



# MATHS

# **BOOKS - SURA MATHS (TAMIL ENGLISH)**

# **QUESTION PAPER -19**



<b>1.</b> The value of x, for which the matrix A =	$\left[ egin{array}{c} e^{x-2} \ e^{2+x} \end{array}  ight.$	$e^{7+x} \ e^{2x+3}  ight]$	is singular is
--	--	-----------------------------	----------------

- A. 7
- B. 6
- C. 9
- D. 8

### Answer:



**2.** The  $n^{th}$  term of the sequence 2, 7, 14, 23, ....is:

A. 
$$n^2 + 2n + 1$$
  
B.  $n^2 + 2n - 1$   
C.  $n^2 - 2n - 1$   
D.  $n^2 - 2n + 1$ 

#### Answer:

Watch Video Solution

3. 
$$\int \frac{\sec x}{\sqrt{\cos 2x}} dx =$$

A.  $an^{-1}(\cos x) + c$ 

 $\mathsf{B}.\sin^{-1}(\tan x) + c$ 

 $\mathsf{C}.\tan^{-1}(\sin x) + c$ 

D. 
$$2\sin^{-1}(\tan x) + c$$



**4.** The line 
$$\frac{x}{a} - \frac{y}{b} = 0$$
 has the slope 1, if:

. .

A. a = b

B. only for a = 1, b = 1

 $\mathsf{C}. a > b$ 

 $\mathsf{D}.\, a < b$ 

#### Answer:

Watch Video Solution

5. The number of five digit numbers in which all digits are even, is :

A.  $4 imes 5^4$ B.  $4 imes 5^5$ C.  $5^5$ D. 5 imes 5

#### Answer:

Watch Video Solution

6. If 
$$f(x) = egin{cases} 2a-x, & ext{for} & -a < x < a \\ 3x-2a, & ext{for} & x \geq a \end{cases}$$
 then which of the following

is true?

A. f(x) is continuous for all x in R

B. f(x) is differentiable for all  $x \ge a$ 

C. f(x) is not differentiable at x = a

D. f(x) is discontinuous at x = a

#### Answer:

**7.** A number is selected from the set  $\{1,2,3,\ldots,20\}$ . The probability that the selected number is divisible by 3 or 4 is ...

A. 
$$\frac{1}{2}$$
  
B.  $\frac{2}{3}$   
C.  $\frac{2}{5}$   
D.  $\frac{1}{8}$ 

### Answer:

Watch Video Solution

**8.** Which of the following is not a periodic function with period  $2\pi$ ?

A. tan x

B. cos x

C. sin x

D. cosec x

#### Answer:

Watch Video Solution

9. Straight line joining the points (2,3) and (-1,4) passes through the point

 $(\alpha,\beta)$  if

A. lpha+3eta=11

B.  $3\alpha + \beta = 11$ 

 $\mathsf{C}.\, lpha+2eta=7$ 

D. 3lpha+eta=9

#### Answer:

10. The minimum and the maximum values of  $|\cos x| - 2$  are respectively :

A. 0 and 2 B. -2 and 0 C. -2 and -1

D. -1 and 1

#### Answer:

Watch Video Solution

## 11.

 $A=\{(x,y)\,/\,y=e^x,x\in[0,\infty)\}$  and  $B=\{(x,y)\,/\,y=\sin x,x\in[0,\infty)$  then n(AnB) is

If

A.  $\infty$ 

B. 1

 $\mathsf{C}.\,\phi$ 



12. For the function 
$$f(x) = egin{cases} x+2, & x>0 \ x-2, & x<0 \end{cases}$$

- A.  $\lim_{x\,
  ightarrow\,2^-}\,f(x)=\,-\,1$
- B.  $\lim_{x o 0} f(x)$  does not exist
- C.  $\lim_{x o 0^-} f(x) = -1$
- D.  $\lim_{x
  ightarrow0^+}f(x)=1$

#### Answer:

Watch Video Solution

13. If  $f(x)=x^2-3x$ , then the points at which f(x) = f'(x) are :

A. both irrational

B. one rational and another irrational

C. Both positive integers

D. both negative integers

#### Answer:

Watch Video Solution

14. The unit vector parallel to the resultant of the vectors  $\hat{i} + \hat{j} + \hat{k}$  and  $\hat{i} - 2\hat{j} + \hat{k}$  is:

A. 
$$\frac{2\hat{i} - \hat{j} + \hat{k}}{\sqrt{5}}$$
  
B.  $\frac{2\hat{i} - \hat{j}}{\sqrt{5}}$   
C.  $\frac{\hat{i} - \hat{j} - \hat{k}}{\sqrt{5}}$   
D.  $\frac{2\hat{i} + \hat{j}}{\sqrt{5}}$ 

