csc\left(\frac{71\pi}{6}\right)$ is

A) -4

B) $-\frac{1}{2}$

C) - 2

D) $-\frac{1}{4}$

E) -3

The value of $\sin 150° + \tan\frac{5\pi}{4} + \sec 300°$ is

A) $\frac{7}{2}$

B) $\frac{3}{2}$

C) $\frac{5-\sqrt{2}}{2}$

D) $\frac{1}{2}$

The exact value of $\sin(-210°) + \cot(735°) + \tan(285°)$ is

A) $\frac{1}{2}$

B) $\frac{\sqrt{2}}{2}$

C) $-\frac{\sqrt{3}}{2}$

D) $-\frac{1}{2}$

E) $\frac{\sqrt{3}}{2}$

If $2\sin\theta = -3\cos\theta, \frac{3\pi}{2} < \theta < 2\pi$, then $\sin\theta - \cos\theta =$

A) $-\frac{5}{\sqrt{13}}$

B) $\frac{5}{\sqrt{13}}$

C) $-\frac{1}{\sqrt{13}}$

D) $\frac{1}{\sqrt{13}}$

E) -1

The value of $\cos(-510^\circ)\csc(300^\circ) + \tan\left(-\frac{9\pi}{4}\right)$ is

(a) 0

(b) $\sqrt{3} - 1$

(c) -2

(d) $\frac{4}{3}$

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

$4\sin(-510°)\cos 300° + \cot 199° - \tan 251° =$

A) -1

B) 1

C) $1 - 2\sqrt{3}$

D) $-1 + 2\sqrt{3}$

E) $-1 - 2\sqrt{3}$

If $\tan 20° = a$, then $\tan 160° + \tan(-380°) =$

A) $-2a$

B) 0

C) $2a$

D) $\sqrt{1 + a^2}$

E) $\frac{1-a}{a}$

If $\tan 324° = x$, then $\csc 36° =$

A) $-\frac{\sqrt{x^2+1}}{x}$

B) $\frac{\sqrt{x^2+1}}{x}$

C) $\sqrt{x^2+1}$

D) $-\sqrt{x^2+1}$

E) $\frac{1}{x}$

If $\sec \frac{9\pi}{5} = x$, then $\tan \frac{\pi}{5} =$

A) $\sqrt{x-1}$

B) $\frac{\sqrt{x^2-1}}{x}$

C) $\sqrt{x^2-1}$

D) $\sqrt{x+1}$

E) $\sqrt{x^2+1}$

For any angle θ, which one of the following is not possible?

A) $\cos\theta = -\frac{4}{3}$ and $\sec\theta = -\frac{3}{4}$

B) $\sin^2(-\theta) + \cos^2(-\theta) = 1$

C) $\tan\theta = 4$ and $\cot\theta = \frac{1}{4}$

D) $\cot^2\theta = \csc^2\theta - 1$

E) $\csc\theta = -5$

The exact value of $\sec\frac{23\pi}{6}\cot\frac{13\pi}{3} - \sin\frac{7\pi}{4}$ is equal to

