

1) The reference angle of  $-115^\circ$  is

A)  $65^\circ$

B)  $55^\circ$

C)  $75^\circ$

D)  $45^\circ$

E)  $25^\circ$

2) If  $f(x) = x^2 - 4x$ ,  $x \geq 2$ , then the inverse of  $f$  is

A)  $f^{-1}(x) = 2 - \sqrt{x+4}$ ,  $x \geq -4$

B)  $f^{-1}(x) = 2 + \sqrt{x+4}$ ,  $x \geq -4$

C)  $f^{-1}(x) = 4 + \sqrt{x+2}$ ,  $x \geq -2$

D)  $f^{-1}(x) = 4 - \sqrt{x+2}$ ,  $x \geq -2$

E)  $f^{-1}(x) = 2 + \sqrt{x-4}$ ,  $x \geq 4$

3) The length of the arc intercepted by a central angle of measure  $30^\circ$  in a circle of diameter 72 cm is

A)  $12\pi$  cm

B)  $6\pi$  cm

C)  $36\pi$  cm

D) 1080 cm

E) 6 cm

4)  $\tan\left(-\frac{7\pi}{4}\right) - \sin^2(-135^\circ) =$

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

B)  $\frac{8}{3}$

C)  $2 + \sqrt{3}$

D)  $-\frac{8}{3}$

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

5) Which one of the following statements is FALSE ?

- A)  $f(x) = x + \cos x \sin x$  is an odd function.
- B) If  $\frac{\pi}{2} < x < \pi$ , then  $\sin x - \cos x > 0$ .
- C)  $f(x) = \cos x \sin^2 x$  is an odd function.
- D)  $f(x) = 3 + \cos x$  is an even function.
- E) The period of the function  $f(x) = -\sin(2\pi x)$  is 1.

6) The graph of the function  $y = -\ln|x - 2|$  is above the  $x$ -axis on

- A)  $(3, \infty)$
- B)  $(-\infty, 1)$
- C)  $(1, 3)$
- D)  $(1, 2) \cup (2, 3)$
- E)  $(-\infty, 1) \cup (3, \infty)$

7) If the terminal side of an angle  $\theta$  in standard position is given by

$$3x - y = 0, x < 0, \text{ then } \csc \theta =$$

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

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

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

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

E)  $-3$

8) The range of the function  $f(x) = 1 + \sqrt{4 - 4 \sin^2 x}$ , is

A)  $[1, 5]$

B)  $[0, 2]$

C)  $[-1, 3]$

D)  $[1, 3]$

E)  $[-3, 5]$

9) The sum of all the solution(s) of the equation  $2(4^{1-x}) - 3(2^{1-x}) = -1$  is

A)  $\log_2 6$

B) 3

C) -3

D) 1

E)  $\log_2 3$

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

11) The sum of all the solution(s) of the equation  $\ln(2x^2 - 4x + 1) = 2 \ln(1 - x)$  is

- A) 1
- B) 2
- C) -1
- D) 0
- E) -2

12) If in the adjacent figure the smaller gear moves at an angular speed of 60 rotations per minute, then the angular speed of the larger gear, in radian per second is

- A)  $8\pi$
- B)  $\pi$
- C)  $2\pi$
- D)  $6\pi$
- E)  $3\pi$

13) If  $8 \log_{25} \sqrt[4]{125} + \frac{\ln 2}{\ln 5} - 5^{\log_{25} 9} = \log_5 A$ , then  $A =$

A) 5

B) 2

C) 1

D) 8

E) 4

14) Which one of the following statements is FALSE ?

A) If  $f = \{(-1, 2), (2, 1), (5, -1)\}$ , then  $f^{-1} = \{(2, -1), (1, 2), (-1, 2)\}$ .

B) If  $f$  is a one to one function, then  $g(x) = f(x) + 5$  is a one to one function.

C) If  $f$  is a one to one function then  $f^{-1}$  is a one to one function.

D) If  $f(x) = x^2$  for all  $x < 0$ , then the range of  $f^{-1}$  is  $(-\infty, 0)$ .

E) If  $f(x) = x + 1$ , then the domain of  $f^{-1}$  is  $(-\infty, \infty)$ .

15) The graph of the function  $f(x) = -3 \sin\left(\frac{\pi}{2} - 2x\right)$ ,  $\frac{\pi}{4} \leq x \leq \frac{5\pi}{4}$  is below the

$x$ - axis on

A)  $\left(\frac{3\pi}{4}, \frac{5\pi}{4}\right)$

B)  $\left(\frac{\pi}{2}, \pi\right)$

C)  $\left(\frac{\pi}{2}, \frac{3\pi}{4}\right)$

D)  $\left(\frac{\pi}{4}, \pi\right)$

E)  $\left(\frac{\pi}{4}, \frac{\pi}{2}\right)$

16) From the top of a tower, a man finds that the angle of depression to a car on the ground is  $30^\circ$ . If the car is 60 meters away from the tower, then the height of the tower in meters is

A) 80

B)  $80\sqrt{3}$

C) 20

D)  $20\sqrt{2}$

E)  $20\sqrt{3}$



17) If the inverse of  $f(x) = 1 + e^{2x-3}$  is  $f^{-1}(x) = a + b \ln(x + c)$ , then  $a + b + c =$

A) 4

B) -2

C) 2

D) 3

E) 1

18) The range of the function  $f(x) = 1 + e^{-|x-2|}$  is

A)  $(2, \infty)$

B)  $(0, 2]$

C)  $(1, \infty)$

D)  $(1, 2]$

E)  $(-\infty, 2]$

19) If the domain of  $f(x) = \frac{\ln(x^2 - x - 2)}{\ln(x - 2)}$  is  $(a, b) \cup (b, \infty)$ , then

$$a + b =$$

A) 6

B) 7

C) 4

D) -1

E) 5

20) Let  $a > 1$  and  $y > 0$ . If  $\log_8 a = x + 1$  and  $\log_a y = \frac{1}{3}$ , then  $2^x =$

A)  $y$

B)  $y - 2$

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

D)  $2y$

E)  $y^2$

Answer Key

Testname: MAH 002 MAJOR I TERM 222 CODE 001

- 1) A
- 2) B
- 3) B
- 4) A
- 5) C
- 6) D
- 7) D
- 8) D
- 9) B
- 10) C
- 11) D
- 12) B
- 13) B
- 14) A
- 15) A
- 16) E
- 17) E
- 18) D
- 19) E
- 20) C