# CLASS X
# MATHEMATICS (CODE 041) Standard
# SAMPLE QUESTION PAPER 2019-20

**Time : 3 Hours** **Maximum Marks : 80**

**General Instructions :**

(i) All questions are compulsory.

(ii) The questions paper consists of 40 questions divided into 4 sections A, B, C and D.

(iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.

(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of calculators is not permitted.

---

## SECTION A **(20 × 1)**

**1.** If $n$ is an even natural number, then the largest natural number by which $n(n+1)(n+2)$ is divisible, is[1]

(a) 6 (b) 8

(c) 12 (d) 24

**2.** If one root of the quadratic equation $ax^2+bx+c=0$ is the reciprocal of the other, then [1]

(a) $b=c$ (b) $a=b$

(c) $ac=1$ (d) $a=c$

**3.** In a circle of radius 14 cm, an arc subtends an angle of 45° at the centre, then the area of the sector is: [1]

(a) $71\,\text{cm}^2$ (b) $76\,\text{cm}^2$

(c) $77\,\text{cm}^2$ (d) $154\,\text{cm}^2$

**4.** An hexagonal pyramid is 20 m high. Side of the base is 5 m. The volume of the pyramid is [1]

(a) $250\sqrt{3}\ \text{m}^3$ (b) $250\,\text{m}^3$

(c) $25\sqrt{3}\ \text{m}^3$ (d) $25\,\text{m}^3$

**5.** In an $AP$, if $a=3.5$, $d=0$ and $n=101$, then $a_n$ will be [1]

(a) 0 (b) 3.5

(c) 103.5 (d) 104.5

**6.** Sides of two similar triangles are in the ratio 4:9. Areas of these triangles are in the ratio. [1]

(a) 2:3 (b) 4:9

(c) 81:16 (d) 16:81

**7.** The centroid of the triangle whose vertices are $(3,-7)$,$(-8,6)$ and (5, 10) is [1]

(a) (0, 9) (b) (0, 3)

(c) (1, 3) (d) (3, 5)

**8.** If $b\tan\theta=a$, the value of $\frac{a\sin\theta-b\cos\theta}{a\sin\theta+b\cos\theta}$ is [1]

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

(c) $\frac{a^2+b^2}{a^2-b^2}$ (d) $\frac{a^2-b^2}{a^2+b^2}$

**9.** If every positive even integer is of the form $2q$, then every positive odd integer is of the form ....., where $q$ is

some integer. [1]

**10.** The highest power of a variable in a polynomial is called its ..... . [1]

**11.** (a) $\sqrt{2}\,x+\sqrt{3}\,y=0,\ \sqrt{3}\,x-\sqrt{8}\,y=0$ has no solution.
(b)If a pair of linear equations is given by $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ and $\frac{a_1}{a_2}\neq\frac{b_1}{b_2}$. In this case, the pair of linear equations is consistent. [1]

**12.** Column-II give roots of quadratic equations given in Column-I. [1]

| | **Column-I** | | **Column-II** |
|---|---|---|---|
| (A) | $6x^2+x-12=0$ | (p) | $(-6,4)$ |
| (B) | $8x^2+16x+10=202$ | (q) | $(9,36)$ |
| (C) | $x^2-45x+324=0$ | (r) | $(3,-1/2)$ |
| (D) | $2x^2-5x-3=0$ | (s) | $(-3/2,4/3)$ |

**13.** **Assertion :** Total surface area of the cylinder having radius of the base 14 cm and height 30 cm is $3872\,\text{cm}^2$.
**Reason :** If $r$ be the radius and $h$ be the height of the cylinder, then total surface area $=(2\pi rh+2\pi r^2)$. [1]
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

**14.** **Assertion :** If a box contains 5 white, 2 red and 4 black marbles, then the probability of not drawing a white marble from the box is $\frac{5}{11}$.
**Reason :** $P(\overline{E})=1-P(E)$, where $E$ is any evnet.[1]
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

**15.** If $A+B=90^\circ$ and $\sec A=\frac{2}{3}$, then find the value of $\operatorname{cosec} B$. [1]

or

Find the value of $\sin^2 41^\circ+\sin^2 49^\circ$

**16.** A pole casts a shadow of length $2\sqrt{3}$ m on the ground, when the Sun's elevation is $60^\circ$. Find the height of the pole. [1]

