Sample Paper 2
Mathematics
Class 10

Time: 3 Hours   **MM: 80**

General Instructions

1. This question paper contains 4 printed pages.
2. This question paper consists of 30 questions in all. All questions are compulsory.
3. This question paper consists of four sections. Section – A carries 1 mark each, Section – B carry 2 marks each, Section – C carry 3 marks each and Section – D carry 4 marks each.

(Section – A)

Q 1: Decompose 32760 into prime factors.

Q 2: Divide $24x^2y^2 - 4xy$ by $2xy$.

Q 3: α and $\frac{1}{\alpha}$ are zeroes of polynomial $4x^2 - 2x + k + 7$. Find the value of k.

Q 4: A polygon of n sides has $\frac{n(n-3)}{2}$ diagonals. If a polygon has 9 diagonals, find the number of sides of the polygon.

Q 5: Simplify:

$$(1 + tan^2\theta)(1 - \sin\theta)(1 + \sin\theta)$$

Q 6: If ΔABC ~ ΔPQR ar(ΔABC) = 16 cm^2 and ar(ΔPQR) = 81 cm^2, AB = 2 cm find PQ.

(Section – B)

Q 7: Find the ratio in which the line segment joining the points A (3, −6) and B (5, 3) is divided by x-axis.

Q 8: Find HCF of 455 and 84 by Euclid's division lemma.

Q 9: Find the probability of getting a number less than 5 in a single throw of a dice.

Q 10: Construct a more than cumulative frequency distribution table:

C.I	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100	100 – 110
F	13	15	17	21	23	19

Q 11: If the 21st term of an A.P. is 25, find the sum of its first 41 terms.

Q 12: Three vertices of a parallelogram taken in order are (1, 2), (2, 4) and (3, 7). Find its fourth vertex.

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(Section – C)

Q 13: If A = 30°, verify that:

$$\cos 2A = \frac{1 - tan^2 A}{1 + tan^2 A}$$

OR

If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, show that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$.

Q 14: If ABCD is a rhombus, then prove that $4AB^2 = AC^2 + BD^2$.

Q 15: From a pack of 52 playing cards, jacks, queens, kings and aces of red colour are removed. From the remaining a card is drawn at random. Find the probability that the card drawn is (i) a black queen (ii) a red card (iii) a black jack (iv) a picture card (jacks, queens and kings are picture cards)

Q 16: Using fundamental theorem of arithmetic, find the HFC and LCM of 306 and 657. Also verify that HCF × LCM = Product of numbers.

Q 17: On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$, respectively. Find $g(x)$.

Q 18: Solve the following system of linear equations graphically:
$2x + y + 6 = 0, 3x - 2y - 12 = 0$

Also find the vertices of the vertices of the triangle formed by the lines representing the above equations and $x -$ axis.

OR

Two places A and B are 120 km apart from each other on highway. A car starts from A and another from B at the same time. If they move in the same direction, they meet in 6 hours and if they move in opposite directions, they meet in 1 hour and 12 minutes. Find the speed of cars.

Q 19: Find the sum of the first 25 terms of an A.P. whose n^{th} term is given by $t_n = 7 - 3n$.

OR

Which term of the Arithmetic Progression 3, 10, 17 … will be 84 more than its 13th term?

Q 20: Prove that the points $(1, -1)$, $\left(-\frac{1}{2}, \frac{1}{2}\right)$ and $(1, 2)$ are the vertices of an isosceles triangle.

Q 21: If the distances of P(x, y) from A(5, 1) and B(-1, 5) are equal, prove that $3x = 2y$.

OR

Find the distance of the point (1, 2) from the mid-point of the line segment joining the points (6, 8) and (2, 4).

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Q 22: In the given figure, a circle touches the side BC of ΔABC at P and touches AB and AC produced at Q and R respectively. If AQ = 5 cm, find the perimeter of ΔABC.
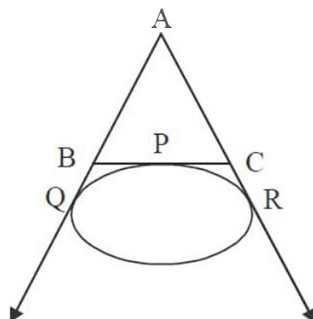
(Section – D)

Q 23: Construct a circle of radius 3 cm. Take a point P on it. Construct a tangent to circle at P without using the centre of the circle.

Q 24: Prove:

$$\frac{\tan A}{(1 + tan^2 A)^2} + \frac{cot}{(1 + cot^2 A)^2} = \sin A \cos A$$

Q 25: A cone of radius 10 cm is divided into two parts by a plane parallel to its base through the mid-point of its height. Compare the volumes of the two parts.

Q 26: A train covered a certain distance at a uniform speed. If the train would have been 6 km/hr faster, it would have taken 4 hours less than the scheduled time and if the train was slower by 6 km/hr, it would have taken 6 hours more than the scheduled time. Find the length of the journey.

Q 27: The angle of elevation of a jet plane from a point A on the ground is 60°. After a flight of 15 seconds the angle of elevation changes to 30°. If the jet plane is flying at a constant height of $1500\sqrt{3}\ m$ find the speed of the jet plane.

Q 28: Prove that the ratio of the areas of similar triangles is equal to the ratio of the squares on the corresponding sides.

Using the above result, find the ratio of the areas of ΔADC and ΔABC when ABC is right-angled triangle at A with AD ⊥ BC, BC = 12 cm and AC = 5 cm.

OR

In a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

From the above theorem, ABC is a triangle, right angled at C and AC = $\sqrt{3}$ BC. Prove that $\angle ABC = 60°$.

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Q 29: A toy is in the form of a cone mounted on a hemisphere of radius 3.5 cm. If the total height of the toy is 15.5 cm. If the total height of the toy is 15.5 cm, find its total surface area and volume of the toy. (Use $\pi = 22/7$)

OR

A well, of diameter 3m, is dug 14 m deep. The earth taken out of it has been spread evenly all around it to a width of 4m, to form an embankment. Find the height of the embankment. (Use $\pi = 22/7$)

Q 30: The following distribution gives the daily income of 50 workers of a factory.

Daily Income (in ₹)	Number of Workers
100 – 120	12
120 – 140	14
140 – 160	8
160 – 180	6
180 – 200	10

Convert the distribution above to a less than type cumulative frequency distribution, and draw its ogive.

Answers

1. 2^3 x 3^2 x 5 x 7 x 13   2. $12xy - 2$ 3. $k = -3$ 4. Number of sides $= 6$

6. PQ $= \frac{9}{2}$

Section B

7. $2:1$ 8. HCF $= 7$ 9. $\frac{2}{}$ 11. 1025

12. $(2, 5)$

Section C

15. $\frac{1}{22}, \frac{9}{22}, \frac{1}{22}, \frac{3}{22}$ 16. 9, 22338   17. $x^2 - x + 1$ 18. $(-3, 0), (9, -6),$

$(4, 0)$ **OR** 60 km/h, 40 km/h   19. -800 **OR** 25th term

21. OR 5   22. 10 cm

Section D

25. $1:14$ 26. 720   27. 720 km/h

29. TSA $= 214.5$ cm^2, Volume $= 243.83$ cm^3 OR   Height $= 1.125$ m

All answers are done properly, if still there is any error, please inform us for corrections. Thanks.

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