A) $\frac{4+3\sqrt{2}}{6}$

B) $\frac{4-3\sqrt{2}}{6}$

C) $-\frac{4+3\sqrt{2}}{6}$

D) $\frac{3\sqrt{2}-4}{6}$

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

$\sin\left(\frac{7\pi}{4}\right)\tan 600° + \cos\left(-\frac{7\pi}{6}\right) =$

A) $-\frac{\sqrt{3}}{2}(\sqrt{2}+1)$

B) $\frac{\sqrt{3}}{2}(\sqrt{2}-1)$

C) $\frac{\sqrt{3}}{2}(1-\sqrt{2})$

D) $\frac{\sqrt{3}}{2}(\sqrt{2}+1)$

E) $-\frac{\sqrt{2}}{2}(\sqrt{3}+1)$

If $-90° < \theta < 90°$, then

A) $\sin(\theta + 90°) > 0$ and $\sec\frac{\theta}{2} > 0$

B) $\sin(\theta + 90°) < 0$ and $\sec\frac{\theta}{2} > 0$

C) $\sin(\theta + 90°) > 0$ and $\sec\frac{\theta}{2} < 0$

D) $\sin(\theta + 90°) < 0$ and $\sec\frac{\theta}{2} < 0$

E) $\tan\theta < 0$ and $\cos\theta > 0$

The exact value of $\csc(225°) \cdot \tan(-240°) + \sin 150°$ is

(a) $\frac{1}{2} + \sqrt{6}$

(b) $\sqrt{3} + \frac{1}{2}$

(c) $\frac{\sqrt{2}+2\sqrt{3}}{\sqrt{3}}$

(d) $\frac{\sqrt{6}+4\sqrt{3}}{\sqrt{2}}$

(e) $\sqrt{6} + 2\sqrt{3}$

If $\tan(71°) = b$, then $\csc^2(19°) + 1 =$

A) $b^2 + 2$

B) $b^2 + 1$

C) 1

D) b^2

E) $b^2 - 1$

$$\cos\frac{17\pi}{4} - \tan 765^\circ \csc\frac{11\pi}{6} =$$

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

B) $4\sqrt{2}$

C) $\frac{\sqrt{2}-4}{4}$

D) $\frac{\sqrt{3}+1}{2}$

E) $\frac{2\sqrt{2}}{3}$

$$\sin\left(-\frac{7\pi}{4}\right) + \tan(870^\circ)$$

A) $\frac{3\sqrt{2}-2\sqrt{3}}{6}$

B) $\frac{3}{2}$

C) $\frac{3\sqrt{2}+2\sqrt{3}}{6}$

D) $\frac{2\sqrt{2}-3\sqrt{3}}{6}$

E) $\frac{-3\sqrt{2}-2\sqrt{3}}{6}$

If $\tan(24°) = \text{t}$ then $\tan(516°) + \cot(156°) =$

A) $\frac{-t^2-1}{t}$

B) $\frac{t^2-1}{t}$

C) $\frac{t^2+1}{t}$

D) $\frac{-t-1}{t}$

E) $\frac{t+1}{t}$

Which one of the following statements is TRUE?

(a) If $90° < \theta < 180°$ then, $\sin(2\theta)$ is negative.

(b) $\sin\theta + \cos\theta = 1$ for all θ.

(c) If $\cot\theta = \frac{1}{2}$, then $\sin\theta = 1$ and $\cos\theta = 2$.

(d) $\sec\theta = -0.3$, for some θ where $\frac{\pi}{2} < \theta < \pi$.

(e) If $\sec\theta > 0$, $\csc\theta > 0$, then θ is in the second quadrant.

Which one of the following statements is FALSE?

A) If $90^\circ \leq \theta \leq 180^\circ$ then $\tan\left(\frac{\theta}{2}\right)$ is negative.

B) If $\tan\theta = \frac{1}{2}$ then the terminal side of θ lies in quadrant I or quadrant III .

C) The range of $\tan\theta$ is $(-\infty, \infty)$.

D) If $0 \leq \theta < \frac{\pi}{2}$, then $\tan^2\theta = \sec^2\theta - 1$.

E) If $\tan(-15^\circ) = \beta$ then, $\tan(15^\circ) = -\beta$.

Which one of the following statements is FALSE?

A) If $0 \leq \theta < \frac{\pi}{2}$ and $\tan\theta = \frac{1}{2}$, then $\sin\theta = 1$ and $\cos\theta = 2$

B) If $0 \leq \theta < \frac{\pi}{2}$, then $\sec^2\theta - \tan^2\theta = 1$

C) If $0 \leq \theta < \frac{\pi}{2}$, then $\sin\left(\frac{\theta}{2}\right)$ is positive

D) The range of $\tan\theta$ is $(-\infty, \infty)$

E) $\sin\left(-\frac{\pi}{3}\right) = \sin\left(\frac{5\pi}{3}\right)$

Decide which one of the following statements is possible.

