BOARD MODEL PAPER - 1

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

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

2. Transform the equation 2x-3y+6=0 into Normal form

3. Find the distance between the mid point of the line segment $\overline{AB}$ and the point (3, -1,2) where A=(6,3,-4), B = (-2,-1,2)

4. Find the equation of the plane through(-1, 6,2) and perpendicular to the join of (1,2,3), (-2,3,4).

5. Compute $\underset{x\to 0}{Lt}\dfrac{3^x-1}{\sqrt{1+x}-1}$

6. Find $\underset{x\to 0}{Lt}\dfrac{8|x|+3x}{3|x|-2x}$

7. Find the derivative of $Y=\dfrac{\sin(x+a)}{\cos x}$

8. If Y = cos (log(cot x)) then find $\dfrac{dy}{dx}$.

9. The diameter of a shere is measured to be 40 cm. If an error of 2.0 cm is made in it, then find approximate errors in volume and surface area of the sphere.

10. verify Lagrange's mean value theorem for the function f(x) = x^2 on [2, 4]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

11. A(1,2), B(2,-3), C(-2,3) are 3 points. A point P moves such that $PA^2+PB^2 = 2PC^2$. show that the equation to the locus of P is 7x-7y+4 =0.

12. When the axes are rotated through an angle α, find the transformed equation of x cosα + Ysinα=P

13. A straight line through $Q\left(\sqrt{3},2\right)$ makes an angle $\pi/6$ with the positive direction of the X-axis. if the straight line intersects the line $\sqrt{3}$ x -4y+8=0 at P, find the distance PQ

14. Show that f(x) = sinx is continuous on R

15. Find the derivative of cosax from the first principle.

16. 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 8 cm, how fast is the enclosed area increase?

17. Show that the curves $x^2+y^2=2$, $3x^2+y^2=4x$ have a common tangent at the point (1,1)
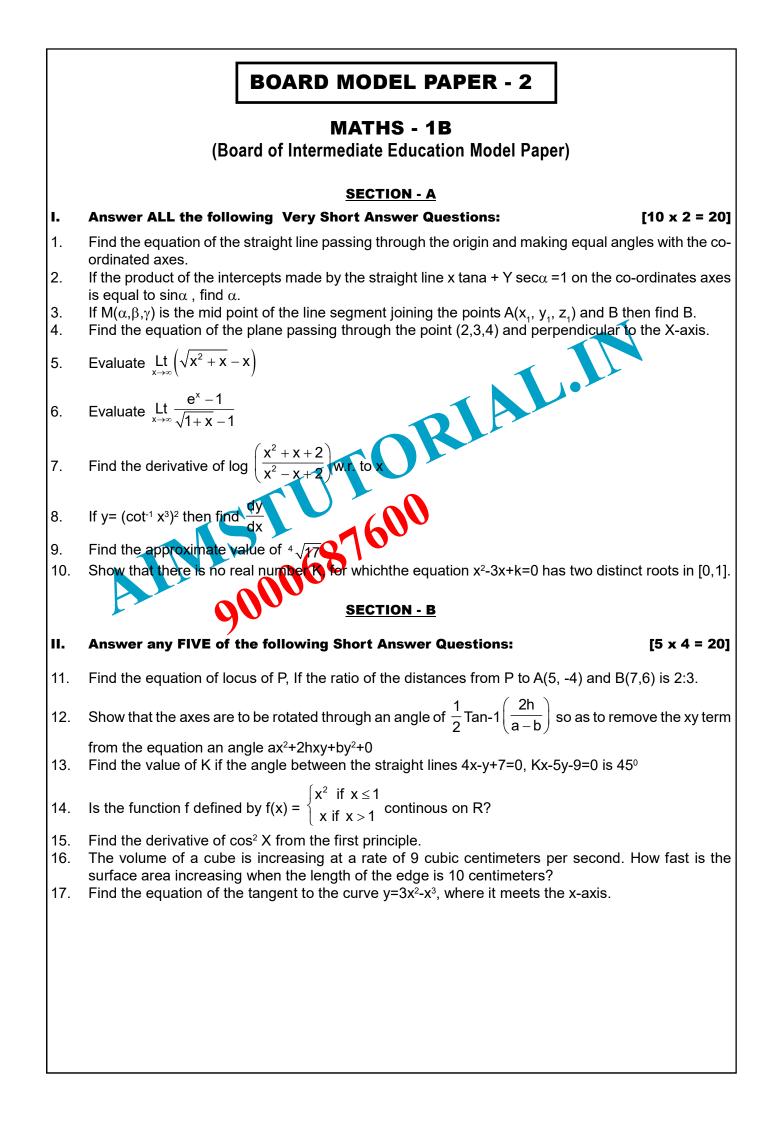
SECTION - C

III. Answer any FIVE of the following Long Answer Questions. : [5 x 7 = 35]

18. Find the circumcentre of the triangle whose vertices are (1,3), (-3,5), (5,-1).
19. Find the centroid and area of the triangle formed by $2y^2 - xy - 6x^2 = 0$ and $x+y+4=0$
20. If the straight lines joining the origin with the points of intersecion of the curve $3x^2-xy+3y^2+2x-3y+4=0$ & the lines $2x +3y=k$ are perpendicular then prove that $6k^2-5k+52=0$
21. Find the direction cosines of two lines which are connected by the relations $l+m+n$, $mn-2nl-2lm=0$.

22. If $x^y + y^x = a^b$ the show that $\dfrac{dy}{dx} = -\left(\dfrac{yx^{y-1} + y^x \log y}{x^y \log x + xy^{x-1}} \right)$

23. Show that the curves $Y^2=4(x+1)$ and $Y^2=36 (9-x)$ interested orthogonally.
24. From a rectangular sheet of dimensions 30cm x 80cm, from equal squares of sides x cm are removed at the corners and the sides are then turned up so as to form an open rectangular box. what is the value of x, so that the volume of the box is the greatest?

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BOARD MODEL PAPER - 2

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20]

1. Find the equation of the straight line passing through the origin and making equal angles with the co-ordinated axes.

2. If the product of the intercepts made by the straight line $x \tan\alpha + Y \sec\alpha = 1$ on the co-ordinates axes is equal to $\sin\alpha$, find α.

3. If $M(\alpha, \beta, \gamma)$ is the mid point of the line segment joining the points $A(x_1, y_1, z_1)$ and B then find B.

4. Find the equation of the plane passing through the point (2,3,4) and perpendicular to the X-axis.

5. Evaluate $\underset{x \to \infty}{Lt} \left(\sqrt{x^2 + x} - x \right)$

6. Evaluate $\underset{x \to \infty}{Lt} \dfrac{e^x - 1}{\sqrt{1+x} - 1}$

7. Find the derivative of $\log\left(\dfrac{x^2 + x + 2}{x^2 - x + 2} \right)$ w.r. to x

8. If $y = (\cot^{-1} x^3)^2$ then find $\dfrac{dy}{dx}$

9. Find the approximate value of $\sqrt[4]{17}$

10. Show that there is no real number K for which the equation $x^2 - 3x + k = 0$ has two distinct roots in [0,1].

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20]

11. Find the equation of locus of P, If the ratio of the distances from P to A(5, -4) and B(7,6) is 2:3.

12. Show that the axes are to be rotated through an angle of $\dfrac{1}{2} \text{Tan-1}\left(\dfrac{2h}{a-b} \right)$ so as to remove the xy term from the equation an angle $ax^2 + 2hxy + by^2 + 0$

13. Find the value of K if the angle between the straight lines 4x-y+7=0, Kx-5y-9=0 is 45^0

14. Is the function f defined by $f(x) = \begin{cases} x^2 & \text{if } x \le 1 \\ x & \text{if } x > 1 \end{cases}$ continous on R?

15. Find the derivative of $\cos^2 X$ from the first principle.

16. 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 the edge is 10 centimeters?

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

SECTION - C

III. **Answer any FIVE of the following Long Answer Questions. :** [5 x 7 = 35]

18. The base of an equilateral triangle is x+y-2=0 and the opposite vertex is (2,-1). Find the equation of the remaining sides.

19. Prove that the product of the perpendicular from(α, β) to $ax^2+2hxy+by^2=0$ is $\dfrac{\left|a\alpha^2 + 2h\alpha\beta + b\beta^2\right|}{\sqrt{(a-b)^2 + 4h^2}}$

20. Show that the equatio $8x^2-24xy+18y^2-6x+9y-5=0$ represents a pair of parallel straight lines and find the distance between them.

21. Show that the lines whose direction cosines are given by l+m+n=0, 2mn+3nl-5lm=0 are perpendicular to each other.

22. Show that the derivates of $Sin^{-1}\sqrt{\dfrac{x-b}{a-b}}$ and $Tan^{-1}\sqrt{\dfrac{x-b}{a-x}}$ are equal.

23. Find the angle between the curves $2y^2-9x=0$, $3x^2+4y=0$ (in the 4th quadrant).

24. Prove that the radius of the right circular cylinder of greatest curved surface area which can be incribed in a given cone is half of that of the cone.

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BOARD MODEL PAPER - 3

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

1. Find the value of x, if the slope of the line passing through (2,5) and (x,3) is 2.
2. Transform the equation x+y+1=0 into Normal form
3. Shoe that the points(1,2,3),(2,3,1) and (3,1,2) form an equilateral triangle.
4. Find the angle between the planes 2x-y+z=6 and x+y+2z=7

5. Show that $\underset{x\to 0+}{Lt}\left(\dfrac{2|x|}{x}+x+1\right)=3$

6. Evaluate $\underset{x\to 0+}{Lt}\dfrac{e^3+x-e^3}{x}$

7. If $f(x)=a^x.e^{x^2}$ then find (x)
8. Find the derivative of log(sin(logx))
9. Find the approximate value of $\sqrt[3]{65}$
10. Verify Rolle's theorem for the function y=f(x)=x²+4 on [-3, 3]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

11. A (2,3) and B(-3, 4) be two given points. Find the equation of the locus of P so that the area of the triangle PAB is 8.5 sq.Units.

12. Find the transformed equation of $x^2+2\sqrt{3}$ xy-y²=2a², when the axes are rotated through an angle $\pi/6$

13. Find the points on the line 3x-4y-1=0 which are at a distance of 5 units from the point (3,2).

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

15. Find the derivative of sin2x from the first principle.

16. A particle is moving in a straight line so that after t seconds its distance s(in cms) from a fixed point on the line is given by s=f(t)=8t+t³. Find (i) the velocity at time t=2 sec(ii) the initial velocity (iii) acceleration at t=2sec.

17. Show that the tangent at any point θ on the curve x=csecθ, Y=ctanθ is ysinθ=x-ccosθ.

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. : [5 x 7 = 35]

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

19. Prove that the area of the traingle formed by the pair of lines $ax^2+2hxy+by^2=0$ and $lx+my+n=0$ is $\dfrac{n^2\sqrt{h^2-ab}}{|am^2-2h/m+bl^2|}$

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 line x+2y=k are mutually perpendicular.

21. If a ray makes angle $\alpha,\beta,\gamma,\delta$ with the four diagonals of a cube then show that $\cos^2\alpha+\cos^2\beta+\cos^2\gamma+\cos^2\delta = 4/3$.

22. If $x = \dfrac{3at}{1+t^3}$ y = $\dfrac{3at^2}{1+t^3}$ then find $\dfrac{dy}{dx}$

23. At any point on the curve x=a(t+sint), Y=a(1-cost), find the lengths of tangent and normal

24. A wire of length l is cut into two parts which are bent respectively in the form of a square and a circle. what are the lengths of pieces of wire so that the sum of areas is least?

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BOARD MODEL PAPER - 4

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

1. Transform the equation x+y+1=0 into normal form.

2. Evaluate $\underset{x \to 2}{Lt}\left([x] + x\right)$

3. Show that the points A(3,-2,4), B(1,1,1), C(-1,4,-2) are collinear.

4. Reduce the equation 4x-4y+2z+5=0 of the plane to the intercept form.

5. Compute $\underset{x \to 0}{Lt} \dfrac{3^x - 1}{\sqrt{1+x} - 1}$

6. Find $\underset{x \to \infty}{Lt} \dfrac{8|x| + 3x}{3|x| - 2x}$

7. If $Y = x^2 \, e^x \sin x$, then find $\dfrac{dy}{dx}$

8. Find the derivative of $Sec^{-1}\left(\dfrac{1}{2x^2 - 1}\right)$

9. The side of a square is increased from 3 cm to 3.01 cm. find the approximate increase in its area.

10. Verify Rolle's theorem for the function x^2-1 on [-1,1]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

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

12. Show that the axes are to be rotated through an angle of $\dfrac{1}{2}$ Tan-1$\left(\dfrac{2h}{a-b}\right)$ so as to remove the term from the equation ax²+2hxy+by²=0

13. Find the image of (1,2) in the straight line 3x+4y-1=0

14. Show that f(x) = $\begin{cases} \dfrac{\cos ax - \cos bx}{x^2} & \text{if } x \neq 0 \\ \dfrac{1}{2}\left(b^2 - a^2\right) & \text{if } x = 0 \end{cases}$, is continuous at 0.

