Or

BC is the arc of a quadrant of a circle of radius 8 cm with centre O. A semi circle is described on the chord BC on the side opposite to the centre of the quadrant. Find the area encloswd between arc BC and the semicircle.

32. Find the mean and mode of the following distribution.   **6**

Marks (more than or equal to)	No. of students
80	150
90	141
100	124
110	105
120	60
130	27
140	12
150	0

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MATHS 2018

MX27TH

Full Marks - 80
Time : Three hours

Attempt all questions

For Question Nos. 1 to 5, write the letter corresponding to the correct answer. The figures in the right hand margin indicate full marks for the questions.

1. If P(x) is a polynomial of degree ≥ 1 and a is any real number, then x-a is a factor of p(x) if and only if :   **1**
    (A)   P(a) = a
    (B)   P(a) = 1
    (C)   P(a) = 0
    (D)   P(-a) = 0

2. The value of k for which the pair of linear equations x+2y-3=0 and 5x+ky+7= 0 has no solution is :   **1**
    (A)   k = 10
    (B)   k = 6
    (C)   k = 3
    (D)   k = 1

3. If $ax^2+ bx + c = 0$ has equal roots, then c is equal to :   **1**

    (A) $\dfrac{-b}{2a}$

    (B) $\dfrac{b}{2a}$

(C) $\dfrac{-b^2}{4a}$

(D) $\dfrac{b^2}{4a}$

4. $\dfrac{2\tan 30^0}{1-\tan^2 30^0}$ is equal to : **1**

(A) $\tan 60^0$

(B) $\cos 60^0$

(C) $\sin 60^0$

(D) $\cot 60^0$

5. If the probability of an event is p, then the probability of its complement event will be : **1**

(A) $p-1$

(B) $\dfrac{1}{p}-1$

(C) $1-p$

(D) $1-\dfrac{1}{p}$

6. Write down the quadratic equation whose roots are 2 and -3. **1**

7. Write the Arithmetic Progression whose first term is "a" and common difference is "d". **1**

8. State the converse of Pythagoras Theorem. **1**

OR

Find the area of the quadrilateral whose vertices are (1,1),(3,4),(5,-2) and (4,-7) taken in order.

28. If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are in the same ratio, prove that the triangle are similar. **5**

OR

Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

29. Construct a triangle similar triangles to a given Δ ABC with its sides equal to $\dfrac{7}{5}$ of the corresponding sides of the Δ ABC, Write the steps of construction. **5**

30. A girl 1.5m tall is standing at some distance from a 30m high tower. The angle of elevation from her eye to the top of the tower increases from 30^0 to 60^0 as she walks towards the tower. Find the disatance she walked towards the tower. **5**

31. A circus tent of height 15m is in the form of cylinder of diameter 32m and height 3m, surmounted by a cone of the same radius. Find the volume of the tent and cost of the canvas at the rate of Rs 110 per square metre. **6**

20. Factorise : $a(b+c)^2 + b(c+a)^2 + c(a+b)^2 - 3abc$. **3**

21. Solve graphically : **3**

    $2x + 3y = 5$

    $5x - 4y + 22 = 0$

22. A circle touches the side BC of a Δ ABC at P and the sides AB and AC produced at Q and R respectively. Prove that AQ is half the perimeter of Δ ABC. **3**

23. Prove that :

    $\dfrac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \sqrt{\dfrac{1 + \sin\theta}{1 - \sin\theta}}$ **3**

24. A cylindrical boiler of diameter 4.2m has a hemispherical end on one side. If the total length of the boiler is 6.1m, find the total capacity of the boiler. (Take $\pi = \dfrac{22}{7}$) **3**

25. Factorise : $4x^3 - 4x^2 - 7x - 2$ by using Factor theorem. **4**

26. The first term of an A.P. is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference. **4**

27. If a vertex of a triangle be (1,1) and the middle points of the sides through it be (-2,3) and (5,2), find the other vertices. **4**

9. When is a line said to be a tangent to a circle? **1**

10. If $0^0 \le \theta \le 90^0$, write the values of θ for which the relation

    $1 + \cot^2\theta = \cos ec^2\theta$ holds. **1**

11. What is the altitude of the sum when the shadow of a vertical pole is $\sqrt{3}$ times the length of the pole? **1**

12. How long is an arc of a sector of a circle with radius 6 cm and angle 30^0 ? (Take $\pi = 3.14$) **1**

13. Define the sample space of a random experiment. **1**

14. If $a^2 > b^2$, prove that IaI > IbI. **2**

15. Find any four consecutive odd composite numbers less than 300. **2**

16. Without solving, show that the roots of the equation $6x^2 - 13x + 6 = 0$ are reciprocal to one another. **2**

17. Write the next term of the A.P. $\sqrt{8}$, π , $\sqrt{32}$,..................... **2**

18. A letter in English alphabet is chosen at random. Determine the probability that the letter is a consonant. **2**

19. Show that every odd integers is of the form 4k+1 or 4k-1. **3**