1) If a belt runs a pulley of radius 24 centimeters and the linear speed of the belt is $\frac{8\pi}{5}$ centimeters per second, then the pulley rotates at

A) 2 revolutions per minute.

B) 12 revolutions per minute.

C) 4π revolutions per minute.

D) $\frac{1}{2}$ revolutions per minute.

E) $\frac{4\pi}{3}$ revolutions per minute.

Sec. 6.2

2) The exact value of $6\sec\left(\frac{31\pi}{6}\right) + \tan\left(-\frac{4\pi}{3}\right)$ is equal to

A) $-5\sqrt{3}$

B) $-3\sqrt{3}$

C) $3\sqrt{3}$

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

E) $4\sqrt{3}$

Sec. 6.2

3) Which one of the following statements is TRUE about the graph of $f(x) = \cos\left(\frac{2\pi x}{3}\right)$?

A) The graph is increasing on the interval $\left[-\frac{3}{2},\ 0\right]$

B) The graph is above the x–axis on the interval $\left[0,\ \frac{3}{2}\right]$

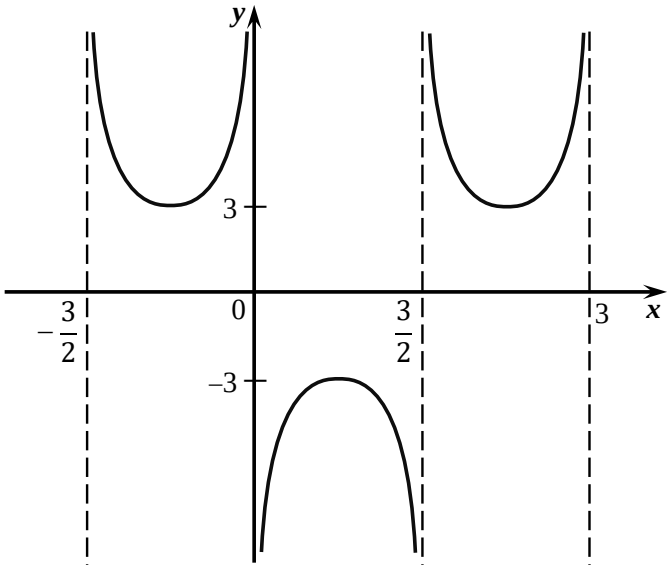
C) The graph has an x–intercept at $x = -\frac{\pi}{4}$

D) The graph is decreasing on the interval $\left[-\frac{3}{4},\ \frac{3}{4}\right]$

E) The graph has period 3π

Sec. 6.3

4) The graph in the adjacent figure represents the function



A) $y = -3\csc\left(\frac{2\pi}{3}x\right)$

B) $y = -3\sec\left(\frac{3\pi}{4}x\right)$

C) $y = -3\sec\left(\frac{2\pi}{3}x\right)$

D) $y = 3\csc\left(\frac{2\pi}{3}x\right)$

E) $y = -3\csc\left(\frac{4\pi}{5}x\right)$

Sec: 6.3

5) The graph of the function $f(x) = 3 - \frac{1}{2}\sin 2\left(x - \frac{\pi}{8}\right)$ has

A) amplitude $\frac{1}{2}$, period π, and phase shift $\frac{\pi}{8}$ units to the right.

B) amplitude 3, period π, and phase shift $\frac{\pi}{4}$ units to the right.

C) amplitude $\frac{1}{2}$, period π, and phase shift $\frac{\pi}{2}$ units to the left.

D) amplitude $\frac{5}{2}$, period $\frac{\pi}{2}$, and phase shift $\frac{\pi}{8}$ units to the right.

E) amplitude $\frac{1}{2}$, period 2π, and phase shift $\frac{\pi}{4}$ units to the left.