15. Find the derivatives of cotx from the first principle.

16. A particle moving along a straight line has the relation s=t³+2t+3, connecting the distnace s describe by the particle in time t. Find the velocity an acceleration of the particle at t=4 sec.

17. Find the equations of the tngent and the normal to the curve y=x³+4x² at (-1,3)

SECTION - C

III. **Answer any FIVE of the following Long Answer Questions. :** [5 x 7 = 35]

18. Find the circumcenter of the traingle whose vertices are (1,3), (0,-2) and (-3,1)
19. Find the centroid and area of the triangle formed by $2y^2 - xy - 6x^2 = 0$ and $x+y+4=0$
20. Write down the equation of the pair of lines joining the origin of intersection of the line $6x-y+8=0$ with the pair of lines $3x^2+4xy-4y^2-11x+2y+6=0$. show that the lines so obtained make equal angles with the coordinate axes.
21. Find the angle between the lines whose direction cosines satisfy the equation $l+m+n=0$, $l^2+m^2-n^2=0$
22. Find the derivative of $(\sin x)^{\log x} + x^{\sin x}$.
23. If the tangent at any point P on the curve $x^m y^n = a^{m+n}$, $mn \neq 0$ meets the coordinate axes in A,B then show that AP:BP is a constant.
24. Show that when the curved surface of a is right circular cylinder inscribed in a sphere of radius R is maximum, then the height of the cylinder is $\sqrt{2}R$

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BOARD MODEL PAPER - 5

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20]

1. Find the ratio in which the straight line 2x+3y-20=0 divides the joins of the points(2,3) and (2,10)
2. Find the length of the perpendicular from the point(-2, -3) to the straight line 5x-2y+4=0
3. Show that the points (1,2,3), (7,0,1),(-2,3,4) are collinear.
4. Find the equation of the plane throught the points (α, β, γ) and parallel to the plane ax+by+cz=0

5. Find $\underset{x \to 1}{Lt} \dfrac{\sin(x-1)}{x^2-1}$

6. Evaluate $\underset{x \to 0}{Lt} \dfrac{e^{\sin x}-1}{x}$

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

8. If $X=e^{\sinh y}$ then find $\dfrac{dy}{dx}$

9. FInd the length of subtangent at a point on the curve y= b sin $\left(\dfrac{x}{a}\right)$

10. Verify Rolle's theorem for the function $f(x)=x^2-5x+6$ in the interval [-3,8]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20]

11. Find the equation of focus of a point, which forms a triangle of area 2 with the points A(1,1), B(-2,3)
12. When the origin is shifted to the point(-1,2), the transformed equation of a curve is $x^2-2y^2+16=0$. Find the original equation of the curve.
13. Find the equation of the straight line parallel to the line 3x+4y=7 and passing through the point of intersection of the lines x-2y-3=0, x+3y-6=0.

14. Is f defined by f(x) = $\begin{cases} \dfrac{\sin 2x}{x} & \text{if} \quad x \neq 0 \\ 1 & \text{if} \quad x \neq 0 \end{cases}$ continuous at 0?

15. If $Y = \dfrac{x\sin^{-1} x}{\sqrt{1-x^2}}$ then find $\dfrac{dy}{dx}$

16. The radius of an air bubble is increasing at the rate of 1/2 cm/sec. At what rate is the volume of the bubble increasing when the radius is 1 cm?

17. Find the equation of tangent and normal to the curve $y = 2.e^{\frac{-x}{3}}$ at the point where the curve meets the Y-axis

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. : [5 x 7 = 35]

18. Find the orthocentre of the traingle whose sides are given by x+y+10=0, x-y-2=0 and 2x+y-7=0

19. If (α, β) is the centroid of the traingle formed by the lines $ax^2+2hxy+by^2=0$, lx+my=1 then

$$\frac{\alpha}{bl-hm} = \frac{\beta}{am-hl} = \frac{2}{3(bl^2 - 2hlm + am^2)}$$

20. 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.

21. A(1,8,4), B(0,-11,4), C(2,-3,1) and 3 points and D is the foot of the perpendicular from A to BC. Find the Coordinates of D.

22. Find the derivative of $Sin^{-1}\left(\dfrac{b + a\sin x}{a + b\cos x}\right)$ w.r.to x.

23. Show that the square of the length of subtangent at any point on the curve $by^2=(x+a)^3$, $b \neq 0$ varies with the length of the subnormal at the point.

24. Find the maximum area of the rectangle that can be formed with fixed perimeter 20.

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BOARD MODEL PAPER - 6

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

1. Find the value of K. If the straight lines y-3k+4=0 and (2k-1)x-(8k-1)y-6=0 are perpendicular.
2. Find the equation of the straight line passing through the point (-2,4) and making intercepts whose sum is zero.
3. Find the ratio in which the point C(6,-17,-4) divides the line segment joining the points A(2,3,4) and B(3,-2,2).
4. Reduce the equation x+2y-3z-6=0 of the plane to the normal form.
5. Evaluate $\underset{x\to 0}{Lt}\dfrac{\cos ax - \cos bx}{x^2}$
6. Find $\underset{x\to 0}{Lt}\left(\sqrt{x+1}-\sqrt{x}\right)$
7. If y=log(cosh2x), then find $\dfrac{dy}{dx}$
8. Find the derivates of $Tan^{-1}\left(\dfrac{a-x}{1+ax}\right)$
9. If Y=x²+x, x=10, Δx =0.1, then find Δ y and dy
10. State Rolle's Theorem.

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

11. Find the equation of locus of P, if A=(-4,0) B=(-4,0) and $\left|PA-PB\right|=4$
12. When the axes are rotated through an angle $\pi/4$, Find the transformed equation of 3x²+10xy +3y²=9
13. If the straight lines ax+by+c=0 and cx+ay+b=0 are concurrent, then prove that a³+b³+c³=3abc
14. If f is given by f(x) = $\begin{cases} k^2 & x\text{-}k \text{ if } x \geq 1 \\ 2 & \text{if } x < 1 \end{cases}$ is a Continous function on R, Then Find K.
15. Find the derivative of sin 2 x from the first principles
16. Show that at any point (x,y) on the curve y = be^{x/a}, the length of subtangent is a constant and the length of the subnormal is Y^{2/a}.
17. A container in the shape of an inverted cone has height 8 cm and radius 6 cm at the top. If it is filled with water at the rate of 2m³/mn, What is the rate of change in the height of water level when the tank is filled 4 m?

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. : [5 x 7 = 35]

18. Find the circumcentre of the triangle Whose sides are given by x+y+2=0, 5x-y-2=0 and x-2y+5=0

19. If $ax^2+2hxy+by^2+2gx+2fy+c=0$ represents two parallel lines then P.T (i) $h^2=ab$ (ii) $af^2=bg^2$

    (iii) The distance between the parallel is $2\sqrt{\dfrac{g^2 - ac}{b(a+b)}}$ or $2\sqrt{\dfrac{f^2 - bc}{b(a+b)}}$

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 lines x+2y=k are mutually perpendicular.

21. If a ray makes angle $\alpha,\beta,\gamma,\delta$ with the four diagonals of a cube then Show that $\cos2\alpha+\cos2\beta+\cos2\gamma+\cos2\delta=4/3$

22. Find the derivative $\dfrac{dy}{dx}$ of the function Y $= \dfrac{(1-2x)^{2/3}(1+3x)^{-3/4}}{(1-6x)^{5/6}(1+7x)^{-6/7}}$

23. Find the angle between the curves x+y+2=0 and $x^2+y^2-10y=0$

24. A windoe is in the shape of arectangle surrounded by a semi-circle. if the perimeter of the window be 20 feet then the maximum area.

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BOARD MODEL PAPER - 7

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20]

1. Find the ratio in which the straight line 2x+3y-5=0 divides the lines joining the points (0,0) and (-2,1).
2. Find the equations of the straight lines passing through (x_0, y_0) and (i) parallel (ii) Perpendicular to the straight line ax+by +c=0
3. Find the distance between the mid point of the line segment $\overline{AB}$ and the point (3, -1,2) when A=(6,3,-4), B=(-2,-1,2).
4. Find the equation of the plane through (-1,6,2) and perpendicular to the join of (1,2,3), (-2,3,4)
5. Evaluate $\underset{x \to 1}{Lt} \dfrac{\sin(x-1)}{x^2-1}$
6. Find $\underset{x \to a}{Lt}\left[\dfrac{\sqrt{a+2x}-\sqrt{3x}}{\sqrt{3a+x}-2\sqrt{x}}\right]$
7. Find the derivates of $\cos^{-1}(4x^3 - 3x)$
8. If $Y = \operatorname{Cosec}^{-1}(e^{2x+1})$, Find $\dfrac{dy}{dx}$
9. The diameter of a sphere is measured to be 40 cm. If an error of 0.02 cm is made in it, then find approximate errors in volume and surface area of the sphere.
10. Verify Lagrange's mean value theorem for the function $f(x) = x^2$ on [2,4]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20]

11. Find the equation of locus of a point, the sum of whose distances from (0,2), (0,-2) is 6 units.
12. Prove that the point to which the origin should be shifted to eliminate the first degree trems in the equation $ax^2+2hxy+by^2+2gx+2fy+c=0$ is $\left(\dfrac{hf-bg}{ab-h^2}, \dfrac{gh-af}{ab-h^2}\right), ab \neq h^2$
13. Find the incenter of the traingle whose vertices are $(1, \sqrt{3})$, ?(2,0) and (0,0)
14. Show that f(x) =sinx is Continious on R.
15. Find the derivative of ax^2+bx+c from the first principles.
16. The radius of a circle is increasing at the rate of 0.7cm/sec/ what is the rate of increase of its circumcentre.
17. Find K so that the length of the subnormal at any point on the curve $xy^k=a^{k+1}$ is a constant.

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18. Find the area of the parallelogram whose sides are 3x+4y+5=0, 3x+4y-2=0, 2x+3y+1=0, 2x+3y-7=0

19. If θ is the angle between the pair of lines $ax^2+2hxy+by^2=0$ then prove that cos θ =

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

20. Show that straight line $y^2-4y+3=0$, $x^2+4xy+4y^2+5x+10y+4=0$ form a parallelogram and find the length od its sides.

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

22. If f(x) = $(a^2-b^2)^{-1/2}$. $Cos^{-1}\left(\frac{a\cos x+b}{a+b\cos x}\right)$, a > b > 0 and 0 < x < ; then show show that

    f'(x) = (a+b cosx)$^{-1}$

23. FInd the angle between the curves $2y^2-9x=0$, $3x^2+4y=0$ (in the 4th quadrant).

24. Find two positive integers x and y such that x+y=60 and xy^3 is maximum.

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BOARD MODEL PAPER - 8

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. **Answer ALL the following Very Short Answer Questions:** **[10 x 2 = 20]**

1. Find the equation of the line perpendicular to the line 3x+4y+6=0 and marking -4 on the X-axis.

2. If the product of the intercepts madeby the straight line x tanα+ysecα = 1, $\left(0 \le \alpha < \frac{\pi}{2}\right)$, on the co-ordinates axes is equal to sinα , find α .

3. If M(α,β,γ) is the mid point of the line segment joining the points A(x_1, y_1,z_1) and B then Find B.

4. Find the equation of the planepassing through the point (2,3,4) and perpendicular to the X-axis.

5. Find $\underset{x \to a}{Lt}\left(\dfrac{x \sin a - a \sin x}{x - a}\right)$

6. Find $\underset{x \to 0}{Lt}\dfrac{\sin(a + bx) - \sin(a - bx)}{x}$

7. Find the derivative of $Log\left(\dfrac{x^2 + x + 2}{x^2 - x + 2}\right)$ w.r.to x

8. If y = (Cot^{-1} x^3)^2 then find $\dfrac{dy}{dx}$

9. Find the approximate value of $\sqrt[4]{17}$

10. If $0 \le x \le \dfrac{\pi}{2}$, then show that x $\ge$ sin x.

SECTION - B

II. **Answer any FIVE of the following Short Answer Questions:** **[5 x 4 = 20]**

11. Find the equation of Locus of P, If the ratio of the distances from P to A(5,-4) and B(7,6) is 2.3

12. When the origin is shifted to the translation of axes, Find the transformed equation of 2x^2+y^2-4x+4y=0

13. (-4,5) is a Vertex of a square and one of its diagonals is 7x-y+8=0. Find the eqaution of the other diagonal.

