POWERMIND COMPLETE KNOWLEDGE CENTER, SEC-10A, GURGAON

"SAHOO BROTHERS"

FOR FURTHUR ANY HELP CONTACT TO 09891042006, E-mail: ranajit1234@rediffmail.com

MATHEMATICS(CODE-041)
CLASS X, SA-II

Time : 3 hours **M.M : 80**

Section – A

Question numbers 1 to 10 carry 1 mark each. For each of the questions 1 – 10, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

1. Which of the following equations has the same roots ?
   a) $x^2 - 6x + 6 = 0$ b) $x^2 + 8x + 16 = 0$ c) $3x^2 + 2x + 6 = 0$ b) $x^2 + 2x + 1 = 0$

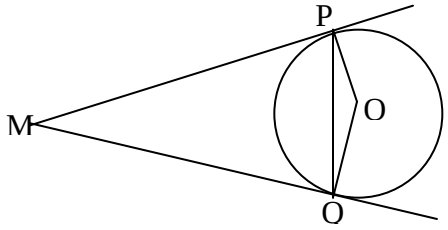
2. If a, a – 2 and 3a are in AP, then the value of a is
   a) – 3 b) -2 c) 3 d) 2

3. A quadrilateral MNOP is drawn to circumscribe a circle. If MN=6cm, ON=7.5cm, OP=7cm, then MP is equal to
   a) 6cm b) 5cm c) 5.5cm d) 6.5cm

4. If the area of quadrant of a circle is 9.625cm2. Find the circumference of circle.
   a) 24cm b)22cm. c) 35cm d) 25cm

5. If TP and TQ are two tangents to a circle with centre O so that <POQ=1100, then <PTQ is equal to :
   a) 60^0 b) 90^0 c) 70^0 d) 80^0

6. Tangents TP and TQ are drawn to a circle with centre O from an external point M. <OPQ= 35^0. Find <PMQ.
   a) 65^0 b) 80^0 c) 70^0 d) 65.5^0



7. The ratio between the volumes of two spheres is 8:27. What is the ratio between their surface areas?
   a) 4:9 b) 5:6 c) 4:5 d) 2:3

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8. The difference between the circumference and radius of a circle is 37cm. The area of the circle is
a) $111cm^2$ b) $184cm^2$ c) $154cm^2$ d) $259cm^2$.

9. The ratio of the height of a man and its shadow is $3 : \sqrt{3}$. The angle of elevation of sun is :
a) 45^0 b) 30^0 c) 60^0 e) 90^0.

10. Find the probability of black or red 10 from well suffled 52 cards.
a) 2/13 b) 2/52 c) 4/52 d) 4/13

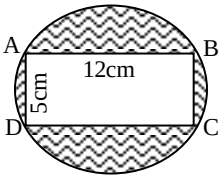
Section – B

Question numbers 11 to 18 carry 2 marks each.

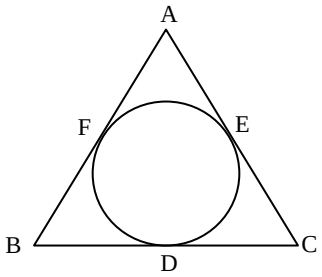
11. Find the roots of the following quadratic equations:
$5x - 35/x = 18$

12. The 10^{th} term of an arithmetic progression(A.P.) is 44 and its 15^{th} term is 64. Find the A.P.

13. Find he area of the shaded region in the given figure. Take Π=3.14.



14. The incircle of triangle ABC touches the sides BC, CA and AB at D, E and F respectively. Prove that AB+BD+CE = AE+CD+BF



15. How many spherical lead shots each having diameter 3cm can be made from a cuboidal lead solid of dimensions 9cm×11cm×12cm.

16. Determine the ratio in which the point P(– 6,a) divides the join of A(- 3 , - 1) and B(- 8,9) . Also find the value of a.

17. Show that the points A(-1,0) , B(3,1) , C(2,2) and D(-2,2) are vertices of parallelogram.

18. A box contains 12 balls out of which x are black. If one ball is drawn at random from the box, what is the probability that it will be a black ball? If 6 more black balls are put in the box, the probability of drawing a black ball is now double of what it was before. Find x.

Or

A coin is tossed three times. Find the probability of getting atmost one head.

Section - C

Questions numbers 19 to 28 carry 3 marks each.