#### Answer:

15. It is given that the events A and B are such that 
$$P(A) = \frac{1}{4}$$
,  $P(A/B) = \frac{1}{2}$  and  $P(B/A) = \frac{2}{3}$ . Then P(B) is  
A.  $\frac{2}{3}$   
B.  $\frac{1}{2}$   
C.  $\frac{1}{6}$   
D.  $\frac{1}{3}$ 

Watch Video Solution

**16.** If  $\overrightarrow{a}$ ,  $\overrightarrow{b}$  are the position vectors A and B then which one of the following points whose position vector lies on AB, is

A. 
$$\frac{2\overrightarrow{a}+\overrightarrow{b}}{3}$$

B. 
$$\frac{\overrightarrow{a} - \overrightarrow{b}}{3}$$
  
C.  $\overrightarrow{a} + \overrightarrow{b}$   
D.  $\frac{2\overrightarrow{a} - \overrightarrow{b}}{2}$ 



17. If  $|x+2| \leq 8$ , then x belongs to?

A. (6, 10)

B. (-10, 6)

C. [6, 10]

D. [-10, 6]

#### Answer:

**18.** The expansion of  $(1-x)^{-2}$  is?

A.  $1 - x + x^2 - \dots$ B.  $1 + x + x^2 + \dots$ C.  $1 - 2x + 3x^2 - \dots$ D.  $1 + 2x + 3x^2 + \dots$ 

#### Answer:

Watch Video Solution

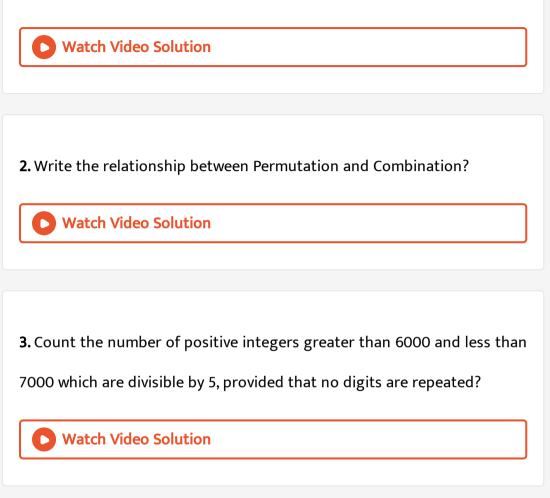
**19.** If :  $R \to R$  is defined by f(x) = |x| - 5, then the range of f is :

A. 
$$(-\infty, -5)$$
  
B.  $(-\infty, 5)$   
C.  $[-5, \infty)$   
D.  $(-5, \infty)$ 

Watch Video Solution
<b>20.</b> Which one of the following is not true about the matrix $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 5 \end{pmatrix}$ ?
A. an upper triangular matrix
B. a lower triangular matrix
C. a scalar matrix
D. a diagonal matrix
Answer:      Watch Video Solution

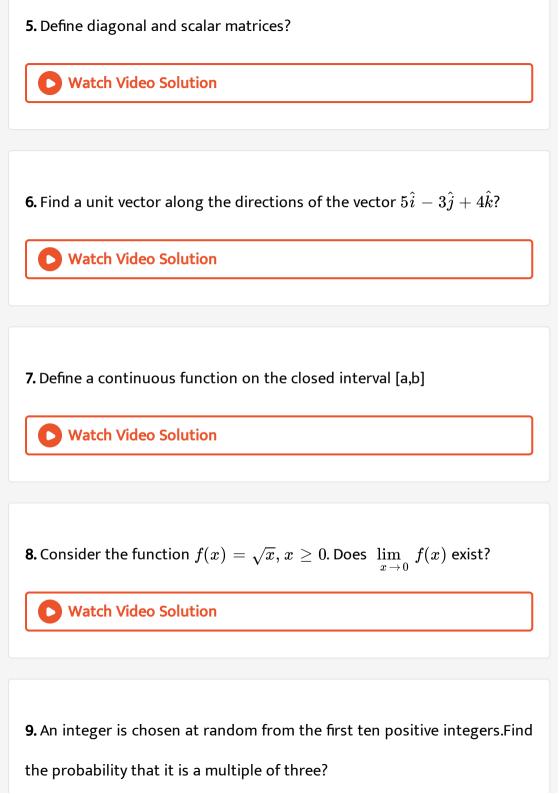


1. Write the use of horizontal line test.



4. Find the separate equations from a combined equation of a straight

line  $2x^2 + xy - 3y^2 = 0$ 



10. Is it correct to say  $A imes A=\{(a,a)\!:\!a\in A\}$  ? Justify your answer.

# Watch Video Solution

### Section lii

**1.** A football player can kick a fotball from ground level with an initial velocity (u) of 80 ft/second. Find the maximum horizzontal distance the football travels and at what angle (Take  $R = \frac{u^2 \sin 2\alpha}{a}$ , and g = 32)

# Watch Video Solution

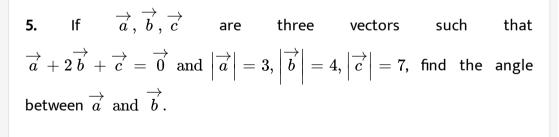
**2.** Find the coefficient of  $x^3$  in the expansion of  $(2-3x)^7$ ?

