Way to Success

10th

Maths

STUDY MATERIAL

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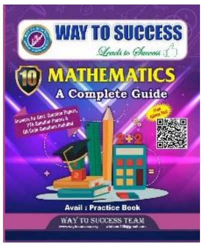
<td>
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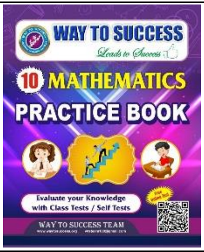
<td>
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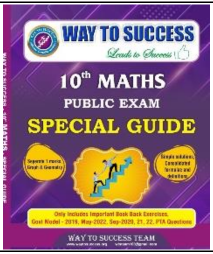
<td>
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PART – I – 1 Mark Questions

1. Relations and Functions

Text Book Questions

1. If $n(A \times B) = 6$ and $A = \{1,3\}$ then $n(B)$ is SEP-21
(A) 1 (B) 2 **(C) 3** (D) 6

2. $A = \{a, b, p\}, B = \{2,3\}, C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is PTA-3
(A) 8 (B) 20 **(C) 12** (D) 16

3. If $A = \{1,2\}, B = \{1,2,3,4\}, C = \{5,6\}$ and $D = \{5,6,7,8\}$ then state which of the following statement is true SEP-20
(A) $(\boldsymbol{A} \times \boldsymbol{C}) \subset (\boldsymbol{B} \times \boldsymbol{D})$ (B) $(B \times D) \subset (A \times C)$
(C) $(A \times B) \subset (A \times D)$ (D) $(D \times A) \subset (B \times A)$

4. If there are 1024 relations from a set $A = \{1,2,3,4,5\}$ to a set B, then the number of element in B is
(A) 3 **(B) 2** (C) 4 (D) 8 PTA-2, JUL-22

5. The range of the relations $R = \{(x, x^2) | x \text{ is a prime number less than } 13\}$ is PTA-4, JUL-22
(A)$\{2,3,5,7\}$ (B) $\{2,3,5,7,11\}$ **(C) $\{4,9,25,49,121\}$** (D) $\{1,4,9,25,49,121\}$

6. If the ordered pairs $(a + 2,4)$ and $(5, 2a + b)$ are equal then (a, b) is PTA-6, MAY-22
(A) $(2, -2)$ (B) $(5,1)$ (C) $(2,3)$ **(D) $(3, -2)$**

7. Let $n(A) = m$ and $n(B) = n$ then the total number of non-empty relations that can be defined from A to B is
(A) m^n (B) n^m **(C) $2^{mn} - 1$** (D) 2^{mn}

8. If $\{(a, 8), (6, b)\}$ represents an identity function, then the value of a and b respectively. PTA-1
(A) (8,6) (B) (8,8) (C) (6,8) (D) (6,6)

9. Let $A = \{1,2,3,4\}$ and $B = \{4,8,9,10\}$. A function $f: A \to B$ given by $f = \{(1,4), (2,8), (3,9), (4,10)\}$ is a PTA-4
(A) Many-one function (B) Identity function
(C) One-to-one function (D) Into function

10. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then $f \circ g$ is
(A) $\frac{3}{2x^2}$ (B) $\frac{2}{3x^2}$ **(C) $\frac{2}{9x^2}$** (D) $\frac{1}{6x^2}$

11. If $f: A \to B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to PTA-2
(A) 7 (B) 49 (C) 1 (D) 14

12. Let f and g be two functions given by
$f = \{(0,1), (2,0), (3, -4), (4,2), (5,7)\}$
$g = \{(0,2), (1,0), (2,4), (-4,2), (7,0)\}$ then the range of $f \circ g$ is
(A) $\{0,2,3,4,5\}$ (B) $\{-4,1,0,2,7\}$ (C) $\{1,2,3,4,5\}$ **(D) $\{0, 1, 2\}$**

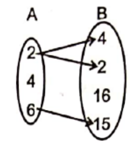
13. Let $f(x) = \sqrt{1 + x^2}$ then
(A) $f(xy) = f(x).f(y)$ (B) $f(xy) \geq f(x).f(y)$
(C) $f(xy) \leq f(x).f(y)$ (D) None of these

14. If $g = \{(1,1), (2,3), (3,5), (4,7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β are
(A) $(-1,2)$ **(B) $(2, -1)$** (C) $(-1, -2)$ (D) $(1,2)$ PTA-6

