First Mid Term Test
X - MATHS.

By A. Babiak
9750493961

I. Choose: 20:

1 → a
2 - a
3 → d
4 → a
5 - b
6 - b
7 - d
8 - b
9 - c

$\sqrt{\frac{x^2}{y^2} - \frac{10x}{y} + 27 - \frac{10y}{x} + \frac{y^2}{x^2}} = \left|\frac{x}{y} - 5 + \frac{y}{x}\right|$

II. Graph
a) Solution $= \{-\frac{3}{2}, 2\}$

b) similar triangle.

III. 5 marks

15. $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$
$B = \{2, 3, 4, 5, 6, 7\}$
$C = \{2\}$
$B - C = \{3, 5, 7\}$
$A \times (B - C) = \{(1,3), (1,5), (1,7), (2,3), (2,5), (2,7), (3,3), (3,5), (3,7), (4,3), (4,5), (4,7), (5,3), (5,5), (5,7), (6,3), (6,5), (6,7), (7,3), (7,5), (7,7)\}$ → (1)

$A \times B =$
$A \times C =$
$(A \times B) - (A \times C) =$ → (2)
$\therefore A \times (B - C) = (A \times B) - (A \times C)$

II. 2 marks

10. Domain $= \{0, 1, 2, 3, 4, 5\}$
Range $= \{3, 4, 5, 6, 7, 8\}$

11. i) $f: A \to A$, $f(x) = x \ \forall \ x \in A$ is called an identity function

ii) $f: A \to B$, $f(x) = a \ \forall \ x \in A$, $a \in B$. is called a constant function.

12. $5(x) \equiv 4 \pmod 6$

$5 \times 1 = 5$
$5 \times 2 = 10$

$\therefore x = 2, 8, 14, 20 \ldots$

13. $x^3 - 27 = (x-3)(x^2+3x+9)$
$(x-3)^2 = (x-3)^2$
$x^2 - 9 = (x+3)(x-3)$
LCM $= (x-3)^2(x+3)(x^2+3x+9)$
(or)
$(x+3)(x-3)(x^3-27)$.
(or)
$(x^2-9)(x^3-27)$.

14. $\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \frac{2^2}{4^2}$
Area of $\Delta DEF = \frac{16}{4} \times 54$
$= 96 \text{ cm}^2$

16. $(fog)oh$ LHS
$goh = 1 - 6x$
$fo(goh) = 2 - 12x + 3 = 5 - 12x$ → (1)
RHS $(fog)oh$
$(fog) = 2 - 4x + 3 = 5 - 4x$
$(fog)oh = 5 - 4(3x) = 5 - 12x$ → (2)
$\therefore fo(goh) = (fog)oh$

17. a-d, a, a+d
Sum $\Rightarrow 3a = 27$ $(a = 9)$
$9^2 - d^2 = \frac{288}{9} 32$
$-d^2 = -49$
$d = \pm 7$
The three terms are 16, 9, 2 (or) 2, 9, 16.

18. $10^2 + 11^2 \ldots 24^2 = (1^2 + 2^2 \ldots 24^2) - (1^2 + 2^2 \ldots 9^2)$
$= 4900 - 285$
$= 4615 \text{ cm}^2$.

19. $4x - 3y + z = 0$ → (1)
$x + 3y - 2z = 0$ → (2)
$x + y + z = 27$ → (3)
Solve (1) & (2) $5x - z = 0$
Solve (2) & (3) $-2x - 5z = -81$
$\therefore 27x = 81$
$x = 3$
$\therefore$ The system has unique solution.

T

FIRST MID TERM TEST - JULY - 2019

STANDARD - X

MATHEMATICS

TIME: 1.30 hours **MARKS - 50**

SECTION - I

Note: (i) Answer All the questions.

I. (ii) Choose the correct answer from the given four alternatives. **9 × 1 = 9**

1. $f : R \to R$ defined by $f(x) = x$ is called
   (a) Constant function (b) Identity function
   (c) Inverse function (d) Reciprocal function

2. Composition of function is associative
   (a) Always true (b) Never true
   (c) Sometimes true

3. $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is
   (a) linear (b) cubic (c) reciprocal (d) quadratic

4. $7^{4k} \equiv$ —— (mod100)
   (a) 1 (b) 2 (c) 3 (d) 4

5. If the HCF of 65 and 117 is expressible in the form of 65m – 117, then the value of m is
   (a) 4 (b) 2 (c) 1 (d) 3

6. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots\ldots\ldots\ldots$ is
   (a) $\frac{1}{24}$ (b) $\frac{1}{27}$ (c) $\frac{2}{3}$ (d) $\frac{1}{81}$

7. A system of three linear equations in three variables is inconsistent if their planes
   (a) intersect only at a point
   (b) intersect in a line
   (c) coincides with each other
   (d) do not intersect

8. Which of the following should be added to make $x^4 + 64$ a perfect square
   (a) $4x^2$ (b) $16x^2$ (c) $8x^2$ (d) $-8x^2$

9. If in triangles ABC and EDF, $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar, when
   (a) $\angle B = \angle E$ (b) $\angle A = \angle D$ (c) $\angle B = \angle D$ (d) $\angle A = \angle F$

SECTION - II

Note: (i) Answer ANY FOUR questions only.

II. (ii) Each question carries TWO marks. **4 × 2 = 8**

10. A Relation R is given by the set $\{(x, y) / y = x+3, x \in \{0,1,2,3,4,5\}$. Determine its domain and Range.
11. Define:
    (i) Identity function
    (ii) Constant function
12. Solve: $5x \equiv 4 \pmod 6$
13. Find the LCM of $x^3 - 27, (x-3)^2, x^2 - 9$.
14. If Δ ABC is similar to Δ DEF such that BC = 3 cm, EF = 4 cm and the area of Δ ABC = 54 cm^2. Find the area of Δ DEF.

SECTION - III

Note: (i) Answer ANY FIVE questions only.

III. (ii) Each carries FIVE marks. **5 × 5 = 25**

15. Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime number verify that
    $A \times (B - C) = (A \times B) - (A \times C)$
16. If $f(x) = 2x + 3$, $g(x) = 1 - 2x$ and $h(x) = 3x$. Prove that $fo(goh) = (fog)oh$.
17. The sum of three consecutive terms that are in A.P is 27 and their product is 288, find the three terms.
18. Rani has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm, ... 24 cm. How much area can be decorated with these colour papers?
19. Discuss the nature of solutions of the following system of equations.
    $\frac{y+z}{4} = \frac{z+x}{3} = \frac{x+y}{2}$; $x + y + z = 27$
20. Find the square root of the expression $\frac{x^2}{y^2} - \frac{10x}{y} + 27 - \frac{10y}{x} + \frac{y^2}{x^2}$.

SECTION - IV

IV. Note: Answer the following: **1 × 8 = 8**

21. (a) Draw the graph of $y = 2x^2$ and hence solve $2x^2 - x - 6 = 0$.

    (OR)

    (b) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{2}{3}$ of the corresponding hides of the triangle PQR. $\left(\text{Scale factor } \frac{2}{3}\right)$