S. S. Education Trust 's

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MOCK TEST: CET-2020

MATHEMATICS MOCK TEST CET - 2020 KEY ANSWERS

1. The range of the function $f(x) = \sqrt{9 - x^2}$ is

a. $(0, 3)$
b. $[0, 3]$
c. $(0, 3]$
d. $[0, 3)$

2. For any two real numbers, an operation * defined by $a * b = 1 + ab$ is
a. Commutative but not associative
b. Associative but not commutative
c. Neither commutative nor associative
d. Both commutative and associative

3. Let $f: N \to N$ defined by,

$$f(n) = \begin{cases} \frac{n+1}{2} & \text{if } n \text{ is odd} \\ \frac{n}{2} & \text{if } n \text{ is even} \end{cases}$$ **Then f is,**

a. One-one and onto
b. One-one but not onto
c. Onto but not one one
d. Neither One one nor onto

4. In a class of 60 students, 25 students play cricket and 20 students play tennis and 10 students play both the game, then the number of students who played neither is
a. 0
b. 35
c. 45
d. 25

5. The shaded region in the figure is the solution set of the inequations,
a. $4x + 5y \leq 20,\ 3x + 10y \leq 30,\ x \leq 6,\ x, y \geq 0$
b. $4x + 5y \geq 20,\ 3x + 10y \leq 30,\ x \leq 6,\ x, y \geq 0$
c. $4x + 5y \leq 20,\ 3x + 10y \leq 30,\ x \geq 6,\ x, y \geq 0$
d. $4x + 5y \geq 20,\ 3x + 10y \leq 30,\ x \leq 6,\ x, y \geq 0$

6. Given $0 \leq x \leq \frac{1}{2}$, then the value of $\tan[\sin^{-1}\left\{\frac{x}{\sqrt{2}} + \frac{\sqrt{1-x^2}}{\sqrt{2}}\right\} - \sin^{-1} x]$ is

a. $\sqrt{3}$

b. $\frac{1}{\sqrt{3}}$

c. 1

d. -1

7. The value of $\sin(2\sin^{-1} 0.8)$ is equal to

a. $sin1.2^0$

b. 0.96

c. 0.48

d. $sin1.6^0$

8. If A is 3X4 matrix and B is matrix such that A'B and BA' are both defined then B is of the type,

3X4

a. 3X3

b. 4X4

c. 4X3

9. If A is the matrix of order 3, such that $A(adj\ A) = 10I$, then $|adj\ A|$

a. 10

b. 10 *I*

c. 1

d. 100

10. The symmetric part of the matrix $A = \begin{bmatrix} 1 & 2 & 4 \\ 6 & 8 & 2 \\ 2 & -2 & 7 \end{bmatrix}$ is

a) $\begin{bmatrix} 1 & 4 & 3 \\ 2 & 8 & 0 \\ 3 & 0 & 7 \end{bmatrix}$ **b)** $\begin{bmatrix} 1 & 4 & 3 \\ 4 & 8 & 0 \\ 3 & 0 & 7 \end{bmatrix}$ c) $\begin{bmatrix} 0 & -2 & -1 \\ -2 & 0 & -2 \\ -1 & -2 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 0 & -2 & 1 \\ 2 & 0 & 2 \\ -1 & 2 & 0 \end{bmatrix}$

11. Consider the following statements:

(A) If any two rows or columns of a determinant are identical, then the value of determinant is zero.

(B) If the corresponding rows and columns of a determinant are interchanged then the value of determinant does not change.

(C) If any two rows (or columns) of a determinant are interchanged, then the value of the determinant changes in sign.

Which of these is correct?

a. (A) and (B)

b. (B) and (C)

c. (A) and (C)

d. (A), (B) and (C)

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12. The inverse of the matrix $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$

a. $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$ **b.** $\begin{bmatrix} 1/2 & 0 & 0 \\ 0 & 1/3 & 0 \\ 0 & 0 & 1/4 \end{bmatrix}$ c. $\frac{1}{24}\begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$ d. $\frac{1}{24}\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