15. $f(x) = (x + 1)^3 - (x - 1)^3$ represents a function which is
(A)linear (B) cubic (C) reciprocal **(D) quadratic** PTA-5

Creative MCQ

1. Let $f(x) = x^2 - x$, then $f(x-1) - f(x+1)$ is SEP-20
   (A) $4x$ (B) $2-2x$ **(C) $2-4x$** (D) $4x-2$
2. If $n(A) = p, n(B) = q$ then the total number of relations that exist between A and B is PTA-1
   (A) 2^p (B) 2^q (C) 2^{p+q} **(D) 2^{pq}**
3. Given $f(x) = (-1)^x$ is a function from $\mathbb{N}$ to $\mathbb{Z}$. Then the range of f is PTA-3
   (A) $\{1\}$ (B) $\mathbb{N}$ **(C) $\{1,-1\}$** (D) $\mathbb{Z}$
4. The given diagram represents PTA-6



   (A) an onto function (B) a constant function
   (C) an one-one function **(D) not a function**

2. Numbers and Sequences

Text Book Questions

1. Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy
   (A) $1 < r < b$ (B) $0 < r < b$ **(C) $0 \le r < b$** (D) $0 < r \le b$
2. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are PTA-5, SEP-20
   (A) 0, 1, 8 (B) 1, 4, 8 (C) 0, 1, 3 (D) 1, 3, 5
3. 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 MAY-22
4. The sum of the exponents of the prime factors in the prime factorization of 1729 is
   (A)1 (B) 2 **(C) 3** (D) 4 SEP-21,PTA-4,JUL-22
5. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is
   (A) 2025 (B) 5220 (C) 5025 **(D) 2520**
6. $7^{4k} \equiv$ _____ $(mod\ 100)$ PTA-1
   (A) 1 (B) 2 (C) 3 (D) 4
7. Given $F_1 = 1, F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is SEP-21, MDL
   (A) 3 (B) 5 (C) 8 **(D) 11**
8. The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A.P.
   (A) 4551 (B) 10091 **(C) 7881** (D) 13531
9. If 6 times of 6^{th} term of an A.P is equal to 7 times the 7^{th} term, then the 13^{th} terms of the A.P is
   (A) 0 (B) 6 (C) 7 (D) 13 PTA-4
10. An A.P consists of 31 terms. It is 16^{th} term is m, then the sum of all the terms of this A.P is
    (A) 16m (B) 62m **(C) 31m** (D) $\frac{31}{2}$ m PTA-5
11. In an A.P., the first term is 1 and the common difference is 4. How many terms of the A.P must be taken for their sum to be equal to 120? MDL
    (A) 6 (B) 7 **(C) 8** (D) 9

12. If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \cdots + 2^0$ which of the following is true? PTA-6, SEP-20
(A) B is 2^{64} more than A
(B) A and B are equal
(C) B is larger than A by 1
(D) A is larger than B by 1

13. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots$ is PTA-2
(A) $\frac{1}{24}$
(B) $\frac{1}{27}$
(C) $\frac{2}{3}$
(D) $\frac{1}{81}$

14. If the sequence $t_1, t_2, t_3, \ldots$ are in A.P then the sequence $t_6, t_{12}, t_{18}, \ldots$ is
(A) a Geometric Progression
(B) an Arithmetic Progression
(C) neither an Arithmetic Progression nor a Geometric Progression
(D) a constant sequence

15. The value of $(1^3 + 2^3 + 3^3 + \cdots + 15^3) - (1 + 2 + 3 + \cdots + 15)$ is PTA-3
(A) 14400
(B) 14200
(C) 14280
(D) 14520

Creative MCQ

1. If t_n is the n^{th} term of an A.P., then $t_{8n} - t_n$ is MAY-22
(A) $(8n-1)d$
(B) $(8n-2)d$
(C) $(7n-2)d$
(D) $(7nd)$

2. The sequence $-3, -3, -3$ ………. is PTA-1
(A) An A.P only
(B) a G.P only
(C) Neither A.P nor G.P
(D) both A.P and G.P

3. If $2 + 4 + 6 + \cdots + 2k = 90$, then the value of k is PTA-3
(A) 8
(B) 9
(C) 10
(D) 11

4. If a and b are two positive integers where $a > 0$ and b is a factor of a, then HCF of a and b is PTA-4
(A) b
(B) a
(C) $3ab$
(D) $\frac{a}{b}$

