



# MATHS

## BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

### IPE:MARCH-2017 [TS]

#### Section A

1. Find the value of  $y$ , if the line joining  $(3,y)$  and  $(2,7)$  is parallel to the line joining the points  $(-1,4)$  and  $(0,6)$ .



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2. Find the value of  $p$  if the straight lines  $x + p = 0$ ,  $y + 2 = 0$ ,  $3x + 2y + 6 = 0$  are concurrent.



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3. Find the fourth vertex of the parallelogram whose consecutive vertices are  $(2, 4, -1)$ ,  $(3, 6, -1)$  and  $(4, 5, 1)$ .



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4. Find the angle between the planes  $x + 2y + 2z - 5 = 0$  and  $3x + 3y + 2z - 8 = 0$ .

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5. Compute  $\lim_{x \rightarrow 0} x^2 \sin\left(\frac{1}{x}\right)$ .

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6. Find  $\lim_{x \rightarrow \infty} \frac{8|x| + 3x}{3|x| - 2x}$

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7. Find  $f(x) = 7^{3+3x}$  ( $x > 0$ ), then find  $f'(x)$ .



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8. If  $x = \tan(e^{-y})$ , then show that  $\frac{dy}{dx} = \frac{-e^y}{1+x^2}$ .



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9. Find  $dy$  and  $\Delta y$  of  $y = x^2 + x$  at  $x=10$  when  $\Delta x = 0.1$ .



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10. Verify Rolles's theorem for the function

$f: [-3, 8] \rightarrow R$  be defined by

$$f(x) = x^2 - 5x + 6.$$



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## Section B

1. A(5,3) and B(3,-2) are 2 fixed points. Find the equation of locus of P, so that the area of  $\triangle PAB$  is 9sq. Units.



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2. When the axes rotated through an angle  $\frac{\pi}{4}$ , find the transformed equation of  $3x^2 + 10xy + 3y^2 = 9$ .



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3.  $x - 3y - 5 = 0$  is the perpendicular bisector of the line segment joining the points A,B. If  $A = (-1, -3)$ , find the co ordinates of B.



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4. Show that

$$f(x) = \begin{cases} \frac{\cos ax - \cos bx}{x^2} & \text{if } x \neq 0 \\ \frac{1}{2}(b^2 - a^2) & \text{if } x = 0 \end{cases}$$
 is continuous at 0



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5. If  $ay^4 = (x + b)^5$  then  $5yy_2 =$



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6. Find the length of subtangent, subnormal at a point on the curve

$$x=a(\cos t+\sin t), y=a(\sin t-t\cos t)$$



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7. The volume of a cube is increasing at a rate of 9 cubic centimeters per second. How fast is the surface area increasing when the length of edge is 10 cms?



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**Section C**



1. Find the condition for the lines joining the origin to the points of intersection of the circle  $x^2 + y^2 = a^2$  and the line  $lx+my=1$  to coincide.

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2. Find the direction cosines of the two lines which are connected by the relations  $l + m + n = 0$  and  $mn - 2nl - 2lm = 0$ .

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3. If  $\sqrt{1-x^2} + \sqrt{1-y^2} = a(x-y)$  then prove

that 
$$\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{\sqrt{1-x^2}}.$$



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4. At a point  $(x_1, y_1)$  on the curve  $x^3 + y^3 = 3axy$ ,

show that the tangent is

$$(x_1^2 - ay_1)x + (y_1^2 - ax_1)y = ax_1y_1.$$



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5. A window is in the shape of a rectangle surmounted by a semi-circle. If the perimeter of the window be 20 feet then find the maximum area.



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