



# MATHS

## BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

### IPE:MARCH-2015(TS)

#### Ipe March 2015 Ts Maths 1 B

1. Find the equation of the straight line passing through  $(-4,5)$  and cutting off equal

and non-zero intercepts on the co-ordinate axes.



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2. Find the equation of the straight line perpendicular to the line  $5x-3y+1=0$  and passing through the point  $(4,-3)$ .



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3. Find the third vertex of  $\Delta ABC$  , if two of its vertices are A (-2,3) , B(4,5) and its centroid is O(1,2) .



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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  $\lim_{x \rightarrow a} \frac{\tan(x - a)}{x^2 - a^2} (a \neq 0)$ .



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6. Compute  $\lim_{x \rightarrow 0} \left( \frac{e^x - 1}{\sqrt{1+x} - 1} \right)$



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7. Find the derivative of

$$y = \sqrt{2x - 3} + \sqrt{7 - 3x}.$$



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8. Find the derivative of  $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$



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9. If  $y = x^2 + 3x + 6$  then find  $\Delta y$  and  $dy$  when  $x = 10$ ,  $\Delta x = 0.01$ .



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10. Verify Rolle's theorem for the function

$$y = f(x) = x^2 + 4 \text{ on } [-3,3]$$



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11. 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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**12.** When the axes are rotated through an angle  $45^\circ$ , the transformed equation of a curve is  $17x^2 - 16xy + 17y^2 = 225$ . Find the original equation of the curve.



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**13.** A straight line with slope 1 passes through  $Q(-3,5)$  and meets the straight line  $x+y-6=0$  at P. Find the distance PQ.



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14. If  $f$  is given by

$$f(x) = \begin{cases} k^2x - k & \text{if } x \geq 1 \\ 2 & \text{if } x < 1 \end{cases}$$
 is a continuous

function on  $\mathbb{R}$ , then find  $k$ .



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15. Find the derivative of  $x^3$  from the first principle.



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**16.** A particle is moving along a line according to  $s = f(t) = 4t^3 - 3t^2 + 5t - 1$  where  $s$  is measured in meters and  $t$  is measured in seconds. Find the velocity and acceleration at time  $t$ . At what time the acceleration is zero.



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**17.** Determine the intervals in which  $f(x) = \frac{2}{(x-1)} + 18x, \forall x \in \mathbb{R} - \{0\}$  is strictly increasing and decreasing.



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**18.** Find the orthocentre of the triangle whose sides are

$$7x + y - 10 = 0, x - 2y + 5 = 0, x + y + 2 = 0$$



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**19.** Prove that the line  $lx + my + n = 0$  and the pair of lines

$$(lx + my)^2 - 3(mx - ly)^2 = 0 \quad \text{form an}$$

equilateral triangle and its area is

$$\frac{n^2}{\sqrt{3}(l^2 + m^2)}$$



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20. Find the value of  $k$ , if the lines joining the origin with the points of intersection of the curve  $2x^2 - 2xy + 3y^2 + 2x - y - 1 = 0$  and the  $x + 2y = k$  are mutually perpendicular.



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21. Find the angle between the lines, whose direction cosines are given by the equation  $3l + m + 5n = 0$  and  $6mn - 2nl + 5lm = 0$ .



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22. Find the derivative of  $(\sin x)^{\log x} + x^{\sin x}$ .



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**23.** IF the tangent at a point on the curve  $x^{2/3} + y^{2/3} = a^{2/3}$  intersects the coordinate axes in A and B then show that the length AB is a constant.



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**24.** 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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