5. If a, b, c are in A.P then $\frac{a-b}{b-c}$ is equal to PTA-6
(A) $\frac{a}{b}$
(B) $\frac{b}{c}$
(C) $\frac{a}{c}$
(D) 1

3. Algebra

Text Book Questions

1. A system of three linear equations in three variables is inconsistent if their planes PTA-1, JUL-22
(A) Intersect only at a point
(B) intersect in a line
(C) Coincides with each other
(D) do not intersect

2. The solution of the system $x + y - 3z = -6$, $-7y + 7z = 7$, $3z = 9$ is JUL-22
(A) $x = 1, y = 2, z = 3$
(B) $x = -1, y = 2, z = 3$
(C) $x = -1, y = -2, z = 3$
(D) $x = 1, y = -2, z = 3$

3. If $(x-6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is PTA-4, MAY-22
(A) 3
(B) 5
(C) 6
(D) 8

4. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is PTA-5
(A) $\frac{9y}{7}$
(B) $\frac{9y^3}{21y-21}$
(C) $\frac{21y^2-42y+21}{3y^3}$
(D) $\frac{7(y^2-2y+1)}{y^2}$

5. $y^2 + \frac{1}{y^2}$ is not equal to PTA-6, JUL-22

(A) $\frac{y^4+1}{y^2}$ **(B) $\left(y + \frac{1}{y}\right)^2$** (C) $\left(y - \frac{1}{y}\right)^2 + 2$ (D) $\left(y + \frac{1}{y}\right)^2 - 2$

6. $\frac{x}{x^2-25} - \frac{8}{x^2+6x+5}$ gives

(A) $\frac{x^2-7x+40}{(x-5)(x+5)}$ (B) $\frac{x^2+7x+40}{(x-5)(x+5)(x+1)}$ **(C) $\frac{x^2-7x+40}{(x^2-25)(x+1)}$** (D) $\frac{x^2+10}{(x^2-25)(x+1)}$

7. The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to SEP-21

(A) $\frac{16}{5}\left|\frac{x^2z^4}{y^2}\right|$ (B) $16\left|\frac{y^2}{x^2z^4}\right|$ (C) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$ **(D) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$**

8. Which of the following should be added to make $x^4 + 64$ a perfect square MAY-22

(A) $4x^2$ **(B) $16x^2$** (C) $8x^2$ (D) $-8x^2$

9. The solution of $(2x-1)^2 = 9$ is equal to

(A) -1 (B) 2 **(C) $-1, 2$** (D) None of these

10. The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are

(A) 100,120 (B) 10,12 **(C) – 120, 100** (D) 12,10

11. If the roots of the equation $q^2x^2 + p^2x + r^2 = 0$ are the squares of the roots of the equation $qx^2 + px + r = 0$, then q, p, r are in ________

(A) $A.P$ **(B) $G.P$** (C) Both $A.P$ and $G.P$ (D) None of these

12. Graph of a linear equation is a SEP-21, PTA-2

(A) Straight line (B) circle (C) parabola (D) hyperbola

13. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis is

(A) 0 **(B) 1** (C) 0 or 1 (D) -2 MAY-22

Creative MCQ

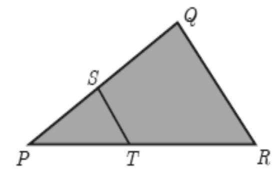
1. The G.C.D of a^m, a^{m+1}, a^{m+2} is SEP-21
   (A) a^m (B) a^{m+1} (C) a^{m+2} (D) 1
2. $\frac{a^2}{a^2-b^2} + \frac{b^2}{b^2-a^2} =$ SEP-20
   (A) $a - b$ (B) $a + b$ (C) $a^2 - b^2$ **(D) 1**
3. The non- diagonal elements in any unit matrix are _______ MDL
   (A) 0 (B) 1 (C) m (D) n
4. The LCM of $x^3 - a^3$ and $(x - a)^2$ is PTA-1
   (A) $(x^3 - a^3)(x + a)$ (B) $(x^3 - a^3)(x - a)^2$
   (C) $(x - a)^2(x^2 + ax + a^2)$ (D) $(x + a)^2(x^2 + ax + a^2)$
5. The excluded value of the rational expression $\frac{x^3+8}{x^2-2x-8}$ is PTA-2
   (A) 8 (B) 2 **(C) 4** (D) 1
6. If a polynomial is a perfect square then its factors will be repeated _______ number of times PTA-4
   (A) Odd (B) zero **(C) even** (D) none of the above
7. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is PTA-5
   (A) $\frac{9y}{7}$ (B) $\frac{9y^3}{21y-21}$ (C) $\frac{21y^2-42y+21}{3y^3}$ (D) $\frac{7(y^2-2y+1)}{y^2}$
8. The solution of $x^2 - 25 = 0$ is PTA-5
   (A) No real roots (B) real and equal roots
   (C) Real and unequal roots (D) imaginary roots
9. For the given matrix $A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 6 \end{bmatrix}$ the order of the matrix $(A^T)^T$ is PTA-5
   (A) 2×3 (B) 3×2 (C) 3×4 (D) 4×3
10. On dividing $\frac{x^2-25}{x+3}$ by $\frac{x+5}{x^2-9}$ PTA-6
    (A) $(x - 5)(x - 3)$ (B) $(x - 5)(x + 3)$ (C) $(x + 5)(x - 3)$ (D) $(x + 5)(x + 3)$

