



## MATHS

### BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

#### SAMPLE PAPER -17

#### Part I

1. The relation R defined on a set  $A = \{0, -1, 1, 2\}$  by  $xRy$  if  $|x^2 + y^2| \leq 2$ , then which one of the following is true?

A.  $R = \{(0,0), (0,-1), (0,1), (-1,0), (-1,1), (1,2), (1,-0)\}$

B.  $R^{-1} = \{(0, 0), (0, -1), (0, 1), (-1, 0), (1, 0)\}$

C. Domain of R is  $\{0, -1, 1\}$

D. Range of R is  $\{0,-1,1\}$

**Answer: D**



[Watch Video Solution](#)

2. The solution of  $5x - 1 < 24$  and  $5x + 1 > -24$  is .....

A. (4,5)

B. (-5,-4)

C. (-5,5)

D. (-5,4)

**Answer: C**



[Watch Video Solution](#)

3. If 3 is spinning at 2 radians/ second. How seconds will it take to make 10 complete rotations.....

A. 5

B. 7

C. 6

D. 9

**Answer: B**



[View Text Solution](#)

4. A wheel is spinning at 2 radians / second. How many seconds wil it take to make 10 complete rotations.....

A.  $10\pi$  seconds

B.  $20\pi$  seconds

C.  $5\pi$  seconds

D.  $15\pi$  seconds

**Answer: A**



[Watch Video Solution](#)

5. The value of  $\cot 5^\circ \cot 10^\circ \dots \cot 85^\circ$  is .....

A. 0

B. 1

C.  $\frac{1}{\sqrt{2}}$

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

**Answer: B**



**Watch Video Solution**

**6.** In an examination there are three multiple choice questions and each question has 5 choices. Number of ways in which a student can fail to get all answer correct is.....

A. 125

B. 124

C. 64

D. 63

**Answer: B**



**Watch Video Solution**

7. Equation of the straight line that forms an isosceles triangle with coordinate axes in the I quadrant with perimeter  $4 + 2\sqrt{2}$  is .....

A.  $x + y + 2 = 0$

B.  $x + y - 2 = 0$

C.  $x + y - \sqrt{2} = 0$

D.  $x + y + \sqrt{2} = 0$

**Answer: B**



[Watch Video Solution](#)

8. The number of permutations of the letters of the word BANANA is .....

A. 42

B. 60

C. 54

D. 36

**Answer: B**



[Watch Video Solution](#)

9. In the expansion  $(1 + x)^{24}$  the highest co-efficient is .....

A.  ${}^{24}C_{24}$

B.  ${}^{24}C_{13}$

C.  ${}^{24}C_{12}$

D.  ${}^{24}C_{11}$

**Answer: C**



**Watch Video Solution**

10. The value of the determinant  $A = \begin{bmatrix} 0 & a & -b \\ -a & 0 & c \\ b & -c & 0 \end{bmatrix}$  is

A.  $-2abc$

B.  $abc$

C.  $0$

D.  $a^2 + b^2 + c^2$

**Answer: C**



**Watch Video Solution**



11. The unit vector parallel to the resultant of the vectors

$\vec{i} + \vec{j} - \vec{k}$  and  $\vec{i} - 2\vec{j} + \vec{k}$  is .....

A.  $\frac{\vec{i} - \vec{j} + \vec{k}}{\sqrt{5}}$

B.  $\frac{2\vec{i} + \vec{j}}{\sqrt{5}}$

C.  $\frac{2\vec{i} - \vec{j} + \vec{k}}{\sqrt{5}}$

D.  $\frac{2\vec{i} - \vec{j}}{\sqrt{5}}$

**Answer: D**



**Watch Video Solution**

12. The value of  $[7 \ 3 \ 2] \begin{bmatrix} 4 \\ -1 \\ 5 \end{bmatrix}$  is

A. [43]

B. [35]

C. [30]

D. [42]

**Answer: B**



**Watch Video Solution**

13. The factor of the determinant  $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix}$  is

A.  $x$

B.  $x + b$

C.  $x + a + b + c$

D.  $x + c$

Answer: A,C



Watch Video Solution

14. if

$$\vec{a} = \vec{i} + \vec{j} + \vec{k}, \vec{b} = 2\vec{i} + x\vec{j} + \vec{k}, \vec{c} = \vec{i} - \vec{j} + 4\vec{k}$$

and  $\vec{a} \cdot (\vec{b} \times \vec{c}) = 70$  then  $x =$

A. 5

B. 7

C. 26

D. 10

Answer: C



Watch Video Solution

15. The function  $f(x) = \begin{cases} 2 & x \leq 1 \\ x & x > 1 \end{cases}$  is not differentiable at.....

A.  $x=0$

B.  $x=1$

C.  $x=-1$

D.  $x=2$

**Answer: B**



**Watch Video Solution**

16.  $\lim_{x \rightarrow \infty} \left(1 - \frac{1}{x}\right)^x$  is .....

A.  $e$

B.  $-e$

C.  $0$

D.  $\frac{1}{e}$

**Answer: D**



**Watch Video Solution**

17.  $\lim_{x \rightarrow \infty} \frac{\sin x}{x}$  is .....

A.  $1$

B.  $0$

C.  $\infty$

D.  $-\infty$

**Answer: B**



**Watch Video Solution**

18.  $\int \frac{e^x}{e^x + 1} dx = \dots\dots\dots$

A.  $\frac{1}{2}x + c$

B.  $\log(e^x + 1) + c$

C.  $x + e^x + c$

D.  $\log e^x + c$

**Answer: B**



**Watch Video Solution**

19. Find  $f(0)$  for  $f(x) = |x|$  is .....

A.  $x$

B. 0

C.  $-x$

D. 1

**Answer: B**



**Watch Video Solution**

20. In a certain college 4% of the boys and 1% of the girls are taller than 1.8 meter. Further 60% of the students are girls. If a student is selected at random and is taller than 1.8 meters, then the probability that the students is a girls is .....