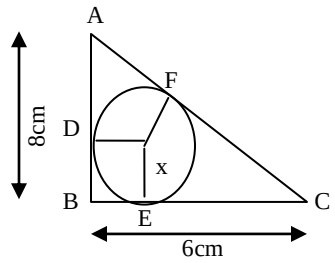
19. If the roots of the equation $(a-b)x^2 + (b-c)x + (c-a)=0$ are equal, prove that $b+c = 2a$.

Or

Find the values of k for which the given equation has real and equal roots.
$(k-12)x^2 + 2(k-12)x + 2 = 0$

20. Find the sum of the integers between 50 and 250 that are divisible by 13.

21. ABC is a right triangle, right angled at B. A circle is inscribed in it. The lengths of the two sides containing the right angle are 6cm and 8cm. Find the radius of the incircle.



22. Draw a circle of radius 3cm. Take two points P and Q on one of its extended diameter each at a distance of 7cm from its centre. Draw tangents to the circle from these two points P and Q.

23. A racetrack is in the form of a ring whose inner and outer circumferences are 437m and 503m respectively. Find the width of the track and also its area.

24. From a solid cylinder whose height is 12cm and diameter 10cm, a conical cavity of same height and same diameter is hollowed out. Find the volume and total surface area of the remaining solid.

Or

A hemispherical depression is cut out from one face of a cubical wooden block such that the diameter 'l' of the hemisphere is equal to the edge of the cube. Determine the surface area of the remaining solid.

25. A person standing on the bank of a river observes that angle of elevation of the top of a tree standing on the opposite bank is 60^0. When he moves 40m away from the bank, he finds the angle of elevation to be 30^0. Find the height of the tree and the width of the river.

26. Find the area of Δ formed by vertices (a, b+c) (b, c+a) and (c, a+b).

27. Prove that (2, -2), (-2,1) and (5,2) are vertices of a right angled triangle. Find the area of the triangle and the length of the hypotenuse.

28. Cards with numbers 5 to 125 are placed in a box. A card is selected at random from the box. Find the probability that the card which is selected has a number which is perfect square.

Section – D

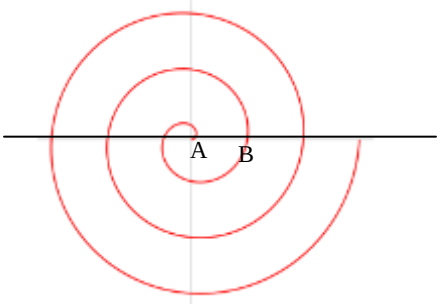
Question numbers 29 to 34 carry 4 marks each.

29. Had Ravinder scored 10 more marks in his mathematics test out of 30 marks, 9 times these marks would have been the square of his actual marks. How many marks did he get in this test?

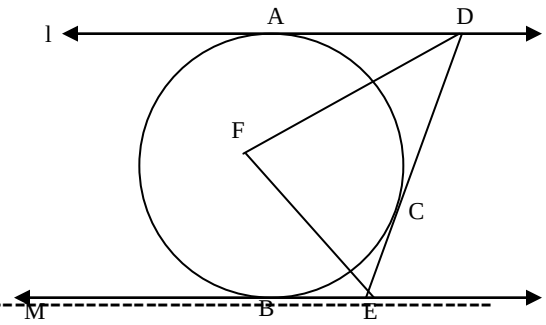
Or

Out of a number of Saras birds, one forth the number are moving about in lotus plants, 1/9 th coupled(along) with ¼ as well as 7 times the square root of the number move ona hill; 56 birds remain in vakula trees. What is the total number of birds.

30. The spiral is made up of successive semi-circles, with centres alternately at A and B, starting with centre at A, of radii 0.5cm, 1.0cm, 2.0cm,…. What is the total length of such a spiral made up of thirteen consecutive semi-cirlces? (π= 22/7)



31. l and m are two parallel tangents at A and B. The tangent at C makes an intercept DE between l and m. Prove that <DFE = 90^0.



32. The height of a cone s 30cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be 1/27 of the volume of the given cone, at what height above the base is the section mode?

33. 21 glass spheres each of radius 2cm are packed in a cuboidal box of internal dimensions 16cm×8cm×8cm and then the box is filled with water. Find the volume of water filled in the box.

34. A man on a cliff observes a boat at an angle of depression of 30^0 which is approaching the shore to the point immediately beneath the observer with a uniform speed. Six minutes later, the angle of depression of the boat is found to be 60^0. Find the time taken by the boat to reach the shore.