14. Evaluate $\underset{x \to \infty}{Lt}\dfrac{x^2 - \sin x}{x^2 - 2}$

15. Using first principle, find the derivative of log$_e^x$ where x$\in(0, \infty$)

16. The volume of a cube is increasing at a rate of 8 cubic centimeters per second. How fast is the surface area increasing when the length of the edge is 12 cm?

17. Find the equations of the tangent and the normal to the curve y^4 = ax^3 at (a,a)

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. : [5 x 7 = 35]

18. The base of an equilateral traingle is x+y-2=0 and the opposite vertex is (2,-1). Find the equation of the remaining sides.

19. show that the lines $(x+2a)^2-3y^2=0$, x=a form an equilateral traingle.

20. Show that the equation $8x^2-24xy+18y^2-6x+9y-5=0$ represents a pair of parallel straight lines and find the distance between them.

21. If (l_1, m_1, n_1), (l_2, m_2, n_2) and d.c.s of two interesting lines, show that d.c.s of two lines, bisecting the angles between them are proportional to $l_1 \pm l_2$, $m_1 \pm m_2$, $n_1 \pm n_2$.

22. Show that the derivatives of $Sin^{-1}\sqrt{\dfrac{x-b}{a-b}}$ and $Tan^{-1}\sqrt{\dfrac{x-b}{a-x}}$ are equal.

23. Find the length of subtangent, subnormal at a point on the curve x=a(cost +tsint), Y=a(sint-t tcost)

24. Prove that the radius of the right circular cylinder of greatest curved surface area which can be incresided in a given cone is half of that of the cone.

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BOARD MODEL PAPER - 9

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

1. Transform the equation 4x-3y+12=0 into (i) Slope - Intercept form (ii) Intercept form
2. Find the value of 'P' if the lines 4x-3y-7=0, 2x+py+2=0 and 6x+5y-1=0 are concurrent.
3. Find the ratio which the XZ- plane divides the line joining A(-2,3,4) and B(1,2,3)
4. Find the angle between the planes x+2y+2z-5=0 and 3x+3y+2z-8=0

5. Evalute $\underset{x \to a}{Lt} \dfrac{\tan(x-a)}{x^2 - a^2}$

6. Compute $\underset{x \to \infty}{Lt} \dfrac{x^2 + 5x + 2}{2x^2 - 5x + 1}$

7. Find the derivative of $Y = \sqrt{2x-3} + \sqrt{7-3x}$.

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

9. If $Y = 5x^2 + 6x + 6$, then find Δy and dy when $\Delta x = 2$, x=0.001
10. Verify Rolle's theorem of the function $\log(x^2+2) - \log 3$ on (-1,1)

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

11. Find the locus of the 3rd vertex of a riight angled triangle, ends of whose hypotenuse are (4,0) and (0,4)
12. Find the point to which the origin is to be shifted so as to remove the first degree terms from the equation $4x^2 + 9y^2 - 8x + 36y + 4 = 0$
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

14. Check the continuity of '*f* ' given by f(x) = $\begin{cases} 4-x^2 & \text{if } x \leq 0 \\ x-5 & \text{if } 0 < x \leq 1 \\ 4x^2-9 & \text{if } 1 < x < 2 \\ 3x+4 & \text{if } x \geq 2 \end{cases}$ at points x = 0,1,2

15. Find the derivative of x^3 from first principle.
16. Let a kind of bacteria grow in such a way that time t sec, there are $t^{3/2}$ bacteria. Find the rate of growth at time t=4 hours

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

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. : **[5 x 7 = 35]**

18. Find the orthocentre of the traingle formed by the vertices (-2, -1), (6,-1) and (2,5)
19. Show that the equation $2x^2-13xy-7y^2+x+23Y-6=0$ represents a pair of straight lines. Also find the angle between them and the coordinates of the point of intersection of the lines.
20. Show that the lines joining the origin to the points of intersection of the curve $x^2-xy+y^2+3x+3y$
21. Find the angle between the lines whose d.c's are related by l+m+n=0 & $l^2+m^2-n^2=0$

22. If siny=xsin(a+y) then show that $\dfrac{dy}{dx} = \dfrac{\sin^2(a+y)}{\text{Sina}}$

23. At a point (x_1,y_1) on the curve x3+y3=3axy, show that the tangent is $(x_1^2-ay_1)x+(y_1^2-ax_1)y=ax_1y_1$
24. Shoe that curves $6x^2-5x=2y=0$, $4x^2+8y^2=3$ touch each other at (1/2,1/2)

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BOARD MODEL PAPER - 10

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

1. Find k, If the lines y-3kx+4=0 and (2k-1)x - (8k-1)y-6=0 are perpendicular.
2. Find the ratio in which the lines 2x+3y-5=0 divides the lines joining the points (0,0) & (-2,1)
3. If (3,2-1), (4,1,1) and (6,2,5) are three vertices and (4,2,2,) is the centroid of a tetrahedron find the fourth vertex.
4. Write the equation of the plane 4x-4y+2z+5=0 in the intercept form

5. Evaluate $\underset{x\to 0}{Lt}\dfrac{a^x-1}{b^x-1}$

6. Evaluate $\underset{x\to\infty}{Lt}\dfrac{11x^3-3x+4}{13x^3-5x^2-7}$

7. Find the derivatives of $y=e^{a\,\sin^{-1}x}$

8. If $y = x^x$, then find $\dfrac{dy}{dx}$

9. If the increase in the side of a square is 4% then find the approximate percentage of increase in the area of the square
10. Verify Rolle's theorem for the function x^2-1 on [-1,1]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

11. Find the equation of locus of a point P, if A=(2,3), B=(2,-3) and PA+PB=8
12. When the prigin is shifted to the point (2,3), the transformed equation of ε curves is $x^2+3xy-2y^2+17x-7y-11=0$. find the original equation of the curve.

13. Transform the equation $\dfrac{x}{a}+\dfrac{x}{b}=1$ into normal form, where a > 0 and b > 0. if the perpendicular distance

    of the straight line from the Origin is P then deducethat $\dfrac{1}{P^2}=\dfrac{1}{a^2}+\dfrac{1}{b^2}$

14. If f is given by f(x) = $\begin{cases} k^2\,x\text{-k} & \text{if } x\geq 1 \\ 2 & \text{if } x<1 \end{cases}$ is a continous function on R, then find k.

15. Find the derivates of tan2x
16. The distance - time formula for the motion of a particle along a straight line is $s=t^3-9t^2+24t-18$. Find when and where the velocity is zero.
17. Find the value of K so that the length of the subnormal at any point on the curve $xy^k = a^{k+1}$ is a constant

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18. Find the circumcentre of the traingle with vertices (1,3), (-3,5) , (5,-1)
19. Prove that the equation of pair of angular bisectors of $ax^2+2hxy+by^2=0$ is $h(x^2-y^2)- (a-b)xy=0$
20. Show that the lines joining the origin with the points of intersection of the curv $7x^2-4xy+8y^2+2x-4y-8=0$ with the line $3x-y=0$ are mutually perpendicular.
21. Find the angle between two diogonals of a cube

22. If $\sqrt{1-x^2} + \sqrt{1-y^2} = a(x-y)$ then prove that $\dfrac{dy}{dx} = \dfrac{\sqrt{1-y^2}}{\sqrt{1-x^2}}$

23. Show that tangent at $P(x_1,y_1)$ on the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ is $xx_1^{-\frac{1}{2}} + yy_1^{-\frac{1}{2}} = a^{\frac{1}{2}}$
24. Find the maximum area of traingle that can be formed with fixed perimeter 20.

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PREVIOUS IPE:MARCH - 2013

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I.   **Answer ALL the following Very Short Answer Questions:**   **[10 x 2 = 20]**

1. Find the equation of straight line passing through the point point (5,4) and parallel to the line 2x+3y+7=0
2. Find the value of P, If straight lines x+p=0, y+2=0, 3x+2y+5=0 are concurrent
3. Show that the points A=(1,2,3) B=(7,0,1), C = (-2,3,4) are collinear.
4. Find the direction cosines of the normal to the plane x+2y+2z-4=0

5. Evaluate $\underset{x \to 0}{Lt} \left(\dfrac{a^x -1}{b^x -1} \right) (a > b > 0, b \neq 1)$

6. Evaluate $\underset{x \to 0}{Lt} \dfrac{e^x - \sin x - 1}{x}$

7. If Y = $Sin^{-1} \sqrt{x}$, then find $\dfrac{dy}{dx}$

8. If y = $\sec^{-1} \left(\dfrac{1}{2x^2 -1} \right)$ find $\dfrac{dy}{dx}$

9. Find the approximate value of $\sqrt{82}$
10. Let f(x) =(x-1)(x-2)(x-3) then prove that there is more than one 'c' in (1,3) such that f'(c) =0

SECTION - B

II.   **Answer any FIVE of the following Short Answer Questions:**   **[5 x 4 = 20]**

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

12. Prove that the angle of rotation of the axes to climate xy term from the equation ax²+2hxy+by²=0 is $\dfrac{1}{2}$ tan-1$\left(\dfrac{2h}{a - b} \right)$ where a $\neq$ b and $\pi/4$ if a=b

13. Find the point on the straight lines 3x+y+4=0 which is equidistant form the points (-5,60 and (3,2)

14. Is F given by f(x) = $\begin{cases} \dfrac{x^2 - 9}{x^2 - 2x - 3} & \\ 1.5 & \end{cases}$ if 0 ,x, 5 and x $\neq$ 3, Continuous at the point 3.

15. Find the derivative of cosax from the first principle.
16. 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?

17. Find lengths of normal and subnormal at a point on the curve y= $\dfrac{a}{2} \left(e^{\frac{x}{a}} + e^{\frac{x}{a}} \right)$

SECTION - C

III. **Answer any FIVE of the following Long Answer Questions. :**   **[5 x 7 = 35]**

18. If Q(h,k) is the image of the point P(x_1,y_1) with respect to the straight line ax+by+c=0 then prove that (h - x_1); a=(k-y_1) ; b= -2(ax_1+by_1+c); (a^2+b^2).

19. Prove that area of the triangle formed by ax^2+2hxy+by^2=0 and lx+my+n=0 is $\dfrac{n^2 \sqrt{h^2 - ab}}{|am^2 - 2h/m + bl^2|}$

20. Find the angle between the lines joining the origin to the points of intersection of the curve x^2+2xy+y^2+2x+2y-5=0 and the line 3x-y+1=0

21. Find the angle between the lines whose d.c's are related by l+m+n=0 & l^2+m^2-n^2=0

22. Find the derivatives of $(sinx)^{logx}$+x^{sinx}

23. If the tangent at a point on the curve $x^{2/3}$ +$y^{2/3}$ =$a^{2/3}$ interests the coordinates axes in A,b then show that the length AB is a constant

24. If the curves surface of right circular cylinder inscribed in a sphere of radius R is maximum, show that the height of the cylinder is $\sqrt{2}$ R

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MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20]

1. Find the equation of straight line passing through the point (-2,4) and making nonzero intercepts whose sum is zero.
2. Find the distance between the parallel straight lines 3x+4y-3=0.
3. Reduce the equation x+2y-3z-6=0 of the plane to the normal form.

4. Compute $\underset{x\to 0}{Lt}\dfrac{e^{7x}-1}{x}$

5. Show that $\underset{x\to 0}{Lt}\left(\sqrt{x+1}-\sqrt{x}\right)=0$

6. If (3,2,-1), (4,1,1) and (6,2,5) are three vertices and (4,2,2) is the centroid of a tetrahedron find the fourth vertex.

7. If y = (cot^{-1} x^3), then find $\dfrac{dy}{dx}$

8. If y= e^{2x}.log(3x+4), $\left(x>\dfrac{-4}{3}\right)$, then find $\dfrac{dy}{dx}$

9. If y = e^x+x, x=5, Δ x=0.02, then find Δ y and dy.
10. Find the value of 'c' in Rolles theorem for the function f(x) = x^2 - 1 on [-1, 1]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20]

11. Find the equation of the locus of P, if A = (4,0), B = (-4,0) and $\left|PA-PB\right|=0$

12. When the axes are roated through an angle π/6, find the transformed equation of x^2+2$\sqrt{3}$ x-y^2 =2a^2

13. If p,q are the lengths of the perpendiculars from the origin to the straightlines x secα+ycosecα = a and xcosα-ysinα=acos2α. prove that 4p^2+q^2=a^2.