A) $\cot\theta = 0.93$

B) $\cos\theta = -\frac{4}{3}$

C) $\tan\theta = \frac{3}{2}$ and $\cot\theta = -\frac{3}{2}$

D) $\csc\theta = -\frac{1}{2}$ and $\sin\theta = -2$

E) $\sec\theta = -0.3$

$\tan(420°) + \sec(495°)\csc(225°) =$

A) $\sqrt{3} + 2$

B) $-\sqrt{3} + 2$

C) $-\sqrt{3} - 2$

D) $\frac{\sqrt{3}}{3} + 2$

E) $-\frac{\sqrt{3}}{3} + \frac{1}{2}$

If α is the least positive coterminal angle with the angle $\frac{65\pi}{9}$, and β is the reference angle of the angle $\frac{5\pi}{9}$, then $\alpha + \beta =$

A) $\frac{5\pi}{3}$

B) $\frac{11\pi}{9}$

C) $\frac{\pi}{9}$

D) $\frac{-\pi}{9}$

E) $\frac{13\pi}{9}$

The reference angle of $\theta = \frac{11\pi}{15}$, in degrees, is equal to

A) $48°$

B) $32°$

C) $49°$

D) $38°$

E) $35°$

If R is the reference angle of 1945° and Q is the smallest positive coterminal angle of -950°, then $\mathrm{R}+\mathrm{Q}$

A) 165°

B) 155°

C) 175°

D) 275°

E) 255°

If the reference angle of 10 radians is $10-n\pi$, then $n=$

A) 3

B) 6

C) 4

D) 7

E) 5

The reference angle of the angle $\theta = \frac{25\pi}{7}$ is equal to

A) $\frac{3\pi}{7}$

B) $\frac{2\pi}{7}$

C) $\frac{5\pi}{7}$

D) $\frac{\pi}{7}$

E) $\frac{4\pi}{7}$

The smallest positive coterminal angle of $\theta = \frac{23\pi}{7}$ is

A) in the third quadrant

B) in the first quadrant

C) in the fourth quadrant

D) a quadrantal angle

E) in the second quadrant

The sum of all coterminal angles with $\frac{2\pi}{3}$ between 2π and 6π is

A) $\frac{22\pi}{3}$

B) $\frac{21\pi}{3}$

C) $\frac{20\pi}{3}$

D) $\frac{13\pi}{3}$

E) $\frac{31\pi}{3}$

The reference angle of $\theta = 16$ radians is equal to

A) $16 - 5\pi$

B) $5\pi - 16$

C) $16 - 4\pi$

D) $4\pi - 16$

E) $6\pi - 16$

The reference angle of the angle $\theta = 1225°$ is

A) $35°$

B) $65°$

C) $55°$

D) $45°$

E) $25°$

The reference angle α', in radians, of the angle $\alpha = 920°$ is equal to:

A) $\frac{\pi}{9}$

B) $\frac{\pi}{3}$

C) $\frac{\pi}{5}$

D) $\frac{\pi}{10}$

E) $\frac{\pi}{6}$

The reference angle of $\theta = 2$ radians is equal to

A) $\pi - 2$

B) $2 - \pi$

C) $2 + \pi$

D) $2\pi - 2$

E) $\frac{\pi}{2} - 2$

The reference angle of $-115°$ is

A) $65°$

B) $55°$

C) $75°$

D) $45°$

E) $25°$

The greatest negative angle that is coterminal with $\frac{27\pi}{5}$ is

A) $-\frac{3\pi}{5}$

B) $-\pi$

C) $-\frac{2\pi}{5}$

D) $-\frac{4\pi}{5}$

E) $-\frac{\pi}{5}$

If α is the smallest positive coterminal angle of $\frac{57\pi}{2}$ and β is reference angle of $1270°$, then $\alpha + \beta =$

A) $100°$

B) $180°$

C) $190°$

D) $280°$

E) $210°$

If α is the reference angle of $845°$ and β is the least positive coterminal of $-705°$, then $\alpha + \beta =$

A) $70°$

B) $80°$

C) $180°$

D) $160°$

E) $150°$

If $\theta = \frac{13\pi}{18}$, then the degree measure of the reference angle of θ is

(A) $50°$

B) $60°$

C) $45°$

D) $70°$

E) $36°$

If α' is the reference angle of $\alpha = -4$ and β' is the reference of $\beta = 7$ then $\alpha' + \beta' =$