**17.** What is the area of the largest square that can be inscribed in a circle of radius 12 cm. ? [1]

**18.** The radius of sphere is $r$ cm. It is divided into two equal parts. Find the whole surface of two parts. [1]

or

Three solid metallic spherical balls of radii 3 cm, 4 cm and 5 cm are melted into a single spherical ball, find its radius. [1]

**19.** From the following frequency distribution, find the median class : [1]

| Cost of living index | 1400-1550 | 1550-1700 | 1700-1850 | 1850-2000 |
|---|---|---|---|---|
| Number of weeks | 8 | 15 | 21 | 8 |

**20.** A card is drawn at random from a well shuffled pack of 52 cards. Find the probability ol getting neither a red card nor a queen. [1]

## SECTION B (6 × 2)

**21.** Given the linear equation $3x+4y=9$. Write another linear equation in these two variables such that the geometrbical representation of the pair so formed is: [2]

i. intersecting lines
ii. coincident lines.

**22.** The x-coordinate of a point $P$ is twice its y-coordinate. If $P$ is equidistant from $Q(2,-5)$ and $R(-3,6)$, find the co-ordinates of $P$. [2]

or

Show that the points $A(0,1), B(2,3)$ and $C(3,4)$ are collinear.

**23.** In an equilateral triangle of side $3\sqrt{3}$ cm find the length of the altitude. [2]

**24.** A cylinder and a cone have base radii 5 cm and 3 cm respectively and their respective heights are 4 cm and 8 cm. Find the ratio of their volumes. [2]

or

A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel?

**25.** The data regarding marks obtained by 48 students of a class in a class test is given below. Calculate the modal marks of students. [2]

| Marks obtained | Number of students |
|---|---|
| 0-5 | 1 |
| 5-10 | 0 |
| 10-15 | 2 |
| 15-20 | 0 |
| 20-25 | 0 |
| 25-30 | 10 |
| 30-35 | 25 |
| 35-40 | 7 |
| 40-45 | 2 |
| 45-50 | 1 |

or

Given below is a frequency distribution table showing daily income of 100 workers of a factory :

| Daily income of workers (in Rs) | 200-300 | 300-400 | 400-500 | 500-600 | 600-700 |
|---|---|---|---|---|---|
| Number of workers | 12 | 18 | 35 | 20 | 15 |

Convert this table to a cumulative frequency distribution table of 'more than type'. [2]

**26.** Two different dice are tossed together Find the probability. [2]

i. that the number on each die is even.
ii. that the sum of numbers appearing on the two dice is 5.

## SECTION C (8 × 3)

**27.** Verify whether 2, 3 and $\frac{1}{2}$ are the zeroes of the polynomial $p(x)=2x^3-11x^2+17x-6$. [3]

or

What should be added to $x^3+5x^2+7x+3$ so that it is completely divisible by $x^2+2x$. [3]

**28.** Which of the following pairs of linear equations are consistent/inconsistent ? If consistent, obtain the solution graphically. [3]

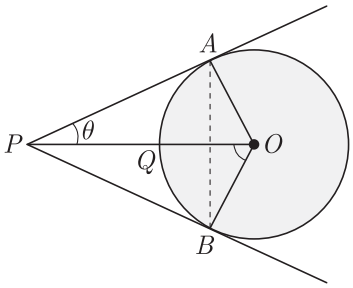
**29.** If $7^{th}$ term of an A.P. is $\frac{1}{9}$ and $9^{th}$ term is $\frac{1}{7}$, find $63^{rd}$ term. [3]

**30.** If the co-ordinates of points $A$ and $B$ are $(-2,-2)$ and $(2,-4)$ respectively, find the co-ordinates of $P$ such that $AP=\frac{3}{7}AB$, where $P$ lies on the line segment $AB$. [3]

or

Find the area of a triangle $ABC$ with $A(1,-4)$ and mid-points of sides through $A$ being $(2,-1)$ and $(0,-1)$.[3]