14. Find the real constants a,b so that the function f given by

$$f(x) = \begin{cases} \sin x & \text{if } x\leq 0 \\ x^2+\alpha & \text{if } 0<x<1 \\ bx+3 & \text{if } 1\leq x \leq 3 \\ -3 & \text{if } x>3 \end{cases}$$ is continous on R.

15. Find the derivarive of sin2x from the first principle.
16. A container is in the shape of an inverted cone has a height 8m and radius 6m at the top. If it is filled with water at the rate of 2m^3/minute, how fast is the height of water changing when the level is 4m?
17. Find the equations of the normal to the curve y^4 = ax^3 at (a,a)

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. : [5 x 7 = 35]

18. Find the orthocenter of the traingle whose sides are given by x+y+10=0, x-y-2=0 and 2x+y-7=0

19. If the equation ax2+2hxy+by2=0 represents a pair of intersecting lines, then prove the combined equation of the pair of bisectirs of the angles between these lines is $h(x^2-y^2) = (a-b)xy$.

20. Find the condition for the chord lx+my=1 of the circle $x^2+y^2=a^2$ (whose centre is the origin) to subtend a right at the origin.

21. Find the angle between the diagonals of a cube.

22. If y = x^{tanx}+(sinx)^{cosx} find $\dfrac{dy}{dx}$

23. Find the angle between the curves xy=2 and $x^2+4y=0$

24. If the curved surface of right circular cylinder inscribed in a sphere of radius R is maximum, show that the height of the cylinder is $\sqrt{2}$ R.

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PREVIOUS IPE : MARCH - 2014

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I.   Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

1. Find the ratio in which the straight line 2x+3y-5=0 divides the line joining the points (0,0) and (-2,1)
2. Find the equation of the straight line passing through the points $(at_1^2, 2at_1)$, $(at_2^2, 2at_2)$
3. If (3,2,-1), (4,1,1) and (6,2,5) are three vertices and (4,2,2) is the centroid of a tetrahedron find the fourth vertex of that tetrahedron.
4. Reduce the equation x+2y-3z-6=0 of the plane to the normal form.

5. Evaluate $\underset{x\to 0}{Lt}\dfrac{\sqrt{1+x}-1}{x}$

6. Evaluate $\underset{x\to\infty}{Lt}\dfrac{11x^3-3x+4}{13x^3-5x^2-7}$

7. Find the derivatives of log(secx+tanx)
8. Find the derivatives of Cos-1(4x³-3x) w.r.to x
9. If y = x²+3x+6 then find Δ y and dy when x=10, Δ x=0.01.
10. Verify Rolle's theorem for the function x²-1 on [-1,1]

SECTION - B

II.   Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

11. Find the locus of P(x,y) which moves such that its distance from A(5,-4), B(7,6) are in the ratio 2:3.
12. When the axes are rotated through an angle α, find the transformed equation of xcosα+ysinα=P
13. 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)

14. Is f given by f(x) = $\begin{cases} \dfrac{x^2-9}{x^2-2x-3} \\ 1.5 \end{cases}$ if 0 ,x, 5 and x $\neq$ 3, Continuous at the point 3.

15. Find the derivative of tan2x from the first principle.
16. Find the angle between the curves x+y+2=0 and x²+y²-10y=0
17. The volume of a cube is increasing at a rate of 8 cubic centimeters per second. how fast is the surface area increasing when the length of the edge is 12cm?

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18. Find the circumcentre of the traingle whose sides are x+y+2=0, 5x-y-2=0, x-2y+5=0
19. If $ax^2+2hxy+by^2+2gx+2fy+c=0$ represents a pair of lines then prove that
     (a) Δ =abc+2fgh-af^2-bg^2-ch^2=0   (b) h$^2\geq$ab, f$^2\geq$bc, g$^2\geq$ac.
20. Find the condition for the chord lx+my=1 of the circle x2+y2=a2 (whose centre is the origin) to subtend a right at the origin.
21. If the vertices of a traingle are A(1,4,2) , B(-2,1,2), C(2,3,-4) then find $\angle$A,$\angle$B,$\angle$C .
22. Find the derivative of x^{tanx} + (sinx)^{cosx} w.r.t0 x.
23. If the tangent at a point on the curve x$^{2/3}$ + y$^{2/3}$=a$^{2/3}$ intersects the coordinates axes in A,B then show that the length Ab is a constant.
24. From a rectangular sheet of dimensions 30cm x 80 cm, four equal squares of sides x cm are removed at the corners and the sides are then turned up so as to form an open rectangular box. what is the value of x, so that the volume of the box is the greatest?

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PREVIOUS IPE : MAY -2014

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. **Answer ALL the following Very Short Answer Questions:** [10 x 2 = 20]

1. Transform the equation $4x-3y+12=0$ (i) Slope - intercept form, (ii) intercept form
2. Find the value of 'p' if the lines $4x-3y-7=0$, $2x+py+2=0$ and $6x+5y-1=0$ are concurrent.
3. Find the ratio which the XZ- plane divides the line joining A(-2,3,4) and B(1,2,3) Also find the point of intersection
4. Find the equation of the plane which makes intercepts 1,2,4 on the x,y,z axes respectively.

5. Evaluate $\displaystyle \operatorname*{Lt}_{x \to 0} \frac{x(e^x - 1)}{1 - \cos x}$

6. Compute $\displaystyle \operatorname*{Lt}_{x \to \infty} \frac{x^2 + 5x + 2}{2x^2 - 5x + 1}$

7. If $f(x) = 1+x+x^2+............+x^{100}$, then find $f^1(1)$
8. If $y = ae^{nx}+be^{-nx}$, then prove that $y_n = n^2 y$.
9. If the increase in the side of a square is 4% then find the approximate percentage of increase in the area of the square.
10. Define the strictly increasing function and strictly decreasing function on an interval.

SECTION - B

II. **Answer any FIVE of the following Short Answer Questions:** [5 x 4 = 20]

11. If the distance from 'P' to the points (2,3) and (2,-3) are in the ratio 2:3 then find the equation of locus of P.
12. When the axes are rotated through an angle $\pi/4$, find the transformed equation of $3x^2+10xy+3y^2=9$
13. If Q(h,k) is the foot of the perpendicular of $P(x1,y1)$ on the line $ax+by+c=0$ then prove that $(h-x_1):a=(k-y_1):b = -(ax_1+by_1+c):(a^2+b^2)$.

14. 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.

15. Find the derivative of cosax from the first principles.
16. Find the equation of the tangent and the normal to the curve $y = x^3+4x^2$ at (-1,3)
17. Find the length of sub tangent, subnormal at a point t on the curve $x=a(\cos t+t\sin t)$, $y=a(\sin t-t\cos t)$

SECTION - C

III. **Answer any FIVE of the following Long Answer Questions. :** [5 x 7 = 35]

18. Find the orthocenter of the tringle formed by the lines x+2y=0, 4x+3y-5=0, and 3x+y=0

19. Prove that the product of the perpendicular from(α, β) to ax²+2hxy+by²=0 is $\dfrac{\left|a\alpha^2 + 2h\alpha\beta + b\beta^2\right|}{\sqrt{(a-b)^2 + 4h^2}}$

20. Find the angle between the lines joining the origin to the points of intersection of the curve x²+2xy+y²+2x+2y-5=0 and the line 3x-y+1=0

21. Find the angle between the lines whose d.c's are related by l+m+n=0 and l²+m²-n²=0

22. If $\sqrt{1-x^2} + \sqrt{1-y^2}$ =a(x-y) then prove that $\dfrac{dy}{dx} = \dfrac{\sqrt{1-y^2}}{\sqrt{1-x^2}}$

23. Find the condition for the orthogonality of the curves ax2+by2=1 and a₁x²+b₁y²=1 is $\dfrac{1}{a} - \dfrac{1}{b} = \dfrac{1}{a_1} - \dfrac{1}{b_1}$

24. Find two positive intergers x and y such that x+y=60 and xy³ is maximum.

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IPE : MARCH -2015[AP]

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20]

1. Find the are of the traingle formed by straight line 3x-4y+2=0 with co-ordinate axes
2. Find the equation of straight linee passing through (-2,4) and making non-zero intercepts whose sum is zero.
3. Find the angle between the planes 2x-y+x=6, x+y+2z=7.
4. If (3,2,-1), (4,1,1) and (6,2,5) are three vertices and (4,2,2) is the centroid of a tetrahedron find the fourth vertex of that tetrahedron

5. Evaluate $\underset{x \to 0}{Lt} \dfrac{a^x - 1}{b^x - 1}$; (a > 0, b > 0. b $\neq$ 1)

6. Show that $\underset{x \to 0}{Lt} \left(\dfrac{2|x|}{x} + x + 1 \right)$

7. If $y = Tan^{-1} \left(\dfrac{2x}{1 - x^2} \right)$ find $\dfrac{dy}{dx}$

8. If $y = ae^{nx} + be^{-nx}$, then prove that $y_n = n^2 y$.
9. If $Y = f(x) = x^2 + x$, x=10, Δx =0.1, then find Δy and dy
10. Verify Rolle's theorem of the function $\log(x^2+2)$ - log3 on (-1,1)

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20]

11. Find the equation of the locus of P, if A=(2,3), B=(2,-3) and PA+PB=8
12. When the axes are roatated through an angle π/6. Find the transformed equation of $x^2+2\sqrt{3}$ xy-y² = 2a².
13. Find the points on the line 3x-4y-1=0 which are at a distance of 5 units from the point (3,2)

14. Is f given by $f(x) = \begin{cases} \dfrac{x^2 - 9}{x^2 - 2x - 3} & \\ 1.5 \end{cases}$ if 0 ,x, 5 and x $\neq$ 3, Continuous at the point 3.

15. Find the derivate of x sin x from the first principle.
16. The volume of a cube is increasing at a rate of 8 cm³/sec cubic centimeters per second. How fast is the surface area increasing when the length of edge is 12 cms?
17. A particle is moving in a straight line so that after 't' seconds its distance is 'S' (in cms) from a fixed point of the line is given is given be S=f(t)=8t+t³.

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18. Find the orthocentre of the traingle formed by the vertices(-2,-1), (6,-1), (2,5)

19. If S $\equiv$ ax^2+2hxy+by^2+2gx+2fy+c=0 represents a pair of parallel straigh lines, then show that (i) h^2=ab,

    (ii)af^2 = bg^2 and (iii) The distance between the parallel lines $2\sqrt{\dfrac{g^2 - ac}{a(a+b)}}$

20. Show that the lines joining the origin to the points of intersection of the curve x^2-xy+y^2+3x+3y-2=0 and the straight line x-y- $\sqrt{2}$ =0 are mutually perpendicular.

21. Find the angle between two diagonals of a cube

22. If y = x$\sqrt{a^2 + x^2}$ + a$^2\left[x + \sqrt{a^2 + x^2} \right]$, then find $\dfrac{dy}{dx}$

23. Find the positive integers x and y such that x+y=60 and xy^3 is maximum.

24. Show that the curves 6x^2-5x+2y=0, 4x^2+8y^2=3 touch each other at $\left(\dfrac{1}{2},\dfrac{1}{2}\right)$

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IPE: MARCH - 2015[TS]

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. **Answer ALL the following Very Short Answer Questions:** **[10 x 2 = 20]**

1. Find the equation of the straight line passing through(-4,5) and cutting off equal and zero intercepts on the co-ordinates axes.

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

3. Find the co-ordinates of the vertex 'c' of $\triangle$ ABC, if its centroid is the origin and the vertices A,B are (1,1,1) and (-2,4,1) respectively.

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

5. Compute $\underset{x \to a}{Lt} \dfrac{\tan(x-a)}{x^2-a^2}$ $(a \neq 0)$

6. Compute $\underset{x \to 0}{Lt} \dfrac{e^x-1}{\sqrt{1+x}-1}$

7. Find the derivate of $y = \sqrt{2x-3} + \sqrt{7-3x}$

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

9. Find $\triangle$ y and dy for the function $y = x^2+3x+6$ at x=10, $\triangle$ x=0.01

10. Verify Rolle's theorem for the function $y = f(x) = x^2+4$ in [-3,3]

SECTION - B

II. **Answer any FIVE of the following Short Answer Questions:** **[5 x 4 = 20]**

11. A(5,3) and B(3,-2) are two fixed points. Find the equation of the locus of P, so that the area of traingle PAB is p.

12. When the axes are rotated through an angle 45^0, the transformed equationn of a curve is $17x^2-16xy+17y^2=225$. Find the original equation of the curve.

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.