13. If a,b,c are in AP, then the value of $\begin{vmatrix} x+2 & x+3 & x+a \\ x+4 & x+5 & x+b \\ x+6 & x+7 & x+c \end{vmatrix}$ **is**

a. $x-(a+b+c)$
b. $9x^2+a+b+c$
c. 0
d. $a+b+c$

14. the local minimum value of the function f' given by $f(x) = 3 + |x|$**,**

a. 3
b. 0
c. -1
d. 1

15. A stone is dropped into a quiet lake and waves move in a circles at the speed of 5cm/sec. At that instant, when the radius of the circular wave is 8cm, how fast is the enclosed area increasing

a. $8\pi\ cm^2/s$
b. $80\pi\ cm^2/s$
c. $6\pi\ cm^2/s$
d. $\frac{8}{3}\ cm^2/s$

16. The area of the region bounded by the line y=mx, x=1, x=2 and x-axis is 6 sq units then 'm' is

a. 1
b. 4
c. 3
d. 2

17. Area of the region bounded by two parabolas $y=x^2$ and $x=y^2$ is

a. 1/3
b. 3
c. 1/4
d. 4

18. The order and degree of the differential equation $y = x\frac{dy}{dx} + \frac{2}{dy/dx}$ is

a. 1, 3
b. 1, 1
c. 1, 2
d. 2, 1

19. The general solution of the differential equation $\frac{dy}{dx} + \frac{y}{x} = 3x$ is

a. $y = x + \frac{c}{x}$
b. $y = x^2 + \frac{c}{x}$
c. $y = x - \frac{c}{x}$
d. $y = x^2 - \frac{c}{x}$

20. The line $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$ is parallel to the plane

a. 3x+4y+5z=7
b. x+y+z=2
c. 2x+3y+4z=0
d. 2x+y-2z=0

21. The angle between two diagonals of a cube is

a. 30^0
b. 45^0
c. $\cos^{-1}(\frac{1}{3})$
d. $\cos^{-1}(1/\sqrt{3})$

22. Lines $\frac{x-2}{1}=\frac{y-3}{1}=\frac{z-4}{-k}$ and $\frac{x-1}{k}=\frac{y-4}{2}=\frac{z-5}{1}$ are coplanar if

a. k =0
b. b) k =-1
c. k =2
d. k =3

23. The probability distribution of x is

X	**0**	**1**	**2**	**3**
P(x)	**0.2**	**k**	**k**	**2k**

Find the value of k

a. 0.2
b. 0.4
c. 0.3
d. 1

24. If A and B each toss three coins. The probability that both get same number of heads is,

a. 1/9
b. 3/16
c. 5/16
d. 3/8

25. A and B are two events such that P (A)≠ 0, P (B/A) if

I) A is subset of B

ii) A∩ *B*=∅ are respectively

a. 0 and 1
b. 1, 0
c. 1, 1
d. 0 , 0

26. Two dice are thrown simultaneously. The probability of obtaining a total score of 5 is

a. $\frac{1}{18}$
b. $\frac{1}{12}$
c. $\frac{1}{9}$
d. $\frac{1}{36}$

27. If A and B are independent events if p $(A^I) = \frac{2}{3}$ and P $(B^I) = \frac{2}{7}$ then $p(A \cap B)$ is equal to

a. $\frac{5}{21}$
b. $\frac{3}{21}$
c. $\frac{4}{21}$
d. $\frac{1}{21}$

28. A box contains 100 bulbs, Out of which 10 are defective. A sample of 5 bulbs is drawn. The probability that none is defective is

a. $(1|10)^5$
b. $(1|2)^5$
c. 9/10
d. $(9|10)^5$

29. The area of parallelogram whose adjacent sides are $\hat{\imath}+\hat{k}$ and $2\hat{\imath}+\hat{\jmath}+\hat{k}$ is

a. $\sqrt{2}$
b. $\sqrt{3}$
c. 3
d. 4

30. If $\vec{a}$ is a unit vector and $(\vec{x}-\vec{a})\ (\vec{x}+\vec{a})$ =8 then $|\vec{x}|$ is

a. 3
b. -3
c. +3, -3
d. 9

31. If $\vec{a}$ and $\vec{b}$ are two unit vectors inclined at angle $\frac{\pi}{3}$ then the value of $|\vec{a}+\vec{b}|$ is