Sec. 6.4

6) If the graph of $f(x) = -a\cot(bx)$, $b > 0$ is a function of period 3π, then $f(\frac{9\pi}{4}) =$

A) a

B) $-a$

C) $-\frac{a}{b}$

D) $-b$

E) $\frac{a}{b}$

Sec: 6.5

7) The vertical asymptotes of $f(x) = 2\tan\left(2x - \frac{\pi}{4}\right)$ are given by $x = \left(\frac{b + c\,n}{8}\right)\pi$, where n is any integer number, then $b + c =$

A) 7

B) 5

C) 11

D) 9

E) 8

Sec. 6.5

8) The range of the function of $y = \frac{1}{2} - \csc\frac{3x}{2}$ is

A) $(-\infty, -\frac{1}{2}] \cup [\frac{3}{2}, \infty)$

B) $(-\infty, -\frac{3}{2}] \cup [\frac{1}{2}, \infty)$

C) $(-\infty, -\frac{3}{2}] \cup [\frac{3}{2}, \infty)$

D) $(-\infty, -\frac{1}{2}] \cup [\frac{1}{2}, \infty)$

E) $(-\infty, -\frac{1}{2}] \cup [\frac{5}{2}, \infty)$

Sec: 6.6

9) If $\tan\alpha = -\frac{\sqrt{7}}{2}$ and $\sec\alpha > 0$, then $11(\sin\alpha)(\cos\alpha) =$

A) $-2\sqrt{7}$

B) $2\sqrt{5}$

C) $-2\sqrt{5}$

D) $-\sqrt{7}$

E) $\sqrt{5}$

Sec: 7.1

10) If $\cos\alpha = m$, and α is in quadrant III, then $\csc\alpha$ is equal to

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

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

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

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

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

Sec: 7.1

11) The expression $\dfrac{1}{1+\csc x} - \dfrac{1}{1+\csc(-x)}$ simplifies to

A) $2 \sin x \sec^2 x$

B) 0

C) $-2 \sin x \sec^2 x$

D) $-2 \tan^2 x$

E) 2

Sec: 7.2

12) The expression $\dfrac{\cos\theta}{1-\tan\theta} + \dfrac{\sin\theta}{1-\cot\theta}$ simplifies to

A) $\sin\theta + \cos\theta$

B) 1

C) $\sin\theta - \cos\theta$

D) $2 \sin\theta$

E) $2 \cos\theta$

Sec: 7.2

13) The expression $\dfrac{2 - 2\tan\alpha}{1 + \tan\alpha}$ is equal to

A) $2\tan\left[\dfrac{\pi}{4} - \alpha\right]$

B) $\tan(2\alpha)$

C) $2\tan\left[\dfrac{\pi}{4} + \alpha\right]$

D) $2\cot\left[\dfrac{\pi}{4} - \alpha\right]$

E) $\cot(2\alpha)$

Sec. 7.3

14) If $\cos\alpha = -\dfrac{3}{5}$, α is in quadrant III, and $\tan\beta = -\sqrt{3}$, β is in quadrant II, then $\cos(\beta + \alpha)$ is equal to

A) $\dfrac{3 + 4\sqrt{3}}{10}$

B) $\dfrac{3 - 4\sqrt{3}}{2}$

C) $\dfrac{4 + 3\sqrt{3}}{5}$

D) $\dfrac{4 - 3\sqrt{3}}{10}$

E) $\dfrac{3 + 3\sqrt{3}}{5}$

Sec: 7.3

15) The range of the function $f(x) = \sqrt{3}\sin(2x) - \cos(2x) - 1$ is

A) $[-3, 1]$

B) $[-2, 2]$

C) $[-1, 1]$

D) $[0, 1]$

E) $[0, 3]$

Reduction Identity

16) The expression $\dfrac{\tan x - \sin x}{2\tan x}$ is identical to

A) $\sin^2\dfrac{x}{2}$

B) $\cos^2\dfrac{x}{2}$

C) $\tan\dfrac{x}{2}$

D) $\cot^2\dfrac{x}{2}$

E) $\sec^2\dfrac{x}{2}$

Sec: 7.4

17) The exact value of $\frac{1}{4} - \frac{1}{2}\sin^2(67.5^\circ)$ is

A) $-\frac{\sqrt{2}}{8}$

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

C) $-\frac{\sqrt{3}}{8}$

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

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

Sec: 7.4

18) If $\cos 2\theta = \frac{4}{5}$, θ is in quadrant III, then $\sin\theta$ =

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

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

C) $-\frac{\sqrt{10}}{4}$

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

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

Sec: 7.4

19) $\cos^{-1}(-\frac{1}{2}) - \tan^{-1}(-\frac{\sqrt{3}}{3}) =$

A) $\frac{5\pi}{6}$

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

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

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

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

Sec: 7.5

20) $\tan\left(2\sin^{-1}\frac{2}{\sqrt{13}}\right) =$

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

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

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

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

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

Sec: 7.5