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

B 5.3

2) If a 100π centimeters arc length subtends a 240° central angle in a circle of radius r, then the radius r in centimeters is

A) 75

B) 150

C) 300

D) $\frac{12\pi}{5}$

E) $\frac{5\pi}{12}$

C 5.2

3) If a car is moving along a circular path of radius 2 kilometers and making $\frac{1}{4}$ revolution per minute, then the distance traveled by the car in kilometers along the path in 3 hours is

A) 180π

B) 240π

C) $60\ \pi$

D) 120π

E) 300π

4) If $f(x) = -\left(\frac{1}{2}\right)^{2-x} + 2$, then the domain of the inverse function f^{-1} is

A) $(-\infty, 2)$

B) $[2, \infty)$

C) $(-\infty, \infty)$

D) $(2, \infty)$

E) $(-\infty, 2]$

5) If from the top of a 60 meters tower, an observer finds that the angle of depression to the bottom of a building opposite to the tower is α, where $\sec \alpha = 3$, then the distance in meters between the tower and the building is

A) $15\sqrt{2}$

B) $2\sqrt{2}$

C) $30\sqrt{2}$

D) $60\sqrt{2}$

E) $120\sqrt{2}$

6) Let $f(x) = a - 2^{bx}$. If $f^{-1}(0) = 0$ and $f^{-1}(-3) = -1$, then $a + b =$

A) -1

B) 0

C) -2

D) 1

E) 2

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

8) $\tan(-150^\circ) + \csc\left(\frac{5\pi}{3}\right)$ =

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

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

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

D) $2\sqrt{3}$

E) $-3\sqrt{3}$

9) The graph of the function $y = \log_2 |x - 2| - 1$ is above the x-axis on

A) $(-\infty, 0) \cup (4, \infty)$

B) $(-\infty, 4) \cup (8, \infty)$

C) $(2, 6)$

D) $(2, \infty)$

E) $(-\infty, 6)$

10) The graph of the function $y = |e^{-x} - 1|$ is increasing on the interval

A) $(0, \infty)$

B) $(-\infty, 0)$

C) $(-\infty, 1)$

D) $(-1, \infty)$

E) $(-\infty, \infty)$

11) The sum of all the solution(s) of the equation $\log(5x) - \log_{0.1}(x-1) = 2$, is

A) 5

B) -4

C) 4

D) 1

E) 9

12) If $\log_6 2 = x$, then $\frac{1}{2}\log_2 144 =$

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

B) $x+1$

C) $\frac{x}{x-1}$

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

E) $\sqrt{x}$

13) The sum of all the solution(s) of $e^{x} - 6\,e^{-x} = -1$ is

A) $\ln 2$

B) $\ln 3$

C) $-\ln 6$

D) 1

E) 2

14) The sum of all the solution(s) of $2\left(3^{2x-6}\right) - 4 = 8$ is

A) $3 + \log_{3} \sqrt{6}$

B) $6 + \log_{3} 6$

C) $3 + \log_{3} 36$

D) $6 - \log_{3} \sqrt{6}$

E) $6 - \log_{3} \sqrt{3}$

15) If $(a, 0)$ is the x - intercept and $(0, b)$ is the y - intercept of the function $f(x) = \log\left(\frac{1}{2}\right) + \log(20 - 2x)$, then $a + b =$

A) 10

B) 8

C) - 8

D) - 10

E) 12

16) Which one of the following statements is TRUE ?

A) $\ln x > 0$, if $x > 1$

B) $\frac{\ln x}{\ln y} = \ln \frac{x}{y}$, $x > 0$, $y > 0$

C) $\ln x^2 = 2 \ln x$, for any real number x

D) $e^{\ln x} = e^{x}$

E) $\ln (x + y) = \ln x + \ln y$, $x > 0$, $y > 0$

17) If the graph of the function $f(x) = 2\cos(bx + c)$, $b > 0$ and $-\frac{\pi}{2} \le c \le \frac{\pi}{2}$, has period $\frac{2\pi}{3}$ and passes through the point $(0, 2)$, then $b + c =$

A) 3

B) 0

C) 4

D) 5

E) 2

18) Which one of the following statements is FALSE about the graph of the function $f(x) = -\frac{1}{2}\sin(\frac{\pi x}{2})$, $-2 \le x \le 2$?

A) is increasing on the interval $(-1, 1)$.

B) has three x-intercepts.

C) lies above the x-axis on the interval $(-2, 0)$.

D) lies below the x-axis on the interval $(0, 2)$.

E) passes through the origin.

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

20) The domain of $f(x) = \ln\left|\frac{3}{4 - x^2}\right|$ is

A) $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

B) $(-2, 2)$

C) $(-2, 0) \cup (0, 2)$

D) $(0, 2)$

E) $(-\infty, -2) \cup (2, \infty)$