A) $3 - 2\pi$

B) $3 - \pi$

C) $11 - 3\pi$

D) $11 - 2\pi$

E) $2\pi - 3$

The value of $2 - \sin^2(40°) - \sin^2(50°)$ is

A) -3

B) 0

C) 3

D) 1

E) -1

The value of $1 - \cos^2(20°) - \cos^2(70°)$ is

A) $\cos^2(90°)$

B) $\sin^2(90°)$

C) $\sin^2(70°)$

D) $1 - \sin^2(20°)$

E) $\sin^2(20°) - \cos^2(20°)$

Let the point $(\mathrm{k}, -2)$ lie on the terminal side of angle θ in standard position. If $\csc\theta = -3$, where $\cos\theta > 0$, then the value of k is equal to

A) $4\sqrt{2}$

B) $-4\sqrt{2}$

C) $2\sqrt{2}$

D) $-2\sqrt{2}$

E) $-\sqrt{2}$

If the terminal side of an angle θ, in standard position, is in quadrant III and has slope equal $\frac{1}{2}$, then $\sin\theta + \cos\theta =$

A) $-\frac{3\sqrt{5}}{5}$

B) $-\frac{\sqrt{5}}{5}$

C) $\sqrt{5}$

D) $-\frac{2\sqrt{3}}{5}$

E) $\sqrt{3}$

If $\tan\theta = 4$ and $P(-3, n)$ is a point on the terminal side of θ where θ is in standard position, then $\sec\theta =$

A) $\sqrt{17}$

B) $-\frac{5}{3}$

C) $-\sqrt{17}$

D) $-\frac{1}{4}$

E) $-\frac{\sqrt{17}}{4}$

If the terminal side of an angle θ in standard position is given by $Ax + y = 0, x < 0$ and $\sin\theta = \frac{1}{3}$, then $A =$

A) $\frac{\sqrt{2}}{4}$

B) $-\frac{\sqrt{2}}{4}$

C) $\frac{3\sqrt{2}}{2}$

D) 1

E) $\frac{3\sqrt{2}}{8}$

If the point $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ is on the terminal side of the angle θ in standard position, then $\tan\theta =$

A) $-\frac{\sqrt{3}}{3}$

B) -2

C) $-\sqrt{3}$

D) $-\frac{2\sqrt{3}}{3}$

E) $-\frac{\sqrt{3}}{2}$

If the terminal side of an angle θ, in standard position, is defined by $x - 2y = 0, x > 0$, then $\sec\theta =$

A) $\frac{2\sqrt{5}}{5}$

B) $\frac{\sqrt{5}}{2}$

C) $\frac{1}{2}$

D) $\sqrt{5}$

E) $\frac{5}{2}$

If the terminal side of an angle θ in standard position is defined by $3x + 2y = 0, x \leq 0$, then $\csc\theta =$

A) $\frac{\sqrt{13}}{3}$

B) $-\sqrt{13}$

C) $\frac{3\sqrt{13}}{13}$

D) $-\frac{3\sqrt{13}}{13}$

E) $-\frac{\sqrt{13}}{3}$

If the terminal side of an angle θ in standard position is given by $3x - y = 0, x < 0$, then $\csc\theta =$

A) $-\frac{3\sqrt{10}}{10}$

B) $\frac{\sqrt{10}}{3}$

C) $\frac{3\sqrt{10}}{10}$

D) $-\frac{\sqrt{10}}{3}$

E) -3

Suppose that the terminal side of the angle θ in standard position is given by $12x - 5y = 0, x \leq 0$, then $\frac{60}{13}(\sec\theta + \csc\theta) =$

A) -17

B) -7

C) 7

D) -8

E) 17

If the equation of the terminal side of θ in standrad position is $x + 2y = 0, x \geq 0$, then $\sin\theta - \cos\theta =$

A) $-\frac{3\sqrt{5}}{5}$

B) $-\frac{\sqrt{5}}{5}$

C) $-\sqrt{5}$

D) $\frac{\sqrt{5}}{5}$

E) $\sqrt{5}$

If the equation of the terminal side of an angle θ in standard position is $4x + 3y = 0$, where $x < 0$, then $\csc\theta + \sec\theta =$

