

Time 3 hours

Mathematics Mock Test X 2013

MM 90

Section A 1 Mark Each

1. If a and b are the roots of  $x^2 - px + q = 0$ , then  $a^2 + b^2$   
(A)  $p^2 + q^2$  (B)  $p^2 + 2q$  (C)  $p^2 - q^2$  (D)  $p^2 - 2q$

or

$x^2 - rx + 1 = 0$  has real roots and distinct root, then r does not lie between  
(A) 1 and 2 (B) - 1 and 1 (C) - 2 and 2 (D) - 1 and 2

2. Which term of the A.P. 24, 21, 18, 15... is the first negative term?  
(A) 8<sup>th</sup> (B) 10<sup>th</sup> (C) 12<sup>th</sup> (D) 6<sup>th</sup>
3. To divide a line segment AB in the ratio 4:7, a ray AX is drawn first such that  $\angle BAX$  is an acute angle and then points  $A_1, A_2, A_3, \dots$  are located at equal distances on the ray AX and the point B is joined to  
(A)  $A_{12}$  (B)  $A_{11}$  (C)  $A_{10}$  (D)  $A_9$
4. The radii of two concentric circles are 20 cm and 15 cm respectively. Then the area of ring enclosed by these is  
(A)  $320 \text{ cm}^2$  (B)  $550 \text{ cm}^2$  (C)  $340 \text{ cm}^2$  (D)  $500 \text{ cm}^2$

or

Perimeter of a circle is equal that to a square. Then ratio of their areas is  
(A) 14:11 (B) 7:22 (C) 22:7 (D) 7:11

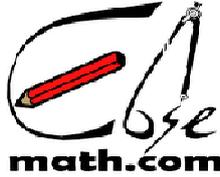
5. To draw a pair of tangents to a circle which are inclined at an angle of  $35^\circ$ , it is required to draw tangents at the end points of those two radii of the side, the angle between which is  
(A)  $105^\circ$  (B)  $70^\circ$  (C)  $140^\circ$  (D)  $145^\circ$
6. The probability for a randomly selected number out of 1, 2, 3, 4 ...25 to be a prime number is  
(A) 0.8 (B) 0.92 (C) 0.4 (D) 0.36

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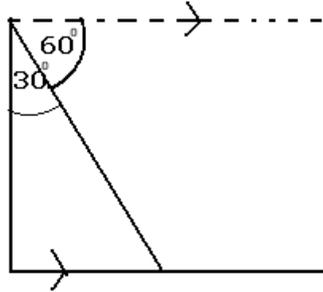


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7. The angle of depression in the following figure  
(A)  $30^\circ$  (B)  $60^\circ$  (C)  $45^\circ$  (D)  $90^\circ$



8. Two tangents making an angle of  $120^\circ$  with each other are drawn to a circle of radius 6 cm, then the length of each tangent is equal to  
(A)  $\sqrt{3}$  cm (B)  $6\sqrt{3}$  cm (C)  $\sqrt{3}$ cm (D)  $2\sqrt{3}$  cm

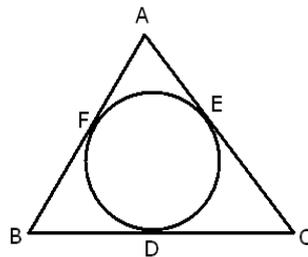
**Section B 2 Marks Each**

9. Solve for x:  $4x^2 - 2(a^2 + b^2)x + a^2 b^2 = 0$

or

Find the roots of  $6x^2 - \sqrt{2}x - 2 = 0$

10. The sum of the 4<sup>th</sup> and 8<sup>th</sup> terms of an A.P. is 24 and the sum of its 6<sup>th</sup> and 10<sup>th</sup> terms is 44 find A.P.
11. In the given fig., all three sides of a triangle touch the circle find the value of y, given AB = 18cm, BD = 10cm, DC = 6 cm, AC = y.

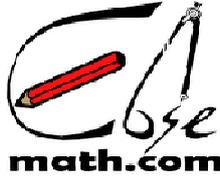


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12. The angle between two tangents to a circle may be  $0^\circ$ . Is it true? Give reason in support of your answer.

or

Prove that the tangents drawn at the end of diameter of a circle are parallel

13. Point P (5, - 3) is one of the two point of trisection of the line segment joining the points A (7, -2) and B(1, - 5) near to A find the coordinates of the other point of trisection.
14. Name the type of triangle formed by the point A (- 5, 6) B (-4, - 2) and C (7, 5)

**Section B 3 Marks Each**

15. Two A.P.'s have the same common difference. The difference between their  $100^{\text{th}}$  terms is 100. What is the difference between their  $10000^{\text{th}}$  terms?
16. Prove that the lengths of two tangents from an external point to circle are equal.

or

The sides of a right triangle are 6cm, 8cm and 10cm. Find the radius of incircle of given triangle.