14. If f is given by f(x) = $\begin{cases} k^2 \ x-k & \text{if } x \geq 1 \\ 2 & \text{if } x < 1 \end{cases}$ is a Continous function on R, Then Find K.

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

16. A particle is moving along a line according to S = f(t) = 4t3-3t2+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?

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

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. : **[5 x 7 = 35]**

18. If the equation of the sides of a traingle are $7x+y-10=0$, $x-2y+5=0$ and $x+y+2=0$ find the orthocentre of the traingle.

19. Show that the lines represented by $(lx+my)^2-3(mx-ly)^2 = 0$, $lx+my+n = 0$ form an equilateral traingle with area $\dfrac{n^2}{\sqrt{3}(l^2 + m^2)}$

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

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

22. Find the derivative of $y=(sinx)^{logx}+x^{sinx}$

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

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MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20]

1. Find the perpendicular distance from the point(3,4) to the straight line: 3x-4y+10=0
2. Find the equation of the straight line passing through the points: $(at_1^2, 2at_1)$ and $(at_2^2, 2at_2)$
3. If (3,2,-1), (4,1,1) and (6,2,5) are three vertices and (4,2,2) is the centroid of a tetrahedron find the fourth vertex of that tetrahedron.
4. Find the angle between the planes: x+2y+2z-5=0 and 3x+3y+2z-8=0

5. Compute : $\underset{x\to\infty}{Lt}\dfrac{3x^2+4x+5}{2x^2+3x-7}$

6. Is the function f, defined by f(x) = $\begin{cases} x^2 & \text{if } x\le1 \\ x & \text{if } x>1 \end{cases}$, continous on R?

7. Find the derivates of the function : $f(x) = (x^2-3)(4x^3+1)$.

8. Find y = $\dfrac{2x+3}{4x+5}$ then find $\dfrac{dy}{dx}$

9. Find $\triangle$ y and dy of the function y = x^2+3x+6, for the values x=10 and $\triangle$ x=0.001.
10. Find the equation of the tangent and the normal to the curve y = $5x^4$ at the point (1,5)

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20]

11. A(1,2), B(2,-3) and c(-2,3) are three points. A point P moves such that: $PA^2 + PB^2 = 2PC^2$. show that the equation to the locus of P is 7x-7y+4=0
12. 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 the curve.
13. Find the equation of the straight lines passing through(1,3) and
    1) Parallel to   2) Perpendicular to
    The line passing through the points (3,-5) and (-6,1).

14. Compute : $\underset{x\to0}{Lt}\dfrac{\sqrt[3]{1+x} - \sqrt[3]{1-x}}{x}$.

15. Show that derivative of the function tan 2x from the first principle.
16. Show that the curves $y^2 = 4(x+1)$ and $y^2 = 36(9-x)$ intersect orthogonally.
17. The total cost C(x) in rupees associated with production of x units of an item is givenby : $C(x) =0.005 x^3-0.02 x^2+30x+500$. Find the marginal cost when 3 units are produces (marginal cost is the rate of change of total cost).

SECTION - C

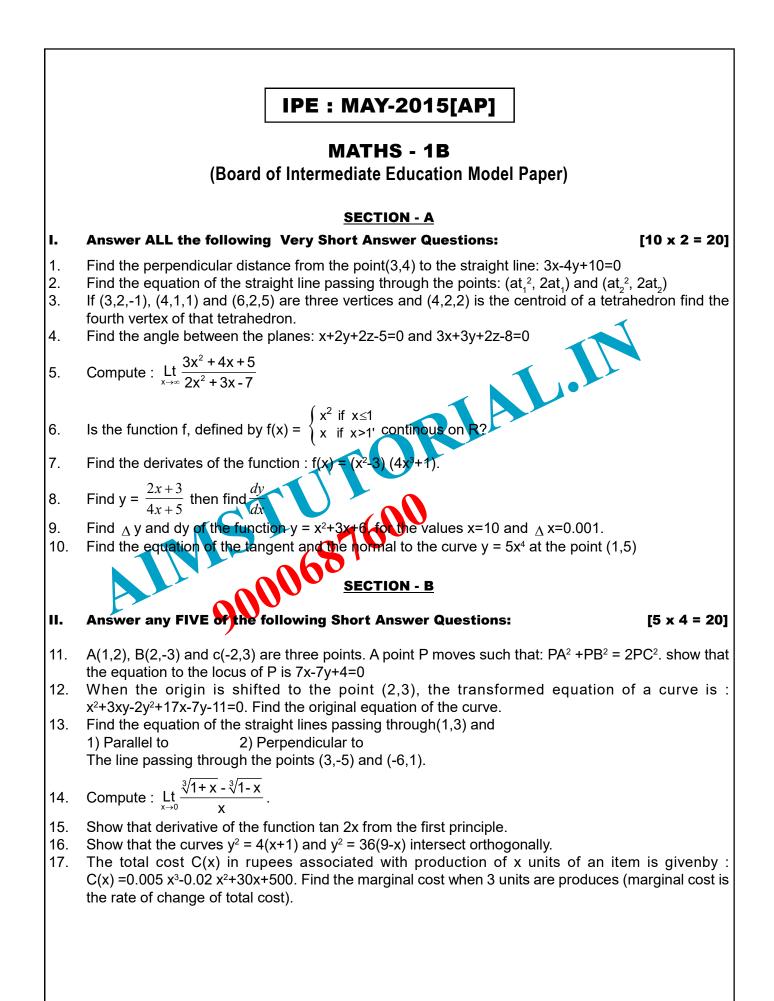**III. Answer any FIVE of the following Long Answer Questions. :** [5 x 7 = 35]

18. Find the orthocentre of the traingle whose vertices are (-2,-1), (6,-1) and (2,5).

19. Show that the product of the perpendicular distances from a point (α,β) to the pair of straight lines
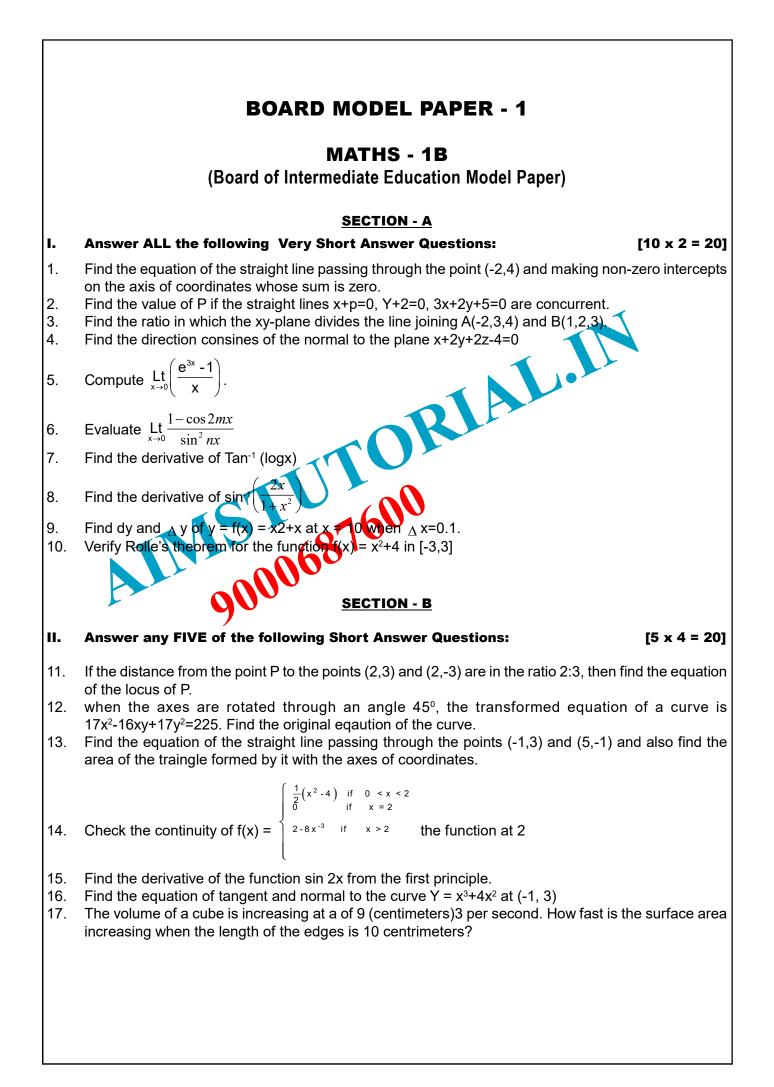
    $ax^2+2hxy+by^2=0$ is : $\left| \dfrac{a\alpha^2 + 2h\alpha\beta + b\beta^2}{\sqrt{(a-b)^2 + 4h^2}} \right|$.

20. Write down the equation of the pair of straight lines joining the origin to the points of intersection of the line 6x-y+8=0 with the pair of straight lines : $3x^2+4xy-4y^2-11x+2y+6=0$.

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

22. If y = tan-1 $\left[\dfrac{\sqrt{1+x^2} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}} \right]$, for $0 < |x| < 1$, find $\dfrac{dy}{dx}$.

23. Show that tangent at $P(x_1,y_1)$ on the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ is $xx_1^{-\frac{1}{2}} + yy_1^{-\frac{1}{2}} = a^{\frac{1}{2}}$

24. If the curved surface of right circular cylinder inscribed in a sphere of radius r is maximum, show that the the height of the cylinder is $\sqrt{2}$ r.

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BOARD MODEL PAPER - 1

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I.   Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

1.   Find the equation of the straight line passing through the point (-2,4) and making non-zero intercepts on the axis of coordinates whose sum is zero.
2.   Find the value of P if the straight lines x+p=0, Y+2=0, 3x+2y+5=0 are concurrent.
3.   Find the ratio in which the xy-plane divides the line joining A(-2,3,4) and B(1,2,3).
4.   Find the direction consines of the normal to the plane x+2y+2z-4=0

5.   Compute $\underset{x \to 0}{Lt}\left(\dfrac{e^{3x}-1}{x}\right)$.

6.   Evaluate $\underset{x \to 0}{Lt}\dfrac{1-\cos 2mx}{\sin^2 nx}$

7.   Find the derivative of Tan^{-1} (logx)

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

9.   Find dy and Δ y of y = f(x) = x2+x at x = 10 when Δ x=0.1.
10. Verify Rolle's theorem for the function $f(x) = x^2+4$ in [-3,3]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

11. If the distance from the point P to the points (2,3) and (2,-3) are in the ratio 2:3, then find the equation of the locus of P.
12. when the axes are rotated through an angle 45^0, the transformed equation of a curve is $17x^2-16xy+17y^2=225$. Find the original eqaution of the curve.
13. Find the equation of the straight line passing through the points (-1,3) and (5,-1) and also find the area of the traingle formed by it with the axes of coordinates.

14. Check the continuity of f(x) = $\begin{cases} \dfrac{1}{2}\left(x^2-4\right) & \text{if} & 0 < x < 2 \\ 0 & \text{if} & x = 2 \\ 2-8x^{-3} & \text{if} & x > 2 \end{cases}$ the function at 2

15. Find the derivative of the function sin 2x from the first principle.
16. Find the equation of tangent and normal to the curve $Y = x^3+4x^2$ at (-1, 3)
17. The volume of a cube is increasing at a of 9 (centimeters)3 per second. How fast is the surface area increasing when the length of the edges is 10 centrimeters?

SECTION - C

III.   Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18.   Find the circumcenter of the traingle whose vertces are (-2,3), (2,-1) and (4,0).

