



# MATHS

# **BOOKS - S CHAND MATHS (ENGLISH)**

# **MODEL TEST PAPER - 9**



1.  $n\{P(P(P(\varphi)))\} =$ 

A. 6

B. 8

C.  $2^{3-1}$ 

D.  $2^{5-1}$ 

#### Answer: C



# **2.** If $A = \{x, y, z\}$ and $B = \{1, 2\}$ , then the

number of relations from A to B is

A. 32

B. 16

C. 64

D. 128

#### Answer: C

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**3.** If A,B,C,D are angles of a cyclic quadrilateral, then the value of  $\cos A + \cos B + \cos C + \cos D$  is

A. - 1

B. 1

C. 0

#### Answer: C



**4.** If x is a real number and |5 - (x - 3)| + 8 < 15, then (i)  $1 \leq x \leq 15$  (ii) 1 < x < 15 (iii)  $1 < x \leq 15$  (iv)  $1 \leq x \leq 15$ A.  $l \leq x \leq 15$ B. 1 < x < 15C. 1 < x < 15D.  $1 \leq x \leq 15$ 



# 5. If $r \ge 1$ , then the sum of infinite G.P. tends to (i) 0 (ii) $\infty$ (iii) 1 (iv) none of these

A. 0

B.  $\infty$ 

C. 1

D. none of these

Answer: B



## 6. Number of 5-digit numbers can be formed using

the digits 2,4,7,9,0 if no digit is repeated :

A. 69

B. 96

C. 169

D. 98

Answer: B

7. Let  $z_1=2-i$  and  $z_2=2+i$ , then  $\operatorname{Im}\!\left(rac{1}{z_1z_2}
ight)$ 

is

A. 0

B. 6

C. 2

D. 8

Answer: A



**8.** Distance between the lines 3x + 4y - 5 = 0 and

$$6x + 8y - 45 = 0$$
 is  
A.  $\frac{1}{3}$   
B.  $\frac{7}{2}$   
C. 1  
D.  $\frac{2}{7}$ 

**Answer: B** 



9. Find the length of the chord intercepted by the circle  $x^2 + y^2 - 8x - 6y = 0$  on the line x - 7y - 8 = 0.A. 5 B.  $\sqrt{2}$ C.  $5\sqrt{2}$ D. 6 Answer: C

10.  $\lim_{x o 5^+} (x - [x])$  is equal to

A. 1

 $\mathsf{B.}-1$ 

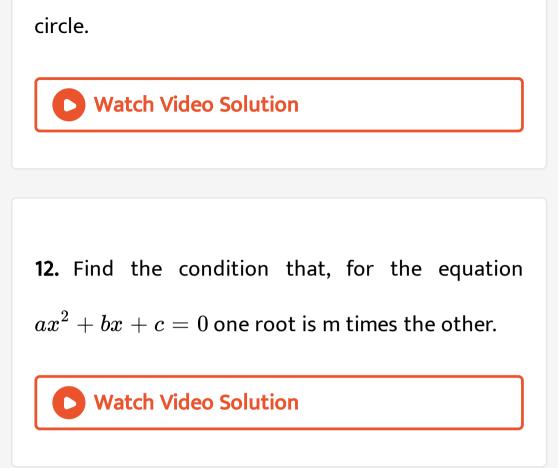
C. 0

D.  $\pm 1$ 

Answer: C

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**11.** An arc 15 ft long describes an angle of 5 radians at the centre of a circle. Find the radius of the



13. Find the square root of  $a^2-1+2ai$ 

14. If 
$$f(x)=3\sqrt{\left(1+x^2
ight)^4}$$
, find f'(1).



**15.** A card is drawn at random from a pack of 52 playing cards. What is the probability that the card drawn is neither a spade nor a queen.

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**16.** In a group of 70 people, 48 speak Tamil, 36 speak English and all the people speak at least one language. Find How many speak both the

languages ?



**17.** In a group of 70 people, 48 speak Tamil, 36 speak English and all the people speak at least one language.

Find :

How many speak only Tamil?

18. If  $\tan\frac{\alpha}{2}$  and  $\tan\frac{\beta}{2}$  are the roots of the equation  $8x^2 - 26x + 15 = 0$ , then find the value of  $\tan\left(\frac{\alpha+\beta}{2}\right)$ 



19. If 
$$\frac{\cos x}{\cos(x-2y)} = \lambda$$
, then show that  $\tan(x-y) = \left(\frac{1-\lambda}{1+\lambda}\right)\cot y$ .