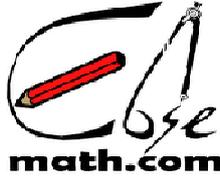
17. Drawn a triangle ABC with side BC=6 cm, AB=5 cm and  $\angle ABC = 75^\circ$ , then construct a triangle whose side are  $2\frac{1}{2}$  times the corresponding sides of  $\triangle ABC$ .
18. If the radii of the circular ends of bucket, which is 21 cm high, are 28cm and 7cm, Find area sheet used to make the bucket
19. Determine the ratio in which the line  $2x + y - 4 = 0$  divides the line segment joining A (2, -2) and B (3, 7). Also find the coordinates of the point.
20. Three consecutive vertices of a parallelogram are (-2, -1), (1, 0) and (4, 3). Find the coordinates of the fourth vertex.
21. Two dice are thrown simultaneously what is the probability that (i) 4 will not come up either time? (ii) 4 will come up at least once?

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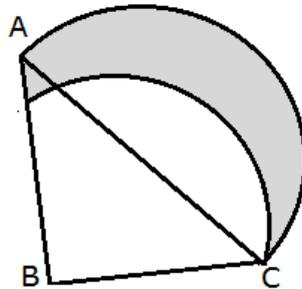
22. Solve for  $x$ :  $\frac{1}{a+b+x} = \frac{1}{x} + \frac{1}{a} + \frac{1}{b}$  ( $a \neq 0, b \neq 0, x \neq 0$ )
23. A card is drawn at random from a well shuffled deck of 52 cards. Find probability that the card is (a) red king or a diamond (b) face card or a red card.
24. If sum of three numbers in A.P. is 21 and their product is 231, find the numbers.

or

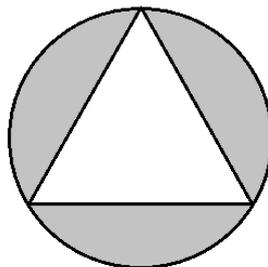
The sum of first 6 terms of A.P. is 42. The ratio of its 19<sup>th</sup> term to its 30<sup>th</sup> term is 1:3. Find the first term and 21<sup>th</sup> term of A.P.

Section D 4 Marks Each

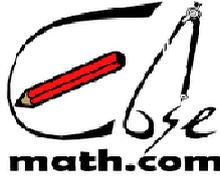
25. ABC is a right triangle, angle B = 90° AB = 28cm and BC = 21cm with AC as diameter a semicircle is drawn and BC as radius a quadrant is drawn find area of shaded region



26. On a circular table cover of radius  $r$ , a design is formed by an inscribed equilateral triangle of side 60cm. Find the area of the region enclosed between circle and equilateral triangle



27. A quadrilateral circumscribes a circle. Prove that the angles subtended at the centre of circle by the opposite sides are supplementary.



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28. A piece of cloth costs Rs. 200. if the piece was 5 meters longer and each meter of cloth costs Rs 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is the original rate per meter?
29. Find the sum of all natural numbers between 100 and 1000 which are multiples of 2 or 3.

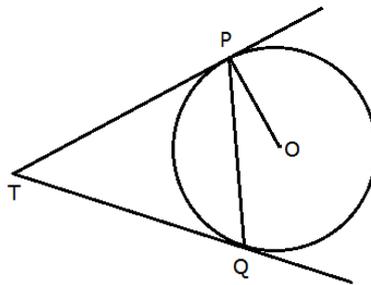
**or**

200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on. In how many rows 200 logs are placed and how many logs are in the top row?

30. The radius of incircle of a triangle is 3 cm and the segments into which one side is divided by the point of contact are 4 cm and 6 cm find the other two sides of the triangle

**or**

Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that  $\angle PTQ = 2 \angle OPQ$



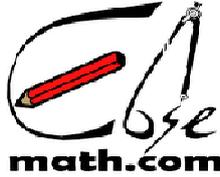
31. A well of diameter 6m and 21m deep is dug the earth, taken out of it has been evenly spread all around it in the shape of a circular ring of width 7m to form an embankment find the height of the embankment.
32. A metallic right circular cone 20 cm high and whose vertical angle is  $60^\circ$  is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter  $\frac{1}{16}$  cm, find the length of the wire.

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33. At a point on the level ground, the angle of elevation of a vertical tower is found to be such that its tangent is  $\frac{5}{12}$ . On walking 192 metres towards the tower the tangent of the angle of elevation is  $\frac{3}{4}$ . Find the height of the tower.
34. A round balloon of radius  $r$  subtends an angle  $\theta$  at the eye of observer while the angle of elevation of its centre is  $\phi$ . Prove that the height of the centre of the balloon is  $r \sin \phi \operatorname{cosec} \frac{\theta}{2}$

**or**

The angles of elevation of the top of a tower from two points at a distance of 4m and 9m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.