19.   Show that the area of the traingle formed by the lines $ax^2+2hxy+by^2=0$ and $lx+my+n=0$ is
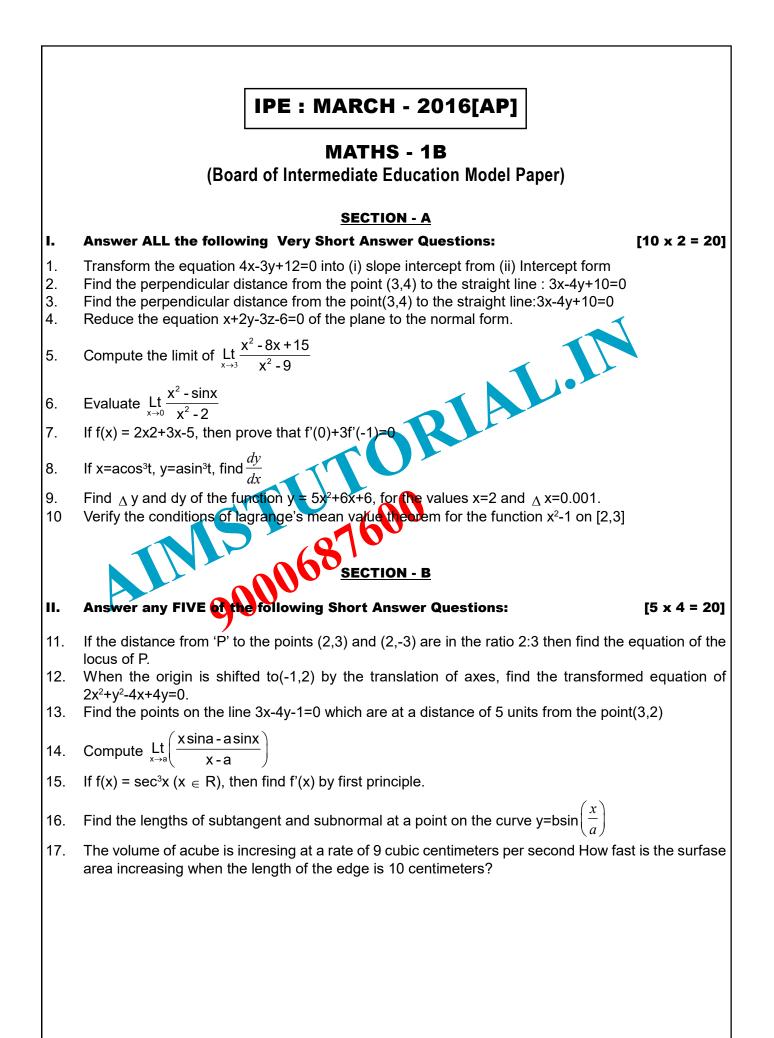
$$\frac{n^2\sqrt{h^2-ab}}{\left|am^2-2h/m+bl^2\right|}$$

20.   Show that the lines joining the origin to the points of intersection of the curve $x^2-xy+y^2+3x+3y-2=0$ and the line $x-y-\sqrt{2}=0$ are mutually perpendicular.

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

22.   If y = tan-1 $\left[\dfrac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right]$, for $0<\left|x\right|<1$, find $\dfrac{dy}{dx}$.

23.   Find the lengths of subtangent, subnormal at a point t on the curve y=a(sin t - t cos t), x=a(cos t + t sin t).

24.   From a rectangular sheet of dimensions 30 m x80 cm four equal squares of side x cms aree removed at the corners and the sides are taken 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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IPE : MARCH - 2016[AP]

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. **Answer ALL the following Very Short Answer Questions:** [10 x 2 = 20]

1. Transform the equation 4x-3y+12=0 into (i) slope intercept from (ii) Intercept form
2. Find the perpendicular distance from the point (3,4) to the straight line : 3x-4y+10=0
3. Find the perpendicular distance from the point(3,4) to the straight line:3x-4y+10=0
4. Reduce the equation x+2y-3z-6=0 of the plane to the normal form.

5. Compute the limit of $\underset{x\to 3}{Lt}\dfrac{x^2-8x+15}{x^2-9}$

6. Evaluate $\underset{x\to 0}{Lt}\dfrac{x^2-\sin x}{x^2-2}$

7. If f(x) = 2x2+3x-5, then prove that f'(0)+3f'(-1)=0

8. If x=acos³t, y=asin³t, find $\dfrac{dy}{dx}$

9. Find Δ y and dy of the function y = 5x²+6x+6, for the values x=2 and Δ x=0.001.
10. Verify the conditions of lagrange's mean value theorem for the function x²-1 on [2,3]

SECTION - B

II. **Answer any FIVE of the following Short Answer Questions:** [5 x 4 = 20]

11. If the distance from 'P' to the points (2,3) and (2,-3) are in the ratio 2:3 then find the equation of the locus of P.
12. When the origin is shifted to(-1,2) by the translation of axes, find the transformed equation of 2x²+y²-4x+4y=0.
13. Find the points on the line 3x-4y-1=0 which are at a distance of 5 units from the point(3,2)

14. Compute $\underset{x\to a}{Lt}\left(\dfrac{x\sin a - a\sin x}{x-a}\right)$

15. If f(x) = sec³x (x $\in$ R), then find f'(x) by first principle.

16. Find the lengths of subtangent and subnormal at a point on the curve y=bsin$\left(\dfrac{x}{a}\right)$

17. The volume of acube is incresing at a rate of 9 cubic centimeters per second How fast is the surfase area increasing when the length of the edge is 10 centimeters?
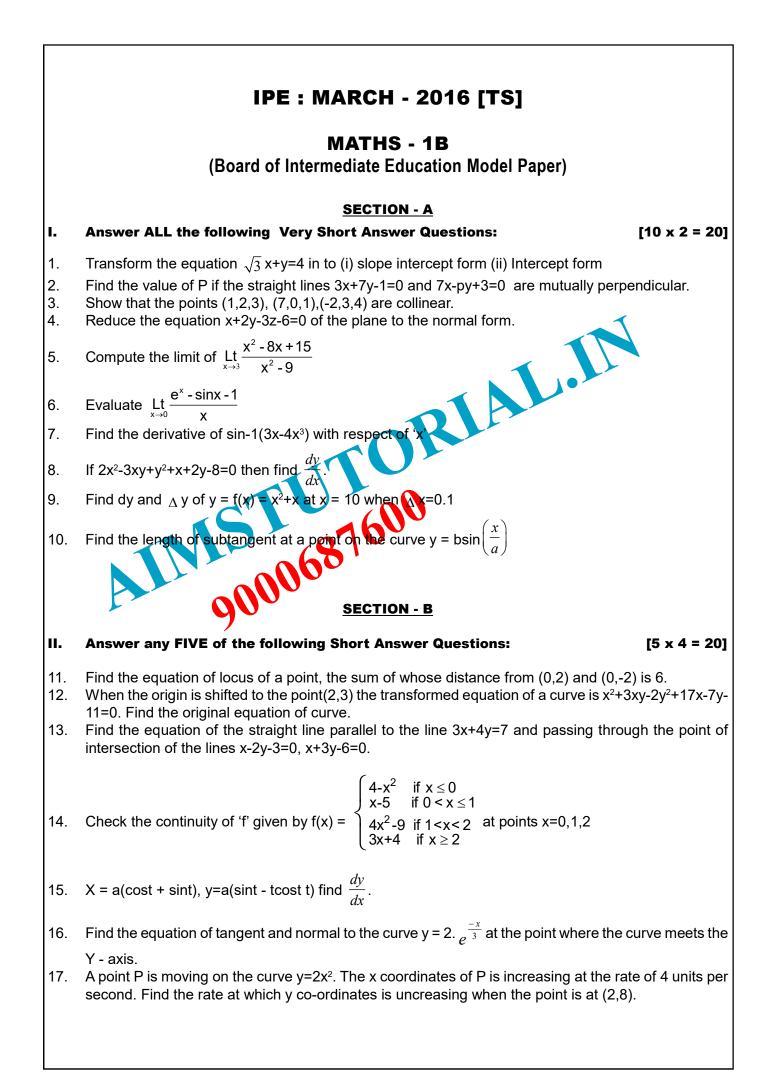
SECTION - C

III. Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18. Find the orthocentre of the traingle whose vertices are (-5,-7), (13,2),(-5,6).
19. If the second degree equation $S \equiv ax^2+2hxy+by^2+2fy+c=0$ in two variables x and y represents a pair of straight lnes then prove that (a) $abc+2fgh-af^2-bg^2-ch2=0$ (b) $h^2 \geq ab$, $f^2 \geq bc$, $g^2 \geq ac$.
20. Find the angle between the lines joining the origin to the points of intersection of the curve $x^2+2xy+y^2+2x+2y-5=0$ and the lines 3x-y+1=0
21. Show that the lines whose direction cosines are given by l+m+n=0, 2mn+3nl-5lm=0 are perpendicular to each other.

22. If y = tan-1 $\left[\dfrac{\sqrt{1+x^2} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}} \right]$, for $0 < |x| < 1$, find $\dfrac{dy}{dx}$.

23. Find the angle between the curves $y^2=4x$ and $x^2+y^2=5$
24. From a rectangular shet of dimensions 30 cm x 80 cm, four equal squares of sides x cm are removed at the corners, and the sides are then turned up so as to form an open rectangular box. what is the value of x, so that the volume of the box is the greatest ?

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IPE : MARCH - 2016 [TS]

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. **Answer ALL the following Very Short Answer Questions:** [10 x 2 = 20]

1. Transform the equation $\sqrt{3}$ x+y=4 in to (i) slope intercept form (ii) Intercept form

2. Find the value of P if the straight lines 3x+7y-1=0 and 7x-py+3=0 are mutually perpendicular.

3. Show that the points (1,2,3), (7,0,1),(-2,3,4) are collinear.

4. Reduce the equation x+2y-3z-6=0 of the plane to the normal form.

5. Compute the limit of $\underset{x\to 3}{Lt}\ \dfrac{x^2 - 8x + 15}{x^2 - 9}$

6. Evaluate $\underset{x\to 0}{Lt}\ \dfrac{e^x - sinx - 1}{x}$

7. Find the derivative of sin-1(3x-4x³) with respect of 'x'

8. If 2x²-3xy+y²+x+2y-8=0 then find $\dfrac{dy}{dx}$.

9. Find dy and $\triangle$ y of y = f(x) = x²+x at x = 10 when $\triangle$x=0.1

10. Find the length of subtangent at a point on the curve y = $bsin\left(\dfrac{x}{a}\right)$

SECTION - B

II. **Answer any FIVE of the following Short Answer Questions:** [5 x 4 = 20]

11. Find the equation of locus of a point, the sum of whose distance from (0,2) and (0,-2) is 6.

12. When the origin is shifted to the point(2,3) the transformed equation of a curve is x²+3xy-2y²+17x-7y-11=0. Find the original equation of curve.

13. Find the equation of the straight line parallel to the line 3x+4y=7 and passing through the point of intersection of the lines x-2y-3=0, x+3y-6=0.

14. Check the continuity of 'f' given by f(x) = $\begin{cases} 4\text{-}x^2 & \text{if } x\le 0 \\ x\text{-}5 & \text{if } 0 < x \le 1 \\ 4x^2\text{-}9 & \text{if } 1<x< 2 \\ 3x+4 & \text{if } x\ge 2 \end{cases}$ at points x=0,1,2

15. X = a(cost + sint), y=a(sint - tcost t) find $\dfrac{dy}{dx}$.

16. Find the equation of tangent and normal to the curve y = 2. $e^{\frac{-x}{3}}$ at the point where the curve meets the Y - axis.

17. A point P is moving on the curve y=2x². The x coordinates of P is increasing at the rate of 4 units per second. Find the rate at which y co-ordinates is uncreasing when the point is at (2,8).

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. : [5 x 7 = 35]

18. The base of an equilateral traingle is x+y-2=0 and opposite vertex is (2,-1) Find the equation of the remaining sides.

19. If the second degree equation $S \equiv ax^2+2hxy+by^2+2gx+2fy+c=0$ in two variables x and y represents a pair of straight lines, then prove that. (a) $abc+2fgh-af^2-bg^2-ch2=0$ (b) $h^2 \geq ab$, $f^2 \geq bc$, $g^2 \geq ac$.

20. Find the lines joining the origin with the points of intersection of the curv $7x^2-4xy+8y^2+2x-4y-8=0$ with the straight line 3x-y=2 and also the angle between them.

21. Find the direction cosines of the two lines which are connected by the relations l-5m+3n=0, $7l^2+5m^2-3n^2=0$.

22. If $x^y+y^x=a^b$ then prove that $\dfrac{dy}{dx} = -\left[\dfrac{yx^{y-1} + y^x \log y}{x^y \log x + xy^{x-1}} \right]$

23. If the curved surface of right circular cylinder inscrided in a sphere of radius 'r' is maximum , show that the height of the cylinder is $\sqrt{2}$ r.

24. If $ax^2+by^2=1$, $a_1x^2+b_1y^2=1$, then show that the condition for orthogonality of above curves is

$$\frac{1}{a} - \frac{1}{b} = \frac{1}{a_1} - \frac{1}{b_1}$$

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IPE : MARCH-2016[TS]

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

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

2. Find the equation of the straight line passing through (-4,5) and cutting off equal intercepts on the coordinates axes.

3. Shoe that the points (1,2,3), (2,3,1) and (3,1,2) form an equilateral traingle.

4. Write the equation of the plane 4x-4y+2z=0 in the intercept form.

5. Evaluate $\underset{x\to 0}{Lt}\dfrac{e^x-1}{\sqrt{1+x}-1}$

6. Evaluate $\underset{x\to 2}{Lt}\left\{\dfrac{1}{x-1}-\dfrac{4}{x^2-4}\right\}$

7. Find the derivatives of $7^{x^3}+3x$.

8. If y=ax^{n+1} +bx^{-n} then show that x²-y"=n(n+1)y.

9. If the increase in the side of a square is 4% then find the approximate percentage of increase in the area of the square.