a. Greater than 1
b. Less than 1
c. Equal to 1
d. Equal to 0

32. The value of $[\vec{a}-\vec{b}\ \ \vec{b}-\vec{c}\ \ \vec{c}\ \ -\vec{a}]$ is equal to

a. 1
b. 0
c. 2
d. $2[\vec{a}\ \vec{b}\ \ \vec{c}\ ]$

33. $\int_0^a \frac{\sqrt{x}}{\sqrt{x}+\sqrt{a-x}}\,dx =$

a. $\frac{a}{2}$
b. a
c. 2a
d. $\frac{a}{4}$

34. $\int \frac{dx}{3x^2+13x-10} =$

a. $\frac{1}{17}\log\left|\frac{3x+2}{3x+15}\right|+c$
b. $\frac{1}{17}\log\left|\frac{3x-2}{3x+15}\right|+c$
c. $\frac{1}{17}\log\left|\frac{3x-2}{3x-15}\right|+c$
d. $\frac{1}{17}\log\left|\frac{3x+2}{3x-15}\right|+c$

35. If $\sin\theta = \sin\alpha$ then

a. $\frac{\theta+\alpha}{2}$ is any odd multiple of $\frac{\pi}{2}$ and
b. $\frac{\theta-\alpha}{2}$ is any multiple of π
c. $\frac{\theta+\alpha}{2}$ is any even multiple of $\frac{\pi}{2}$ and
d. $\frac{\theta-\alpha}{2}$ is any odd multiple of π
e. $\frac{\theta+\alpha}{2}$ is any multiple of $\frac{\pi}{2}$ and
f. $\frac{\theta-\alpha}{2}$ is any odd multiple of π

g. $\frac{\theta+\alpha}{2}$ is any multiple of $\frac{\pi}{2}$ and

h. $\frac{\theta-\alpha}{2}$ is any even multiple of π

36. If $\tan x = \frac{3}{4}$, $\pi < x < \frac{3\pi}{2}$, then the value $\cos\frac{x}{2}$ is

a. $\frac{3}{\sqrt{10}}$

b. $\frac{-3}{\sqrt{10}}$

c. $\frac{-1}{\sqrt{10}}$

d. $\frac{1}{\sqrt{10}}$

37. If $x + y \leq 2$, $x \geq 0, y \geq 0$ the point at which the value of $3x + 2y$ attained will be

a. (0,0)

b. $\left(\frac{1}{2}, \frac{1}{2}\right)$

c. (0,2)

d. $(2, 0)$

38. If α and β are two different complex numbers with $|\beta| = 1$ then $\left|\frac{\beta-\alpha}{1-\bar{\alpha}\beta}\right|$ is equal to,

a. 0

b. 1

c. $\frac{1}{2}$

d. -1

39. In a triangle ABC, a$[bcosC - ccosB]$ =

a. a^2

b. b^2

c. 0

d. $b^2 - c^2$

40. How many 5 digit telephone numbers can be constructed using the digits $0 - 9$, if each number starts with 67 and no digit appears more than once?

a. 336

b. 337

c. 335

d. 338

41. If 21st and 22nd terms in the expansion of $(1+x)^{44}$ are equal, then x is equal to

a. $\frac{21}{22}$
b. $\frac{23}{24}$
c. $\frac{8}{7}$
d. $\frac{7}{8}$

42. Consider an infinite geometric series with first term 'a' and common ratio 'r'. If the sum is 4 and second term is $\frac{3}{4}$, then

a. $a=\frac{4}{7}$, $r=\frac{3}{7}$
b. $a=3$, $r=\frac{1}{4}$
c. $a=2$, $r=\frac{3}{8}$
d. $a=\frac{3}{2}$, $r=\frac{1}{2}$

43. A straight line passes through the points (5,0) and (0,3). The length of perpendicular from the point (4,4) on the line is

a. $\frac{\sqrt{17}}{2}$
b. $\sqrt{\frac{17}{2}}$
c. $\frac{15}{\sqrt{34}}$
d. $\frac{17}{2}$

44. Equation of the circle with centre (-a, -b) and radius $\sqrt{a^2-b^2}$ is

a. $x^2+y^2-2ax-2by-2b^2=0$
b. $x^2+y^2-2ax+2by+2a^2=0$
c. $x^2+y^2+2ax+2by+2b^2=0$
d. $x^2+y^2-2ax-2by+2b^2=0$