**3.** Find the nearest point on the line x - 2y- 5 from the origin.



**4.** Prove that square matrix can be expressed as the sum of a symmetric matrix and a skew-symmetric matrix.





6. Examine the continuity of the following :

 $\cot x + \tan x$ 

# Watch Video Solution

7. Find 
$$\displaystyle rac{dy}{dx}$$
 in the following : $y = \sin^1 igg( \displaystyle rac{1-x^2}{1+x^2} igg), 0 < x < 1.$ 

Watch Video Solution

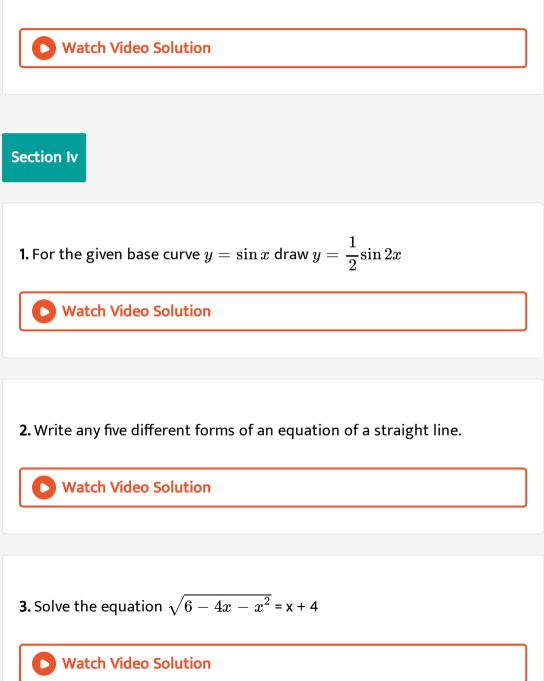
8. Find 
$$\frac{dy}{dx}$$
 if x =a (t-sint),y=a(1-cos t)?

# Watch Video Solution

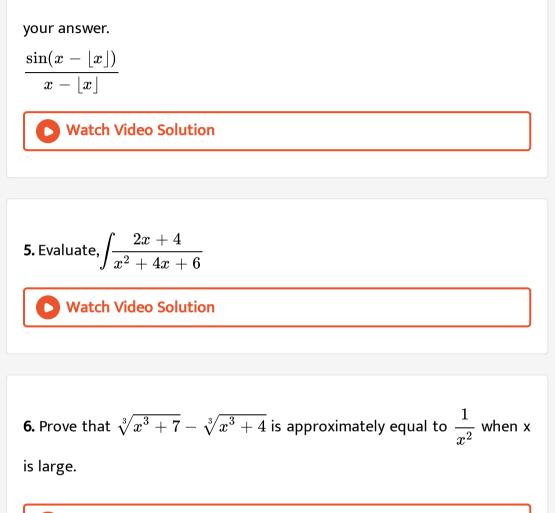
9. Evaluate: 
$$\int (x-3)\sqrt{x+2}dx.$$

10. Construct a suitable domain X such that f: X o N defined by f(n) = n

+ 3 to be one to one and onto.



# **4.** Do the limits of following functions exists as x o 0? State reason for



7. Find the unit vectors perpendicular to each of the vectors  $\overrightarrow{a}+\overrightarrow{b}$ 

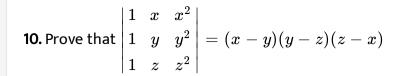
and 
$$\overrightarrow{a} - \overrightarrow{b}$$
 ,where  $\overrightarrow{a} = \hat{i} + \hat{j} + \hat{k}$ and  $\overrightarrow{b} = \hat{i} + 2\hat{j} + 3\hat{k}$ .

# Watch Video Solution

**8.** Find 
$$rac{d^2y}{dx^2}$$
 if  $x^2+y^2=4$ 

Watch Video Solution

**9.** The chances of X, Y and Z becoming managers of a certain company are 4 : 2 : 3. The probabilities that bonus scheme will be introduced if X, Y and Z become managers are 0.3, 0.5 and 0.4 respectively. If the bonus scheme has been introduced, what is the probability that Z was appointed as the manager?





**11.** Evaluate  $\int (x^2+x+1)/\sqrt{x} dx$ .