



# MATHS

## BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

IPE: MAY-2019[AP]

### Section A

1. Find the the value of  $p$  if the straight lines

$3x + 7y - 1 = 0$  and  $7x - py + 3 = 0$  are

mutually perpendicular.



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2. Show that the points  $A(3, 2, -4)$ ,  $B(5, 4, -6)$  and  $C(9, 8, -10)$  are collinear and find the ratio in which B divides  $\overline{AC}$ .



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3. Find the equation to the plane parallel to the ZX-plane and passing through (0,4,4).

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4. Show that  $\lim_{x \rightarrow 2} \frac{|x - 2|}{x - 2} = -1$

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5. Find  $\lim_{x \rightarrow -\infty} \frac{5x^3 + 4}{\sqrt{2x^4 - 1}}$ .

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6. If  $f(x) = 2x^2 + 3x + 5$ , then prove that  $f'(0) + 3f'(-1) = 0$



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7. The time 't' of a complete oscillation of a simple pendulum of length 1 is given by

$$t = 2\pi \sqrt{\frac{l}{g}}$$

where g is gravitational constant.

Find the approximate percentage of error in t

when the percentage of error in l is 1%



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8. What is chemical combination? Explain with an example.



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## Section B

1. Find the equation of locus of P, if the line segment joining  $(2,3)$  &  $(-1,5)$  subtends a right

angle at P.



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2. When the origin is shifted to the point  $(2, 3)$  the transformed equation of a curve is  $x^2 + 3xy - 2y^2 + 17x - 7y - 11 = 0$ . Find the original equation of curve.



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3. A straight line passing through  $A(1, -2)$  makes an angle  $\frac{\tan^{-1} 4}{3}$  with the positive direction of the X-axis in the anticlock wise sense. Find the point on the straight line whose distance from A is 5 units.



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4. Check the continuity of the following function at 2.

$$f(x) = \begin{cases} \frac{1}{2}(x^2 - 4) & \text{if } 0 < x < 2 \\ 0 & \text{if } x = 2 \\ 2 - 8x^{-3} & \text{if } x > 2 \end{cases}$$



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5. Find the derivative of  $\cot x$  from the first principle.



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6. A stone is dropped into a quiet lake and ripples move in circles at the speed of 5 cm/sec. At the instant when the radius of



circular ripple is 8cm, how fast is the enclosed area increases?



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7. Find the angle between the curves

$$y^2 = 8x, x^2 = 4y - 12$$



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**Section C**

1. Find the equation of the straight lines passing through the point  $(1, 2)$  and making an angle of  $60^\circ$  with the line  $\sqrt{3}x + y + 2 = 0$



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2. Area of the triangle formed by the lines  $3x^2 - 4xy + y^2 = 0, 2x - y = 6$  is



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3. Show that product of the perpendicular distances from origin to pair of lines represented by

$$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0 \quad \text{is}$$

$$\frac{|c|}{\sqrt{(a-b)^2 + 4h^2}}$$



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4. Find the angle between the lines, whose direction cosines are given by the equation

$$3l + m + 5n = 0 \text{ and } 6mn - 2nl + 5lm = 0.$$





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5. Find the equations of the tangent to the curve  $y = 3x^2 - x^3$ , where it meets the X-axis.



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6. From a rectangular sheet of dimension  $30\text{cm} \times 80\text{cm}$ , four equal squares of side  $x$  cm. are removed at the corners, and the sides are then turned up so as to form an open rectangular box.

Find the value of  $x$ , so that the volume of the box is the greatest.



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