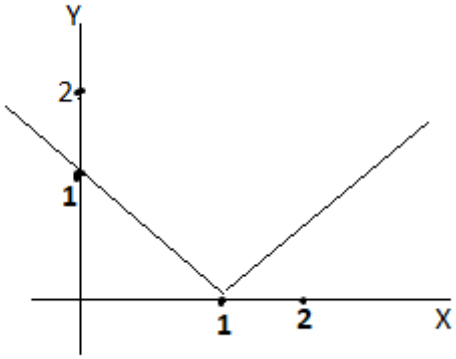
45. The area of triangle formed by the lines joining the vertex of the parabola $x^2=12y$ to the ends of Latus rectum is,

a. 180 square units
b. 19 square units
c. 20 square units
d. 17 square units

46. If the coefficient of variation and standard deviation are 60 and 21 respectively the arithmetic mean of distribution is

a. 30
b. 21
c. 60
d. 35

47. The function represented by the following graph is,



a. Differentiable but not continuous at x=1
b. Neither continuous nor differentiable at x=1
c. Continuous but not differentiable at x=1
d. Continuous and differentiable at x=1

48. If $f(x) = \begin{cases} \frac{3sin\pi x}{5x} & x \neq 0 \\ 2K & x = 0 \end{cases}$ **is continuous at x=0, then the value of K is**

a. $\frac{3\pi}{10}$
b. $\frac{3\pi}{5}$
c. $\frac{\pi}{10}$
d. $\frac{3\pi}{2}$

49. Which one of the following is not correct for the features of exponential function given by $f(x) = b^x$ **where** $b > 1$ **?**

a. The domain of the function is R, the set of real numbers
b. The range of the function is the set of all positive numbers
c. For very large negative values of x, the function is very close to zero
d. The point (1,0) is always on the graph of the function

50. If $y = (1+x)(1+x^2)(1+x^4)$ then $\frac{dy}{dx}$ at $x = 1$ is

a. 28
b. 0
c. 20
d. 1

51. If $y = (\tan^{-1} x)^2$ then $(x^2+1)^2 y_2 + 2x(x^2+1)y_1$ is equal to

a. 0
b. 1
c. 4
d. 2

52. If $f(x) = x^3$ and $g(x) = x^3 - 4x$ in $-2 \le x \le 2$, the consider the statements

a) f(x) and g(x) satisfy mean value theorem

b) f(x) and g(x) both satisfy Roller's theorem

c) Only g(x) satisfies Roller's theorem of these statements

i) (a) alone is correct ii) (a) and(c) are correct iii) (a) and (b) are correct iv) None is correct

53. Which of the following is not a correct statement?

a. $\sqrt{3}$ is prime
b. The sun is a star
c. Mathematics is interesting
d. $\sqrt{2}$ is irrational

54. If the function f(x) satisfies $\lim_{x\to 1} \frac{f(x)-2}{x^2-1} = \pi$ then $\lim_{x\to 1} f(x) =$

a) 2

b) 3

c) 1

d) 0

55. The tangent to the curve $y = x^3 + 1$ at $(1, 2)$ makes the angle θ with y- axis then the value of $\tan\theta$ is

a. 3
b. $\frac{1}{3}$
c. $\frac{-1}{3}$
d. -3

56. If the function f(x) is defined by $f(x) = \frac{x^{100}}{100} + \frac{x^{99}}{99} + - - - - + \frac{x^2}{2} + x + 1$, then $f'(0)$=

a. 100
b. -1
c. $100\, f'(0)$
d. 1

57. If $f(x) = f(\pi + e - x)$ and $\int_e^{\pi} f(x)dx = \frac{2}{e+\pi}$ then $\int_e^{\pi} x\, f(x)dx$ is

a. $\frac{\pi+2}{e}$
b. $\frac{\pi-e}{2}$
c. $\pi - e$
d. 1

58. If linear function f(x) and g(x) satisfy $\int (3x-1)cosx + (1-2x)sinx\, dx = f(x)cosx + g(x)sinx + c$ Then

a) $f(x) = 3x - 5$
b) $g(x) = 3 + x$
c) $f(x) = 3(x-1)$
d) $g(x) = 3(x-1)$

59. The value of the line integral $\int_{-\pi/4}^{\pi/4} \log(sec\theta - tan\theta)\, d\theta$ is

a. $\frac{\pi}{4}$
b. $\frac{\pi}{2}$
c. 0
d. π

60. $\int \frac{sin2x}{sin^2x+2cos^2x}\, dx =$

a. $\log(1+cos^2x)+c$
b. $\log(1+tan^2x)+c$
c. $-\log(1+sin^2x)+c$
d. $\mathbf{-\log(1+cos^2x)+c}$

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