**20.** A set B is given as  $B = \{1, 2\}$ . Some elements of  $A \times B$  are (3,1),(5,1) and (7,2) Find the remaining elements  $A \times B$  of such that  $n(A \times B)$  is least.

- **21.** Let  $A = \{1, 2, 3\}, B = 4, 5, 6, 7\}$  and let
- $f = \{(1,4), (2,5), (3,6)\}$  be a function from A to
- B. Show that f is one one but not onto.

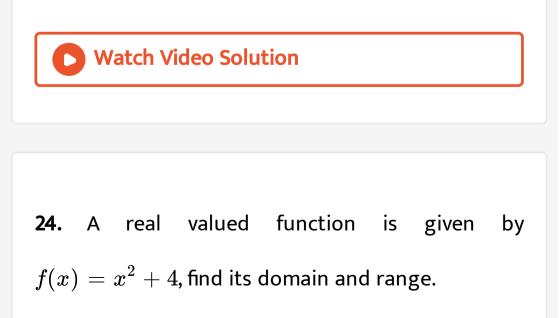


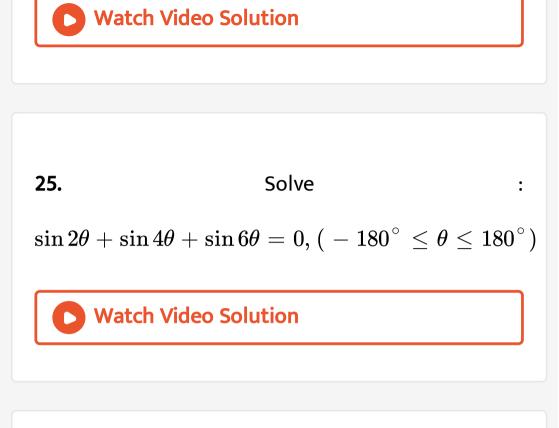
**22.** Find the  $6^{th}$  term from the end in the expansion

of 
$$\left(2x-rac{1}{x^2}
ight)^{10}$$

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**23.** A polygon has 35 diagonals. Find the number of sides.





26. In any  $\Delta ABC, \angle B = 90^{\circ}$ , prove that  $\tan \frac{A}{2} = \sqrt{\frac{b-c}{b+c}}$ 

27. Using mathematical induction, to prove that

 $1 \cdot 1! + 2 \cdot 2! + 3.3! + \ldots + n \cdot n! = (n+1)! - 1$ 

, for all  $n \in N$ 



28. Using definition, differentiate w.r.t. 'x'  

$$f(x) = \cos^2 x$$
  
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29. Evaluate : 
$$\lim_{x o 0} rac{ an x - \sin x}{x^3}$$



**30.** If sum of the roots of  $ax^2 + bx + c = 0$  is equal to the sum of the squares of their reciprocals then show that  $2a^2c = ab^2 + bc^2$ .

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31. if the equation  $x^2+qx+rp=0$  and  $x^2+rx+pq=0,\,(q
eq r)$  have only one root in common, then prove that p+q+r=0.

**32.** If a,b,c are in A.P., b,c,d are in G.P. and  $\frac{1}{c}, \frac{1}{d}, \frac{1}{e}$ 

are in A.P, prove that a,c,e are in G.P.



**33.** Find the equation of straight lines through the point A(3,-2) and inclined at  $60^{\circ}$  to the line  $\sqrt{3}x + y = 1$ .



**34.** Show that the points (0,3),(-6,0),(-1,5) and (-4,-1)

are concyclic.



35. Calculate the variance and standard deviation

of the observations : 11, 12, 13, . . . . 20.

