Roll Number		

SET NO. 1

INDIAN SCHOOL MUSCAT
MID TERM EXAMINATION
MATHEMATICS

CLASS: X | Sub. Code: 041 | Time Allotted: 3 Hrs

10.05.2018 | Max. Marks: 80

General Instructions:

(i) *All questions are compulsory.*

(ii) *The question paper consists of 30 questions divided into four sections A, B, C and D.*

(iii) *Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.*

(iv) *There is no overall choice. However, an internal choice has been provided in four 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 (6 x 1 = 6 marks)
(Question numbers 1 to 6 carry 1 mark each)

1. State whether the pair of linear equations y = 0 and y = - 5 has no solution, unique solution or infinitely many solutions.

2. Comment on the nature of the graph of the following pair of linear equations without actually drawing the graphs: $x = 2y \; and \; y = 2x$.

3. Is the sequence $\sqrt{3},\ \sqrt{6},\ \sqrt{9}, \sqrt{12}$ ... an A.P? Give reason.

4. The perimeters of two similar triangles are 25 cm and 15 cm respectively. If one side of the first triangle is 9 cm, find the corresponding side of the second triangle.

5. If $18, a, b, -3$ are in A.P., then find $a + b$.

6. In **fig.1**, find x if $AB||MN$.

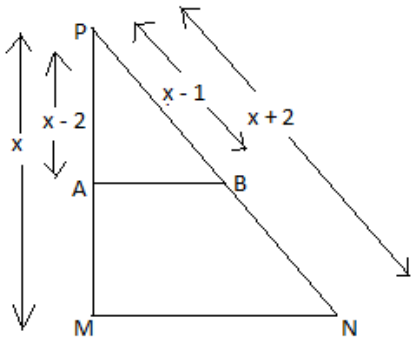

Fig. 1

SECTION B (6 x 2 = 12 marks)
(Question numbers 7 to 12 carry 2 marks each)

7. For what values of *k* will the following pair of linear equations have infinitely many solutions?
$kx + 3y - (k - 3) = 0$ and $12x + ky - k = 0$?

8. Find, if 100 is a term of the A.P. 25, 28, 31,... or not.

9. D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB.CD$.

10. In **fig. 2**, DE || OQ and DF || OR. Show that EF || QR.

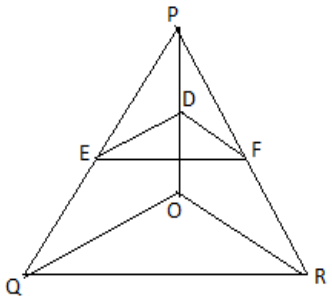

Fig. 2

11. The 17th term of an AP exceeds its 10th term by 7. Find the common difference.

12. ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2AC^2$.

SECTION C (10 x 3 = 30 marks)
(Question numbers 13 to 22 carry 3 marks each)

13. Solve the pair of linear equations: $\frac{x}{a} - \frac{y}{b} = 0$ and $ax + by = a^2 + b^2$.

(OR)

Ritu can row downstream 20 km in 2 hours, and upstream 4 km in 2 hours. Find her speed of rowing in still water and the speed of the current.

14. Solve for $x \; and \; y$: $99x + 101y = 499 \; and \; 101x + 99y = 501$.

15. A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.

16. The 8^{th} term of an A.P. is zero. Prove that its 38^{th} term is triple of its 18^{th} term.

(OR)

If the 3rd and the 9th terms of an AP are 4 and – 8 respectively, which term of this AP is zero?

17. Which term of the AP: 121, 117, 113, . . , is its first negative term?

18. Find the sum of :
    (i) the first 1000 positive integers
    (ii) the first *n* positive integers.

19. In **fig. 3**, $AB||CD||PQ$, $AB = x\ units, CD = y\ units\ and\ PQ = z\ units$. Prove that $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$.

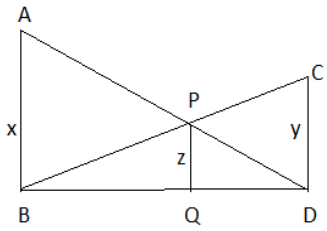

Fig. 3

(OR)

In Δ ABC, AD is perpendicular BC. AD^2 = BD x DC. Prove that Δ ABC is a right angled triangle.

20. In **fig. 4**, $PQ||BC\ and\ CP||QR$, prove that $PA^2 = AR \times AB$.

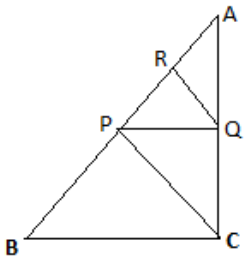

Fig. 4

21. In right triangle ΔACB, ∠ACB = 90° and CD ⊥ AB. Prove that $\frac{BC^2}{AC^2} = \frac{BD}{AD}$.

(OR)

An aeroplane leaves an airport and flies due north at a speed of 1000 km per hour. At the same time, another aeroplane leaves the same airport and flies due west at a speed of 1200 km per hour. How far apart will be the two planes after $1\frac{1}{2}$ hours?

22. If the sum of first n terms of an A.P. is given by $S_n = 3n^2 + 4n$. Determine the A.P. and the nth term

SECTION D (8 x 4 = 32 marks)
(Question numbers 23 to 30 carry 4 marks each)

23. Check whether the pair of equations $x + 3y = 6$ and $2x - 3y = 12$ is consistent. If so, solve them graphically.

24. The ratio of incomes of two persons is 9 : 7 and the ratio of their expenditures is 4 : 3. If each of them manages to save ₹ 2000 per month, find their monthly incomes.

(OR)

Solve the following pair of equations algebraically: $3x - y = 3$ and $9x - 3y = 9$

25. Solve the pair of equations by reducing them to a pair of linear equations:
$\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$ and $\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$

26. In a garden bed, there are 23 rose plants in the first row, 21 in the 2nd row, 19 in the 3rd row and so on. There are 5 plants in the last row. How many rows are there of rose plants? Also find the total number of rose plants in the garden.

27. The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle.

28. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

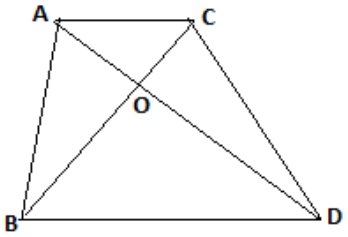

Fig. 5

(OR)

In **fig. 5**, ABC and DBC are two triangles on the same base BC. If AD intersects BC at O, show that $\frac{ar(\Delta ABC)}{ar(\Delta DBC)} = \frac{AO}{DO}$.

29. In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class in which they are studying. e.g., a section of Class I will plant 1 tree, a section of Class II will plant 2 trees and so on till Class XII. There are three sections of each class.

(i) How many trees will be planted by the students?

(ii) Which **value** is depicted in this problem?

(OR)

How many terms of the A.P. $-15, -13, -11, \ldots$ are needed to make the sum -55? Explain the reason for the double answer.

30. Prove that in a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.

End of the Question Paper