A) $-\frac{5}{12}$

B) $\frac{5}{12}$

C) $-\frac{7}{12}$

D) $\frac{7}{5}$

E) $-\frac{1}{5}$

If the point $(2,-3)$ is on the terminal side of the angle θ in the standard position, then $12\csc\theta + 4\sec\theta$ is equal to

(A) $-2\sqrt{13}$

B) $-\sqrt{13}$

C) $\sqrt{13}$

D) $2\sqrt{13}$

E) $-\frac{18\sqrt{13}}{13}$

The equation of the terminal side of θ is given by $\sqrt{3}x + y = 0$, where $x \leq 0$, then $\csc\theta =$

A) $\frac{2\sqrt{3}}{3}$

B) $\frac{\sqrt{3}}{2}$

C) $-\frac{\sqrt{3}}{3}$

D) $-\frac{2\sqrt{3}}{3}$

E) $\frac{1}{2}$

If the equation of the terminal side of an angle θ in standard position is $4x - 3y = 0, x < 0$, then $4\csc\theta + 9\tan\theta =$

A) 7

B) -5

C) 11

D) -6

E) 10

If the terminal side of the angle θ in the standard position coincides with the line $\sqrt{3}x + y = 0$, with $x \leq 0$ then

(a) $\cot\theta = -\frac{\sqrt{3}}{3}$

(b) $\tan\theta = \sqrt{3}$

(c) $\sin\theta = -\frac{1}{2}$

(d) $\cos\theta = \frac{\sqrt{3}}{2}$

(e) $\tan\theta = -2$

If $12x - 5y = 0, x \leq 0$, is the equation of the terminal side of an angle α, then $5\tan\alpha - 12\csc\alpha =$

A) 25

B) - 1

C) 15

D) 20

E) -25

Suppose that the terminal side of an angle θ in standard position lies on the line $y = -\frac{1}{2}x$ where $x > 0$, then $\sin\theta + \tan\theta =$

A) $-\frac{5+2\sqrt{5}}{10}$

B) $-\frac{10+\sqrt{5}}{5}$

C) $\frac{2-\sqrt{5}}{5}$

D) $-\frac{10-2\sqrt{5}}{10}$

E) $\frac{1-\sqrt{5}}{10}$

If $\sin\theta = \frac{1}{5}$, and $p(-3, k)$ is a point on the terminal side of θ in standard position, then the value of k is:

A) $\frac{\sqrt{6}}{4}$

B) $-\frac{\sqrt{6}}{2}$

C) $-\frac{\sqrt{6}}{4}$

D) 1

E) $\frac{\sqrt{6}}{2}$

If the terminal side of the angle θ in standard position is defined by $6x + 8y = 0, y < 0$ then $10\cos\theta - 12\tan\theta =$

A) 17

B) -17

C) -1

D) 1

E) 24

If the angle $\theta = 12$ radian, then

(a) θ is in the fourth quadrant

(b) θ is a quadrantal angle

(c) θ is in the first quadrant

(d) θ is in the second quadrant

(e) θ is in the third quadrant

If $(a, -\frac{3}{4})$ is a point on a unit circle on the terminal side of an angle θ, in standard position, in quadrant III, then cos θ =

A) $-\frac{\sqrt{7}}{4}$
B) $-\frac{\sqrt{7}}{2}$
C) $-\frac{a}{4}$
D) $-\frac{a}{2}$
E) $-\frac{5}{4}$

The exact value of $\left[\tan\left(\frac{11\pi}{4}\right)+\sin\left(-\frac{13\pi}{6}\right)\right] \div (\csc^2 25° - \cot^2 25°)$, is

A) $-\frac{3}{2}$

B) $\frac{1}{2}$

C) 0

D) $\frac{3}{2}$

E) $-\frac{1}{2}$

For $\frac{\pi}{2} < \theta < \pi$, if $x = 5\sec\theta$, then $\frac{\sqrt{x^2-25}}{x} =$

A) $-\sin\theta$

B) $\sin\theta$

C) $-\cos\theta$

D) $\cos\theta$

E) $-\sin\theta\sec^2\theta$