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Section B

**1.** The equation of axis of the parabola having focus (2,3) and directrix x - 4y + 3 = 0 is

A. 
$$x - 4y - 11 = 0$$

B. 
$$4x - y - 11 = 0$$

C. 
$$x + 4y + 11 = 0$$

D. 
$$4x+y-11=0$$

#### Answer: D

2. The distance between the vertex and corresponding focus of the ellipse  $25x^2 + 16y^2 = 400$  is A. 5 B. 3 C. 2 D. 4

#### Answer: C

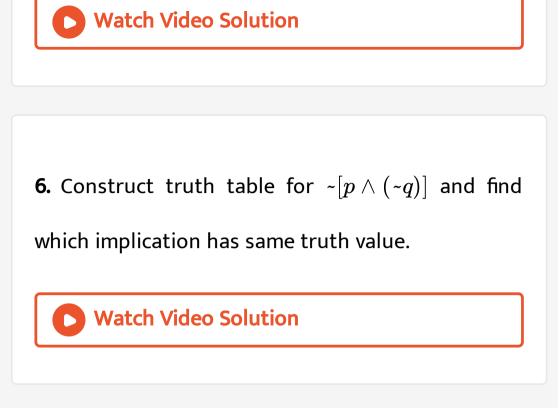


**3.** Find the equation of locus of a point whose distance from z-axis is equal to its distance from xy-plane.

4. Does the straight line 
$$\frac{x}{a} + \frac{y}{b} = 2$$
 touch the ellipse  $\left(\frac{x}{a}\right)^2 + \left(\frac{y}{b}\right)^2 = 2?$  justify.

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- 5. Write the converse of the contrapositive of
- $p \Rightarrow q$



7. Show that the statement "If x is real number such

that  $x^3 + 4x = 0$ , then x=0" is true by the method

of contrapositive.



8. Find the equation of hyperbola with foci at the points (-3, 5) and (5,5) and length of latus rectum  $= 2\sqrt{8}$  units.

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**9.** Reduce the following equation of parabola to a standard form, hence find the vertex focus and the equations of the directrix and equation of latus rectum:  $4x - y^2 + 2y - 13 = 0$ .

**10.** The mid-points if the sides of a triangle are  $\left(3, 2, \frac{3}{2}\right), \left(1, \frac{3}{2}, 3\right)$  and  $\left(2, \frac{5}{2}, \frac{5}{2}\right)$ . Find the

coordinates of its centroid.

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**1.** Using simple average of price relatives method, the price index for 2010, taking 2001 as base year was found to be 127. If  $\Sigma I = 612 + \frac{50x}{9}$  and number of commondities = 6 then find the value of

х.

A. 20

B. 27

C. 25

D. 29

#### Answer: B



**2.**  $D_5$  is always equal to

A.  $P_1$ 

 $\mathsf{B.}\,P_{10}$ 

 $\mathsf{C.}\,P_{25}$ 

D.  $P_{50}$ 

#### Answer: D



## 3. In an asymmetrical distribution mean is 58 and

median is 61. Find mode.

**4.** Calculate sixty first percentile from the following data of the marks obtained by 10 students is an examination : 22,26,14,30,18,11,35,41,12,32

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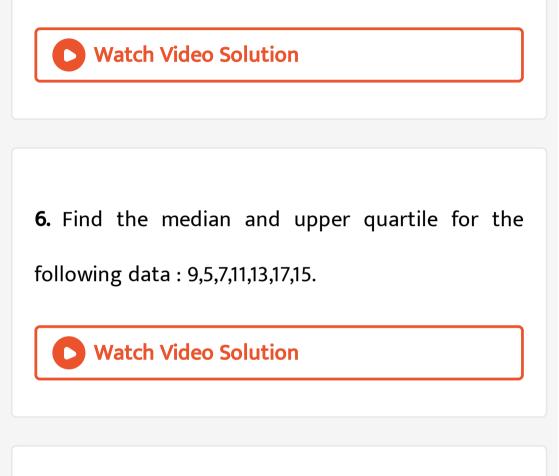
**5.** A small industrial concern used three raw materials A B and C in its manufacturing process.

The prices of the materials are as shown below :

We.	2006	2016			
A	4	5 57 42			
В	60				
C	36				

Using 2006 as the base year, calculate for 2016 a

simple aggregate price index.



7. The mean of two samples is 45. The mean of  $1^{st}$  samples and  $2^{nd}$  samples ware 30 and 50

respectively. Determine the ratio of the number of

observations of the two samples.



**8.** Calculate Separman' coefficient of rank correlation from the following data and interpret the result.

					25					
Y:	25	25	27	31	27	33	35	41	45	41



9. The mathematical aptitude score of 10 computer

programmers with their job performance is given

below:

Mathematics score	7	5	1	4	3	0	2	6	8	9
Job performance rating	8	16	8	9	5	4	3	8	17	12

Calculate the Karl Pearson's correlation coefficient

and interpret the result.