10. Verify Rolles' theorem for the function f(x)=x²-5x+6 in the interval [-3,8]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

11. Find the equation of locus of a point p, if the distance of P from A(3,0) twice the distance of P from B(-3,0).

12. When the axes are roated through an angle 45⁰, the transformed equation of a curve is 17x²-16xy+17y²=225. find the original equation of the curve.

13. Find the value of k if the angle between the straight lines 4x-y+7=0, kx-5y-9=0 is 45⁰

14. If f is given by f(x) = $\begin{cases} k^2 \ x-k \ \text{if} \ x \geq 1 \\ 2 \quad \text{if} \ x < 1 \end{cases}$ is a Continous function on R, Then Find K.

15. Find the derivative of sin2x from the first principles.

16. The radius of a circle is increasing at the rate of 0.7 cm/sec/what is the rate of increase of its circumcentre.

17. Find the value of k, so that the length of the subnormal at any point on the curve y=a^{1-k}x^k is a constant.
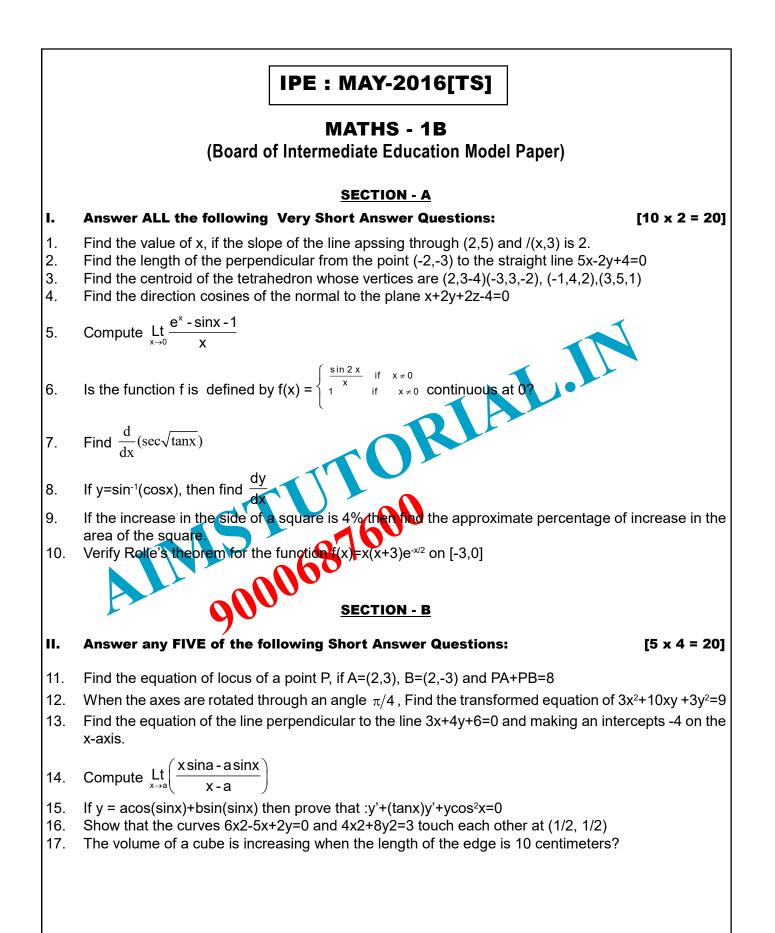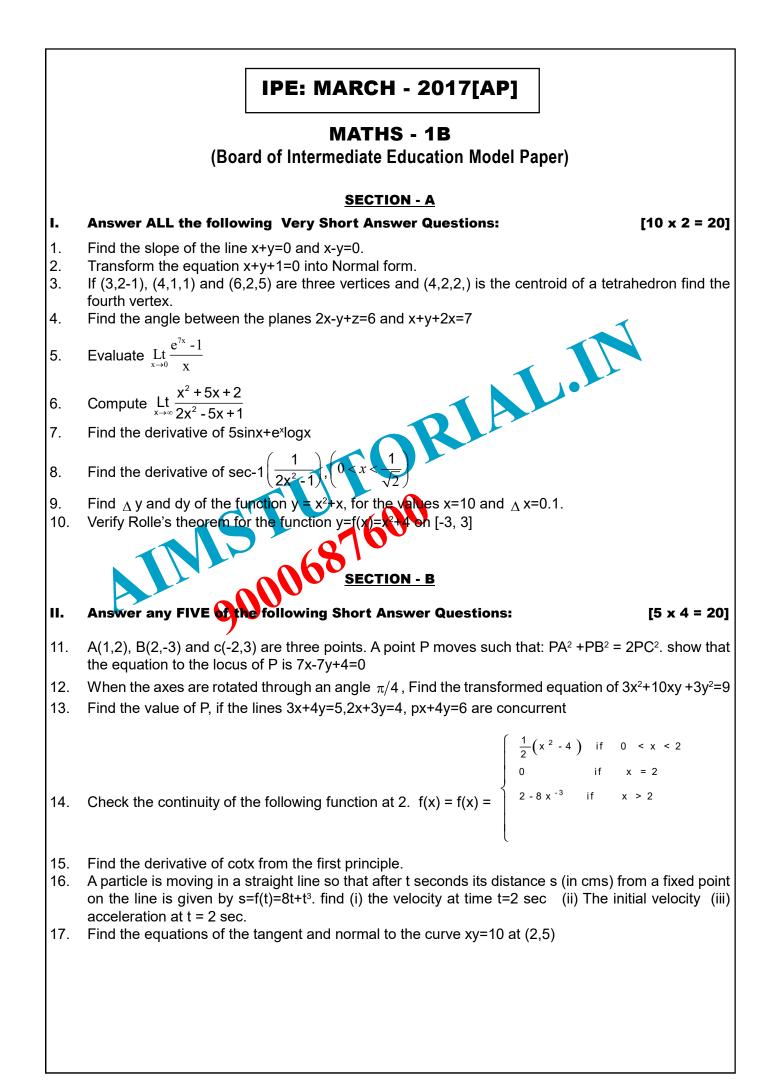
SECTION - C

III.   Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18.   Find the circumcenter of the traingle whose vertices are (-2,3),(2,-1),(4,0).
19.   Prove that the equation $3x^2+7xy+2y^2+5x+5y+2=0$ represents a pair of straight lines and find the coodinates of the point of intersection.
20.   Find the angle between the lines joining the origin to the points of intersection of the curve $x^2+2xy+y^2+2x+2y-5=0$ and the line $3x-y+1=0$
21.   Find the direction cosines of the two lines which are connected by the relations l-5m+3n=0, $7l^2+5m^2-3n^2=0$.

22.   If $\sqrt{1-x} + \sqrt{1-y}$ =a(x-y) then prove that $\dfrac{dy}{dx} = \dfrac{\sqrt{1-y}}{\sqrt{1-x}}$

23.   If the tangent at a point on the curve $x^{2/3}+y^{2/3}=a^{2/3}$ intersects the coordinates axes in A and B then show that the length AB is a constant.
24.   Find the maximum area of the rectangle that can be formed with fixed perimeter 20 units.

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MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20]

1. Find the value of x, if the slope of the line apssing through (2,5) and /(x,3) is 2.
2. Find the length of the perpendicular from the point (-2,-3) to the straight line 5x-2y+4=0
3. Find the centroid of the tetrahedron whose vertices are (2,3-4)(-3,3,-2), (-1,4,2),(3,5,1)
4. Find the direction cosines of the normal to the plane x+2y+2z-4=0

5. Compute $\underset{x\to 0}{\text{Lt}} \dfrac{e^x - \sin x - 1}{x}$

6. Is the function f is defined by $f(x) = \begin{cases} \dfrac{\sin 2x}{x} & \text{if} \quad x \neq 0 \\ 1 & \text{if} \quad x \neq 0 \end{cases}$ continuous at 0?

7. Find $\dfrac{d}{dx}(\sec\sqrt{\tan x})$

8. If y=sin⁻¹(cosx), then find $\dfrac{dy}{dx}$

9. If the increase in the side of a square is 4% then find the approximate percentage of increase in the area of the square.
10. Verify Rolle's theorem for the function f(x)=x(x+3)e⁻ˣ/² on [-3,0]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20]

11. Find the equation of locus of a point P, if A=(2,3), B=(2,-3) and PA+PB=8
12. When the axes are rotated through an angle $\pi/4$, Find the transformed equation of 3x²+10xy +3y²=9
13. Find the equation of the line perpendicular to the line 3x+4y+6=0 and making an intercepts -4 on the x-axis.

14. Compute $\underset{x\to a}{\text{Lt}}\left(\dfrac{x\sin a - a\sin x}{x - a}\right)$

15. If y = acos(sinx)+bsin(sinx) then prove that :y'+(tanx)y'+ycos²x=0
16. Show that the curves 6x2-5x+2y=0 and 4x2+8y2=3 touch each other at (1/2, 1/2)
17. The volume of a cube is increasing when the length of the edge is 10 centimeters?

SECTION - C

III.   Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18.   Find the circumcentre of the traingle whose vertices are (1,3),(0,-2),(-3,1)

19.   Show that the area of the traingle formed by the lines $ax^2+2hxy+by^2=0$ and $lx+my+n=0$ is

$$\frac{n^2\sqrt{h^2-ab}}{\left|am^2-2h/m+bl^2\right|}$$

20.   Find the equation of the pair of straight lines joining the origin to the points of intersection of the line : $6x-y+8=0$ with the pair of straight lines $3x^2+4xy-4y^2-11x+2y+6=0$ and show that the lines obtained make equal angles with the coordinate axes.

21.   If a ray makes angle $\alpha,\beta,\gamma,\delta$ with the four diagonals of a cube then show that $\cos^2\alpha+\cos^2\beta+\cos^2\gamma+\cos^2\delta$

22.   If $x^y+y^x=a^b$ then prove that $\dfrac{dy}{dx}=-\left[\dfrac{yx^{y-1}+y^x\log y}{x^y\log x+xy^{x-1}}\right]$

23.   Find the lengths of subtangent, subnormal at a point t on the curve $y=a(\cos t+t\sin t)$, $x=a(\sin t - t\cos t)$.

24.   The profits function p(x) of a company, selling x items per day is given by $p(x)=(150-x)x-1600$. find the number of items that the comapny should sell to get maximum profit. Also find the maximum profit.

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IPE: MARCH - 2017[AP]

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20]

1. Find the slope of the line x+y=0 and x-y=0.
2. Transform the equation x+y+1=0 into Normal form.
3. If (3,2-1), (4,1,1) and (6,2,5) are three vertices and (4,2,2,) is the centroid of a tetrahedron find the fourth vertex.
4. Find the angle between the planes 2x-y+z=6 and x+y+2x=7

5. Evaluate $\underset{x \to 0}{Lt} \dfrac{e^{7x} -1}{x}$

6. Compute $\underset{x \to \infty}{Lt} \dfrac{x^2 + 5x + 2}{2x^2 - 5x + 1}$

7. Find the derivative of 5sinx+e^{x}logx

8. Find the derivative of sec-1$\left(\dfrac{1}{2x^2 -1} \right), \left(0 < x < \dfrac{1}{\sqrt{2}} \right)$

9. Find $\triangle$ y and dy of the function y = x^2+x, for the values x=10 and $\triangle$ x=0.1.
10. Verify Rolle's theorem for the function y=f(x)=x^2+4 on [-3, 3]

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20]

11. A(1,2), B(2,-3) and c(-2,3) are three points. A point P moves such that: PA^2 +PB^2 = 2PC^2. show that the equation to the locus of P is 7x-7y+4=0

12. When the axes are rotated through an angle $\pi/4$, Find the transformed equation of 3x^2+10xy +3y^2=9

13. Find the value of P, if the lines 3x+4y=5,2x+3y=4, px+4y=6 are concurrent

14. Check the continuity of the following function at 2. f(x) = f(x) = $\begin{cases} \frac{1}{2}\left(x^2 - 4\right) & \text{if } 0 < x < 2 \\ 0 & \text{if } x = 2 \\ 2 - 8x^{-3} & \text{if } x > 2 \end{cases}$

15. Find the derivative of cotx from the first principle.
16. A particle is moving in a straight line so that after t seconds its distance s (in cms) from a fixed point on the line is given by s=f(t)=8t+t^3. find (i) the velocity at time t=2 sec   (ii) The initial velocity (iii) acceleration at t = 2 sec.
17. Find the equations of the tangent and normal to the curve xy=10 at (2,5)