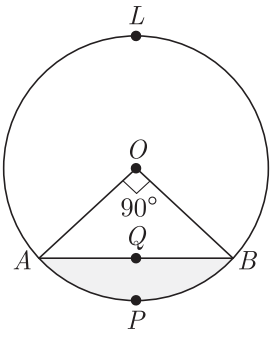
**31.** In the given figure, $OP$ is equal to the diameter of a circle with center $O$ and $PA$ and $PB$ are tangents. Prove that $ABP$ is an equilateral triangle. [3]




**32.** If in a triangle $ABC$ right angled at $B, AB=6$ units and $BC=8$ units, then find the value of $\sin A.\cos C+\cos A.\sin C$. [3]

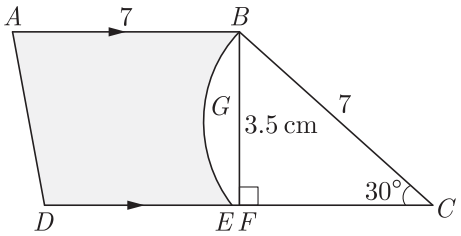
**33.** An aeroplane, when flying at a height of 4000 m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are $60^{o}$ and $45^{o}$ respectively. Find the vertical distance between the aeroplanes at that instant. (Use $\sqrt{3}=1.73$) [3]

**34.** In the even figure, a chord $AB$ of the circle with centre $O$ and radius 10 cm, that subtends a right angle at the centre of the circle. Find the area of the minor segment $AQBP$. Hence find the area of major segment $ALBQA$. (Use $\pi=3.14$) [3]




or

Adjoining fig, $ABCD$ is a trapezium with $AB \parallel DC$ and $\angle BCD=30^{\circ}$. Fig. $BGEC$ is a sector of a circle with centre $C$ and $AB=BC=7$ cm, $DE=4$ cm and $BF=3.5$ cm, then find the the area of the shaded region. $\left(\text{Use } \pi=\frac{22}{7}\right)$ [3]



## SECTION D $(6 \times 4)$

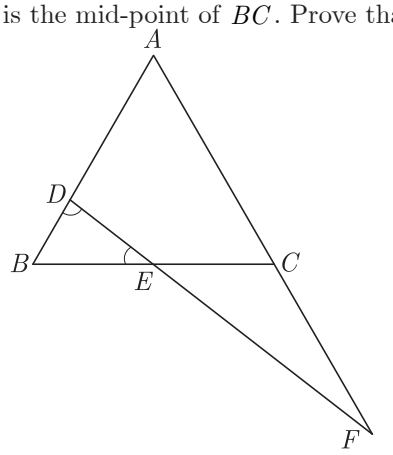
**35.** Show that the square of any positive integer is of the forms $4m$ or $4m+1$, where $m$ is any integer. [5]

or

Prove that $\sqrt{3}$ is an irrational number. Hence, show that $7+2\sqrt{3}$ is also an irrational number. [5]

**36.** Solve for $x$ : $\frac{3}{x+1}+\frac{4}{x-1}=\frac{29}{4x-1}; x=, -1, \frac{1}{4}$ [5]

**37.** In the figure, $\angle BED = \angle BDE$ and $E$ is the mid-point of $BC$. Prove that $\frac{AF}{CF}=\frac{AD}{BE}$. [5]




**38.** Draw two concentric circles of radii 3 cm and 5 cm. Taking a point on the outer circle, construct the pair of tangents to the inner circle. [5]

or

Construct a triangle $ABC$ with $BC=7\,\text{cm}$, $\angle B=60^\circ$ and $AB=6\,\text{cm}$. Construct another triangle whose sides are $\frac{3}{4}$ times of the corresponding sides of $\Delta ABC$.. [5]

**39.** If $15\tan^2\theta+4\sec^2\theta=23$, then find the value of $(\sec\theta+\text{cosec}\,\theta)^2-\sin^2\theta$. [5]

or

Prove that: $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}}+\sqrt{\frac{1-\sin\theta}{1+\sin\theta}}=2\sec\theta$. [5]

**40.** On annual day of a school, 400 students participated in the function. frequency distribution showing their ages is as shown in the following table:

| Ages (in years) | 05-07 | 07-09 | 09-11 | 11-13 | 13-15 | 15-17 | 17-19 |
|---|---|---|---|---|---|---|---|
| Number of students | 70 | 120 | 32 | 100 | 45 | 28 | 5 |

Find mean and median of the above data. [5]