4. Geometry

Text Book Questions

1. 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) $\angle A = \angle F$
2. In ΔLMN, $\angle L = 60^\circ$, $\angle M = 50^\circ$. If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is SEP-20
   (A) 40° **(B) 70°** (C) 30° (D) 110°
3. If ΔABC is an isosceles triangle with $\angle C = 90^\circ$ and $AC = 5\ cm$, then AB is PTA-4, MAY-22
   (A) $2.5\ cm$ (B) $5\ cm$ (C) $10\ cm$ **(D) $5\sqrt{2}\ cm$**

4. In a given figure $ST \parallel QR$, $PS = 2\ cm$ and $SQ = 3\ cm$. Then the ratio of the area of ΔPQR to the area of ΔPST is



(A) 25 : 4 (B) 25 : 7

(C) 25 : 11 (D) 25 : 13

5. The perimeters of two similar triangles ΔABC and ΔPQR are 36 cm and 24 cm respectively. If $PQ = 10\ cm$, then the length of AB is PTA-5

(A) $6\frac{2}{3}\ cm$ (B) $\frac{10\sqrt{6}}{3}\ cm$ (C) $66\frac{2}{3}\ cm$ **(D) 15 cm**

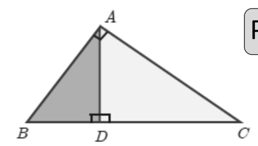
6. If in ΔABC, $DE \parallel BC$. $AB = 3.6\ cm$, $AC = 2.4\ cm$ and $AD = 2.1\ cm$ then the length of AE is

(A) 1.4 cm (B) 1.8 cm (C) 1.2 cm (D) 1.05 cm SEP-21, PTA-3, JUL-22

7. In a $\Delta\ ABC$, AD is the bisector of $\angle BAC$. If $AB = 8\ cm$, $BD = 6\ cm$ and $DC = 3\ cm$. The length of the side AC is PTA-6, MAY-22

(A) 6 cm **(B) 4 cm** (C) 3 cm (D) 8 cm

8. In the adjacent figure $\angle BAC = 90^\circ$ and $AD \perp BC$ then PTA-1



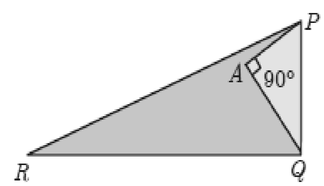
(A) $BD \cdot CD = BC^2$ (B) $AB \cdot AC = BC^2$

(C) $BD \cdot CD = AD^2$ (D) $AB \cdot AC = AD^2$

9. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?

(A) 13 m (B) 14 m (C) 15 m (D) 12.8 m

10. In the given figure, $PR = 26\ cm$, $QR = 24\ cm$, $\angle PAQ = 90^\circ$, $PA = 6\ cm$ and $QA = 8\ cm$. Find $\angle PQR$ PTA-6



(A) 80° (B) 85°

(C) 75° **(D) 90°**

Creative MCQ

1. The perimeters of two similar triangles ΔABC and ΔPQR are $36cm$ and 24cm respective. If $PQ = 10cm$, then the length of AB is PTA-5
   (A) $6\frac{2}{3}\ cm$ (B) $\frac{10\sqrt{6}}{3}\ cm$ (C) $66\frac{2}{3}\ cm$ **(D) $15\ cm$**