SECTION - C

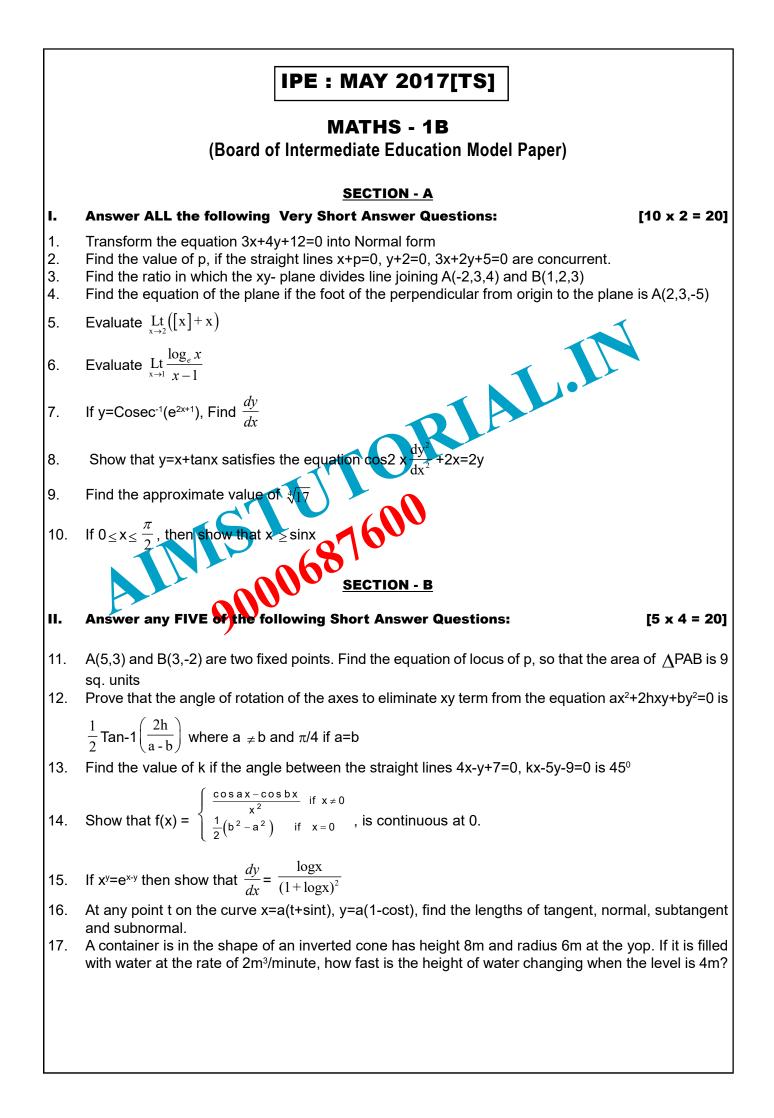**III. Answer any FIVE of the following Long Answer Questions. :** [5 x 7 = 35]

18. Find the circumcenter of the traingle whose vertices are (-2,3), (2,-1) , (4,0)

19. Show that the area of the traingle formed by the lines $ax^2+2hxy+by^2=0$ and $lx+my+n=0$ is

$$\frac{n^2\sqrt{h^2-ab}}{|am^2-2hlm+bl^2|}$$

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

21. Find the angle between the lines whose d.c's are related by l+m+n=0 & $l^2+m^2+n^2=0$

22. Find the $\dfrac{dy}{dx}$ of $y=(sinx)^{logx}+x^{sinx}$

23. Find the angle between the curves xy=2 and $x^2+4y=0$

24. A wire of length l is cut into two parts which are bent respectively in the form of a square and a circle. what are the lengths of pieces of wire so that the sum of areas is least?

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IPE : MARCH -2017[TS]

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

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) nad (0,6)

2. Find the value of P, if the straight linesx+p=0, y+2=0, 3x+2y+5=0 are concurrent.

3. Find the fourth vertex of the parallelogram whose consecutive vertices are (2,4-1), (3,6,-1) and (4,51)

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

5. Compute $\underset{x\to 0}{Lt}\ x^2 \sin\left(\dfrac{1}{x}\right)$

6. Find $\underset{x\to \infty}{Lt}\ \dfrac{8|x|+3x}{3|x|-2x}$

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

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

9. Find dy and $\triangle$ y of y = f(x) = x2+x at x = 10 when $\triangle$ x=0.1

10. Verify Rolle's theorem for the function f:[-3,8]→R be defined by f(x) = x²-5x+6.

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

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

12. When the axes are rotated through an angle $\pi/4$, Find the transformed equation of 3x²+10xy +3y²=9

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

14. Show that f(x) = $\begin{cases} \dfrac{\cos ax-\cos bx}{x^2} & \text{if } x\neq 0 \\ \dfrac{1}{2}\left(b^2-a^2\right) & \text{if } x=0 \end{cases}$, where a and b real constants is continuous at x=0.

15. If ay⁴=(x+b)⁵ then 5yy^n=(y')².

16. Find the lengths of subtangent, subnormal at a point t on the curve y=a(cost+tsint), x=a(sin t - tcost).

17.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 the edge is 10 centimeters?

SSECTION - C

III. Answer any FIVE of the following Long Answer Questions. : [5 x 7 = 35]

18. Find the orthocentre of the traingle whose vertices are (5,-2),(-1,2),(1,4)

19. Show that the area of the traingle formed by the lines $ax^2+2hxy+by^2=0$ and $lx+my+n=0$ is

$$\frac{n^2\sqrt{h^2-ab}}{|am^2-2h/m+bl^2|}$$

20. 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.

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

22. If $\sqrt{1-x^2}+\sqrt{1-y^2}=a(x-y)$ then prove that $\dfrac{dy}{dx}=\dfrac{\sqrt{1-y^2}}{\sqrt{1-x^2}}$

23. At a point (x_1,y_1) on the curve $x^3+y^3=3axy$, show that the tangent is $(x_1^2-ay_1)x+(y_1^2-ax_1)y=ax_1y_1$.

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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MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: **[10 x 2 = 20]**

1. Find the equation of the straight line passing through the points (-2,4) and making intercepts, whose sum is zero

2. Find the value of K, if the straight lines 6x-10y+3=0 and Kx-5y+8=0 are parallel.

3. Show that points (5,4,2), (6,2,-1) and (8,-2,-7) are collinear

4. Find the equation of the plane passing through the poinnts (1,1,1) and parallel to the plane x+2y+3z-7=0

5. Evaluate $\underset{x \to 0}{\text{Lt}} \dfrac{\sqrt{1+x}-1}{x}$

6. Is the function f is defined by $f(x) = \begin{cases} \dfrac{\sin 2x}{x} & \text{if} \quad x \neq 0 \\ 1 & \text{if} \quad x \neq 0 \end{cases}$ continuous at 0?

7. Find the derivative of log(secx+tanx)

8. If y=e^t+cost, x=logt+sint then find $\dfrac{dy}{dx}$

9. Find dy and Δy of y = f(x) = x^2+x at x = 10 when Δx=0.1

10. Define Rolle's theorem.

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: **[5 x 4 = 20]**

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

12. When the prigin is shifted to the point (2,3), the transformed equation of ε curves is x^2+3xy-2y^2+17x-7y-11=0. find the original equation of the curve.

13. Find the value of P, if the lines 3x+4y=5,2x+3y=4, px+4y=6 are concurrent

14. Evaluate $\underset{x \to 0}{\text{Lt}} \dfrac{\cos ax - \cos bx}{x^2}$

15. Find the derivative of tan2x from the first priinciple.

16. A stone is dropped into a quiet lake and ripples move in circles at the speed of 5cm/sec. AT the instant when the radius of circular ripple is 8cm, how fast is the enclosed area increases?

17. Show that at any point (x,y) on the curve y=be$^{x/a}$, the length of subtangent is a constant and the length of the subnormal is y^2/a.

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18. Find the circumcentre of the traingle with vertices (1,3), (-3,5) , (5,-1)

19. Prove that the product of the perpendicular from(α, β) to $ax^2+2hxy+by^2=0$ is $\dfrac{\left|a\alpha^2 + 2h\alpha\beta + b\beta^2\right|}{\sqrt{(a-b)^2 + 4h^2}}$

20. Write down the equation of the pair of straight lines joining the origin to the points of intersection of the line 6x-y+8=0 with the pair of straight lines : $3x^2+4xy-4y^2-11x+2y+6=0$.

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

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

23. If the tangent at a point on the curve $x^{2/3} +y^{2/3} =a^{2/3}$ interests the coordinates axes in A,B then show that the length AB is a constant

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

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IPE : MAY 2017[TS]

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions: [10 x 2 = 20]

1. Transform the equation 3x+4y+12=0 into Normal form
2. Find the value of p, if the straight lines x+p=0, y+2=0, 3x+2y+5=0 are concurrent.
3. Find the ratio in which the xy- plane divides line joining A(-2,3,4) and B(1,2,3)
4. Find the equation of the plane if the foot of the perpendicular from origin to the plane is A(2,3,-5)

5. Evaluate $\underset{x \to 2}{Lt}\left([x] + x\right)$

6. Evaluate $\underset{x \to 1}{Lt} \dfrac{\log_e x}{x-1}$

7. If $y = Cosec^{-1}(e^{2x+1})$, Find $\dfrac{dy}{dx}$

8. Show that y=x+tanx satisfies the equation $\cos 2\, x \dfrac{dy^2}{dx^2} + 2x = 2y$

9. Find the approximate value of $\sqrt[4]{17}$

10. If $0 \le x \le \dfrac{\pi}{2}$, then show that $x \ge \sin x$

SECTION - B

II. Answer any FIVE of the following Short Answer Questions: [5 x 4 = 20]

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

12. Prove that the angle of rotation of the axes to eliminate xy term from the equation $ax^2+2hxy+by^2=0$ is $\dfrac{1}{2}Tan\text{-}1\left(\dfrac{2h}{a-b}\right)$ where $a \ne b$ and $\pi/4$ if a=b

13. Find the value of k if the angle between the straight lines 4x-y+7=0, kx-5y-9=0 is 45^0

14. Show that f(x) = $\begin{cases} \dfrac{\cos ax - \cos bx}{x^2} & \text{if } x \ne 0 \\ \dfrac{1}{2}\left(b^2 - a^2\right) & \text{if } x = 0 \end{cases}$, is continuous at 0.

15. If $x^y = e^{x-y}$ then show that $\dfrac{dy}{dx} = \dfrac{\log x}{(1+\log x)^2}$

16. At any point t on the curve x=a(t+sint), y=a(1-cost), find the lengths of tangent, normal, subtangent and subnormal.

17. A container is in the shape of an inverted cone has height 8m and radius 6m at the yop. If it is filled with water at the rate of 2m³/minute, how fast is the height of water changing when the level is 4m?

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. :   **[5 x 7 = 35]**

18. Find the orthocentre of the traingle formed by the vertices(-5,-7), (13,2),(-5,6)

19. If (α,β) is the centroid of the traingle formed by the lines $ax^2+2hxy+by^2=0$, $lx+my=1$ then

$$\frac{\alpha}{bl-hm} = \frac{\beta}{am-hl} = \frac{2}{3(bl^2-2hlm+am^2)}$$

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 lines $x+2y=k$ are mutually perpendicular.

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

22. Show that the derivatives of sin-1 $\sqrt{\dfrac{x-\beta}{\alpha-\beta}}$ Tan-1 $\sqrt{\dfrac{x-\beta}{\alpha-x}}$ are equal.

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

24. Prove that the radius of the right circular cylinder of greatest curved surface area which can be increibed in a given cone is half of that of the cone.

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BOARD MODEL PAPER - 1

MATHS - 1B
(Board of Intermediate Education Model Paper)

SECTION - A

I.   **Answer ALL the following Very Short Answer Questions:**   **[10 x 2 = 20]**

1.   If

SECTION - B

II.   **Answer any FIVE of the following Short Answer Questions:**   **[5 x 4 = 20]**

11.   Pro

SECTION - C

III.   **Answer any FIVE of the following Long Answer Questions. :**   **[5 x 7 = 35]**

18.   If f :

BOARD MODEL PAPER - 1

MATHS - 1B
(Board of Intermediate Education Model Paper)

<u>SECTION - A</u>

I.   **Answer ALL the following Very Short Answer Questions:**   **[10 x 2 = 20]**

1.   If

<u>SECTION - B</u>

II.   **Answer any FIVE of the following Short Answer Questions:**   **[5 x 4 = 20]**

11.   Pro

<u>SECTION - C</u>

III.   **Answer any FIVE of the following Long Answer Questions. :**   **[5 x 7 = 35]**

18.   If f :