A.  $\frac{2}{11}$

B.  $\frac{3}{11}$

C.  $\frac{5}{11}$

D.  $\frac{7}{11}$

**Answer: B**



[Watch Video Solution](#)

## Part II

1. If  $A=\{1,2,3,4\}$  and  $B=\{3,4,5,6\}$  find  $n(A \cup B) \times (A \cap B) \times (A \Delta B)$ .



[View Text Solution](#)



2. In any triangle ABC prove that

$$\frac{a^2 \sin(B - C)}{\sin A} + \frac{b^2 \sin(C - A)}{\sin B} + \frac{c^2 \sin(A - B)}{\sin C} = 0$$

 [Watch Video Solution](#)

3. Expand  $\frac{1}{5 + x}$  in ascending powers of  $x$ .

 [Watch Video Solution](#)

4. A line passing through the points  $(a, 2a)$  and  $(-2, 3)$  is perpendicular to the line  $4x + 3y + 5 = 0$  find the value of  $a$ .

 [Watch Video Solution](#)

5. If A and B are square matrices of orders 3 such that  $|A| = -2$  and  $|B| = 3$  find the value of  $|3AB|$ .

 [Watch Video Solution](#)

6. Find  $\lim_{x \rightarrow 0} \frac{(2+x)^5 - 2^5}{x}$

 [Watch Video Solution](#)

7. Find  $f'(x)$  if  $f(x) = \sqrt{x^2 + 1}$

 [Watch Video Solution](#)

8. Evaluate:  $\int 4 - \frac{5}{x+2} + 3 \cos 2x dx$



 [Watch Video Solution](#)

9. An integer is chosen at random from the first 100 positive integers. What is the probability that the integer chosen is a prime or multiple of 8?

 [Watch Video Solution](#)

10. If  ${}^{10}P_4 = {}^7P_{r+2}$  find  $r$ .

 [Watch Video Solution](#)

Part Iii

1. If  $A \times A$  has 16 elements

$S = \{(a, b) \in A \times A : a < b\}$ ,  $(-1, 2)$  and  $(0, 1)$  are two elements of  $S$ , then find the remaining elements of  $S$ .

 [Watch Video Solution](#)

2. Solve  $\frac{3(x-1)}{5} \leq \frac{5(2-x)}{3}$

 [Watch Video Solution](#)

3. Given  $\sec \theta = \frac{13}{5}$ ,  $\theta$  lies in IV quadrant find the order five trigonometric functions.

 [Watch Video Solution](#)

4. Compute  $(102)^4$

 [Watch Video Solution](#)

5. The ratio of the distances of a moving point from the points  $(3, 4)$  and  $(1, -2)$  is  $2:3$ , find the locus of the moving point.

 [Watch Video Solution](#)

6. Prove that

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc \left( 1 + \frac{1}{a} + \frac{1}{b} + \frac{1}{c} \right)$$

 [Watch Video Solution](#)

7. Find the derivative of  $y = x^{\cos x}$  with respect to  $x$ .



Watch Video Solution

8. If  $f''(x) = 12x - 6$  and  $f(1) = 30$ ,  $f'(1) = 5$  find  $f(x)$ .



Watch Video Solution

9. (i) If the odds that the event  $A$  occurs is 5 to 7 find  $P(A)$ .

(ii) Suppose  $P(B) = \frac{2}{5}$ . Express the odds that the event  $B$  occurs.



Watch Video Solution

10. If  $\vec{a}$ ,  $\vec{b}$  are any two vectors, then prove that

$$|\vec{a} \times \vec{b}|^2 + (\vec{a} \cdot \vec{b})^2 = |\vec{a}|^2 |\vec{b}|^2$$

 [Watch Video Solution](#)

## Part IV

1. Find the vectors whose length is 5 and which are  $\perp^r$  to the vectors  $\vec{a} = 3\hat{i} + \hat{j} - 4\hat{k}$  and  $\vec{b} = 6\hat{i} + 6\hat{j} - 2\hat{k}$ .

 [Watch Video Solution](#)

2. Solve:  $\frac{2x - 1}{x} > -1$

 [Watch Video Solution](#)

3. If the 2nd, 3rd and 4th terms in the binomial expansion of  $(x + a)^n$  are 240, 720 and 1080 for a suitable values of  $x$ , find  $x$ ,  $a$  and  $n$ .

 [Watch Video Solution](#)

4. Evaluate  $\int \sqrt{(6-x)(x-4)} dx$

 [Watch Video Solution](#)

5. If  $a, b, c$  are  $p$ th,  $q$ th and  $r$ th terms of an A.P., find the value

of 
$$\begin{vmatrix} a & b & c \\ p & q & r \\ 1 & 1 & 1 \end{vmatrix}$$

 [Watch Video Solution](#)



6. Find the derivative of  $\tan^{-1}\left(\frac{\sin x}{1 + \cos x}\right)$  with respect to  $\tan^{-1}\left(\frac{\cos x}{1 + \sin x}\right)$



[Watch Video Solution](#)

7. Given  $P(A) = 0.4$  and  $P(A \cup B) = 0.7$ . Find  $P(B)$  if (i) A and B are mutually exclusive (ii) A and B are independent events (iii)  $P(A/B) = 0.4$ , (iv)  $P(B/A) = 0.5$



[Watch Video Solution](#)