5. Coordinate Geometry

Text Book Questions

1. The area of triangle formed by the points $(-5,0), (0,-5)$ and $(5,0)$ is SEP-21,PTA-2
   (A) 0 sq. units **(B) 25 sq. units** (C) 5 sq. units (D) none of these
2. A man walks near a wall, such that the distance between him and the wall is 10 units consider the wall to be the Y axis. The path travelled by the man
   (A) $x = 10$ (B) $y = 10$ (C) $x = 0$ (D) $y = 10$
3. The straight line given by the equation $x = 11$ is PTA-1, SEP-20
   (A) Parallel to X axis **(B) parallel to Y axis**
   (C) passing through the origin (D) passing through the point (0,11)
4. If $(5,7), (3,p)$ and $(6,6)$ are collinear then the value of p is PTA-5, MAY-22
   (A) 3 (B) 6 **(C) 9** (D) 12
5. The point of intersection $3x - y = 4$ and $x + y = 8$ is PTA-2, JUL-22
   (A) (5,3) (B) (2,4) **(C) $(3,5)$** (D) (4,4)
6. The slope of the line joining $(12,3)$ and $(4,a)$ is $\frac{1}{8}$ the value of $'a'$ is PTA-3
   (A) 1 (B) 4 (C) -5 **(D) 2**
7. The slope of the line which is perpendicular to line joining the points $(0,0)$ and $(-8,8)$ is MAY-22
   (A) -1 **(B) 1** (C) $\frac{1}{3}$ (D) -8
8. If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then the slope of the perpendicular bisector of PQ is PTA-6, JUL-22
   (A) $\sqrt{3}$ **(B) $-\sqrt{3}$** (C) $\frac{1}{\sqrt{3}}$ (D) 0
9. If A is a point on the $y-$ axis whose ordinate is 8 and B is a point on the X axis whose abscissae is 5 then the equation of the line AB is
   (A) $8x + 5y = 40$ (B) $8x - 5y = 40$ (C) $x = 8$ (D) $y = 5$
10. The equation of the line passing through the origin and perpendicular to the line $7x - 3y + 4 = 0$ PTA-4
    (A) $7x - 3y + 4 = 0$ (B) $3x - 7y + 4 = 0$ **(C) $3x + 7y = 0$** (D) $7x - 3y = 0$
11. Consider four straight lines
    (i) $l_1: 3y = 4x + 5$ (ii) $l_2: 4y = 3x - 1$ (iii) $l_3: 4y + 3x = 7$ (iv) $l_4: 4x + 3y = 2$
    Which of the following statement is true
    (A) l_1 and l_2 are perpendicular (B) l_1 and l_4 are parallel
    (C) l_2 and l_4 are perpendicular (D) l_2 and l_3 are parallel
12. A straight line has equation $8y = 4x + 21$ which of the following is true. PTA-3
    (A) The slope is 0.5 and the y intercept is 2.6 (B) The slope is 5 and the y intercept is 1.6
    (C) The slope is 0.5 and the y intercept is 1.6 (D) The slope is 5 and the y intercept is 2.6
13. When proving that a quadrilateral is a trapezium it is necessary to show PTA-4
    (A) Two sides are parallel **(B) Two parallel and two non- parallel sides**
    (C) Opposite sides are parallel (D) All sides are of equal length

14. When proving that a quadrilateral is a parallelogram by using slopes you must find
    (A) The slopes of two sides
    (B) The slopes of two pair of opposite sides
    (C) The length of all sides
    (D) Both the length and slopes of two sides

15. (2,1) is the point of intersection of two lines
    (A) $x - y - 3 = 0, 3x - y - 7 = 0$
    (B) $\boldsymbol{x + y = 3,\ 3x + y = 7}$
    (C) $3x + y = 3,\ x + y = 7$
    (D) $x + 3y - 3 = 0, x - y - 7 = 0$

Creative MCQ

1. The perimeter of a triangle formed by the points (0,0), (1,0) and (0,1) is SEP-21
   (A) $\sqrt{2}$ (B) 2 **(C)** $\boldsymbol{2 + \sqrt{2}}$ (D) $2 - \sqrt{2}$

2. If the points $A(6,1), B(8,2), C(9,4)$ and $D(p,3)$ are the vertices of a parallelogram, taken in order then the value of p is PTA-5
   (A) -7 **(B) 7** (C) 6 (D) -6