



# MATHEMATICS POINT<sup>TM</sup>

[Platform for +1, +2, IIT-JEE, AIEEE & Maths Olympiad]

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**SAMPLE TEST-2 (11TH)  
PAPER - 2**

**Time : 1 Hour 45 Minutes**

**Maximum Marks : 114**

**Please read the Instructions carefully**

**(A) General instructions**

- This booklet contains 18 Questions and has 16 Pages.

**(B)** For each Question in **Section A**, you will be **awarded 5 marks** for the complete solution. **No Negative marking** will be awarded for incorrect answer.

**(C)** For each Question in **Section B**, you will be **awarded 8 marks** for the complete solution. **No Negative marking** will be awarded for incorrect answer.

**Name of the Candidate**

**Phone No.**

**Starting Time** \_\_\_\_\_

**Date :-**

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**Section : A**

1. Prove that  $2(\sin^6 \theta + \cos^6 \theta) - 3(\sin^4 \theta + \cos^4 \theta) + 1$  is independent of  $\theta$ .

**Solution :**



2. Three horses each with a rope of 7m are tied at the vertices of a grassy triangular field of dimension 15m, 18m, 20m. How much area of triangular field can three horses graze?

**Solution :**

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3. A person seeing a cock, fight going on, spoke privately to both the owners of cocks. To one he said; if your bird wins, than you give me your stake-money, but if you do not win, I shall give you two third of that'. Going to other, he promised in the same way to give three fourths. From both of them his gain would be only 12 gold goins. Find the stake of money each of the cock-owners have.

**Solution :**

*MP*

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4.

a) Simplify  $\frac{(x^2 - y^2)^3 + (y^2 - z^2)^3 + (z^2 - x^2)^3}{(x - y)^3 + (y - z)^3 + (z - x)^3}$ . [3]

b) Factorize :  $8x^4 + 2x^2 - 1$ . [2]

**Solution :**



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5. Let  $ABC$  be a right-angled triangle with  $AC$  as its hypotenuse. Prove that (the symbol ' $>$ ' means "greater than")
- i)  $AC > AB$  and  $AC > BC$
  - ii)  $AC^3 > AB^3 + BC^3$

**Solution :**



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6. In a triangle ABC, it is known that  $AB = AC$ . Suppose D is the mid-point of AC and  $BD = BC = 2$ . Then find the area of the triangle ABC.

**Solution :**

*MP*

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7. Express with rational denominator :  $\frac{1}{\sqrt[3]{9} - \sqrt[3]{3} + 1}$

**Solution :**

8. The area of an isosceles triangle is  $60 \text{ cm}^2$  and the length of each one of its equal sides is 13 cm. Find its base.

**Solution :**

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9. A cylindrical metallic pipe is 21 cm in length. The difference between the outside and inside surface areas is  $44 \text{ cm}^2$ . If the pipe is made up of  $110 \text{ cm}^3$  of metal, find the outer and inner diameter of the pipe.

**Solution :**



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10. If  $BCP$ ,  $CAQ$ ,  $ABR$  be equilateral triangles described on the sides of a triangle  $ABC$ , Show that  $AP = BQ = CR$

**Solution :**

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**Section : B**

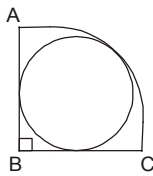
11. A train X starts from Meerut at 4 p.m. and reaches Ghaziabad at 5 p.m., while another train Y starts from Ghaziabad at 4 p.m. and reaches Meerut at 5.30 p.m. At what time will the two trains cross each other?

**Solution :**

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12. In a bullet the gun powder is to be filled up inside the metallic enclosure. The metallic enclosure is made up of a cylindrical base and conical top with the base of radius 5 cm. The ratio of height of cylinder and cone is 3:2. A cylindrical hole is drilled through the metal solid with height two-third the height of metal solid. What would be the radius of the hole, so that the volume of the hole (in which gun powder is to be filled up) is one-third the volume of metal solid after drilling?

**Solution :**

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13. If ABC is a quarter circle and a circle is inscribed in it and if  $AB = 1$  cm, find radius of smaller circle.



**Solution :**

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14. If  $\operatorname{cosec} \theta - \sin \theta = a$  and  $\sec \theta - \cos \theta = b$ , then prove that  $a^2 b^2 (a^2 + b^2 + 3) = 1$

**Solution :**

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15. ABCD is a square. A is joined to the point X in DC and D to the point Y in CB, So that  $AX = DY$ . Prove that  $AX \perp DY$ .

**Solution :**

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16. Prove that of all triangles on the same base and of the same area, the isosceles triangle has the least Perimeter.

**Solution :**

*MP*

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17. A quadrilateral is inscribed in a circle of radius  $200\sqrt{2}$ . Three of the sides of this quadrilateral have length 200. What is the length of the fourth side?

**Solution :**

18. Find the square root of :  $5 - \sqrt{10} - \sqrt{15} + \sqrt{6}$

**Solution :**





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Answers

2. 77

3. 42,40

4. a)  $(x+y)(y+z)(z+x)$

b)  $(2x^2 + 1)(2x - 1)(2x + 1)$

6.  $\sqrt{7}$

7.  $\frac{\sqrt[3]{3}+1}{4}$

8. 24,10

9.  $R = 8/3$  ,  $r = 7/3$

11. 4: 36

12.  $\sqrt{\frac{55}{8}}$

13.  $\sqrt{2}-1$

17. 500

18.  $\frac{\sqrt{2}+\sqrt{3}-\sqrt{5}}{\sqrt{2}}$

