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SAMPLE PAPER 01 FOR HALF YEARLY EXAM (2017-18)

SUBJECT: MATHEMATICS   **MAX. MARKS : 80**

CLASS : X   **DURATION : 3 HRS**

General Instructions:
(i). **All** questions are compulsory.
(ii). This question paper contains **30** questions divided into four Sections A, B, C and D.
(iii).   **Section A** comprises of 6 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 10 questions of **3 marks** each and **Section D** comprises of 8 questions of **4 marks** each.
(iv).   Use of Calculators is not permitted

SECTION – A

1. If the sum of the zeroes of the polynomial $f(x) = 2x^3 - 3kx^2 + 4x - 5$ is 6, then find the value value of k.

2. State Euclid's division lemma

3. Find he value of k for which the system of equations $x - 2y = 3$ and $3x + ky = 1$ has a unique solution.

4. If $\Delta ABC \sim \Delta PQR$, BC = 8 cm and QR = 6 cm, find the ratio of the areas of Δ ABC and Δ PQR.

5. If 2x, x + 10, 3x + 2 are in A.P., find the value of x.

6. If $\sin A = \dfrac{1}{2}$, find the value of $\dfrac{2\sec A}{1 + \tan^2 A}$.

SECTION – B

7. Using Euclid's division algorithm, find the HCF of 2160 and 3520.

8. If $\sec A + \tan A = m$ and $\sec A - \tan A = n$, find the value of $\sqrt{mn}$.

9. If A and B are angles of right angled triangle ABC, right angled at C, prove that
$\sin^2 A + \sin^2 B = 1$

10. Find the zeroes of the quadratic polynomial $5t^2 + 12t + 7$ and verify the relationship between the zeroes and the coefficients.

11. Find the value of k if the points A(2, 3), B(4, k) and C(6, –3) are collinear.

12. Find the roots of $\dfrac{1}{x} - \dfrac{1}{x-2} = 3, x \neq 0, 2$

SECTION – C

13. Find the quotient and remainder when $4x^3 + 2x^2 + 5x - 6$ is divided by $2x^2 + 3x + 1$.

14. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$.

15. Prove that $\sqrt{5}$ is an irrational number.

16. Show that the square of an odd positive integer can be of the form $6q + 1$ or $6q + 3$ for some integer q.

17. If $(1, 2)$, $(4, y)$, $(x, 6)$ and $(3, 5)$ are the vertices of a parallelogram taken in order, find x and y.

18. Find the ratio in which the line segment joining the points $(-3, 10)$ and $(6, -8)$ is divided by $(-1, 6)$.

19. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20th term.

20. Find the roots of the equation $5x^2 - 6x - 2 = 0$, by method of competing the square.

21. Prove that: $\dfrac{1}{\cos ecA - \cot A} - \dfrac{1}{\sin A} = \dfrac{1}{\sin A} - \dfrac{1}{\cos ecA + \cot A}$.

22. In the below figure, the line segment XY is parallel to side AC of Δ ABC and it divides the triangle into two parts of equal areas. Find the ratio $\dfrac{AX}{AB}$.
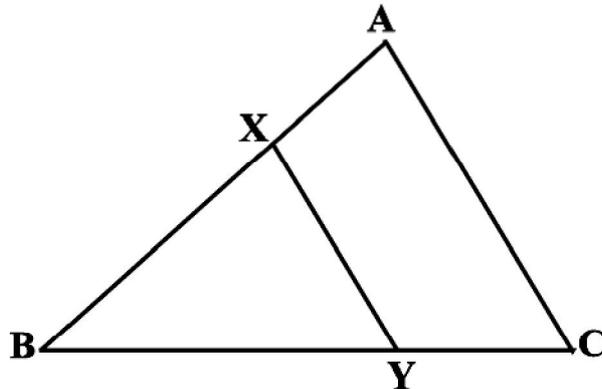
SECTION – D

23. Prove that "The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides."

24. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that Δ ABC $\sim$ Δ PQR.
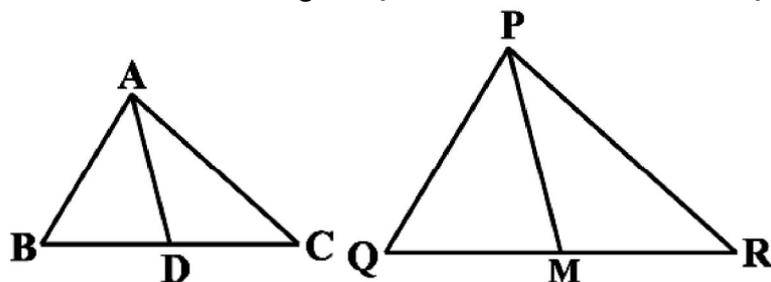
25. Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars? While driving, the driver should maintain the speed limit as allowed. Comment