Federal Board SSC-I (2009)
MATHEMATICS SSC-I
SECTION-A (Marks 15)

Q1. Circle the correct option i.e. A / B / C / D. Each part carries one mark.

i. If the number of elements in a set A is 2 and in a set B is 3, then number of elements in a set A × B will be:
A. 2 B. 4
C. 6 D. 8

ii. The range of $R = \{(1,0)(2,1)(4,3)\}$ is:
A. $\{2,3,4\}$ B. $\{0,1,3\}$
C. $\{1,2,4\}$ D. $\{1,2,3\}$

iii. The additive inverse of Zero is:
A. Does not exist B. Zero
C. 1 D. None of these

iv. $\forall x \in R,\ x = x$ is called:
A. Reflective property
B. Symmetric property
C. Additive property
D. Multiplicative property

v. The characteristics of $\log 0.00058$ is:
A. 3 B. $\overline{3}$
C. 4 D. $\overline{4}$

vi. The degree of polynomial $8x^2 + 3xy^2 + y$ is:
A. 4 B. 3
C. 2 D. 1

vii. For what value of m, $x^2 + 4x + m$ will be complete square?
A. 8 B. -8
C. 4 D. -4

viii. $(x-6)(x-4) =$ __________
A. $x^2 + 10x + 24$ B. $x^2 - 10x - 24$
C. $x^2 + 10x - 24$ D. $x^2 - 10x + 24$

ix. $\begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$ **is a/an __________ matrix.**
A. zero B. identity
C. rectangular D. scalar

x. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$ then the order of AB is ________.
A. 2 × 1 B. 2 × 2
C. 1 × 2 D. 1 × 1

xi. If two lines intersect each other, then non-adjacent angles are called:
A. Complementary angles
B. Alternate angles
C. Vertical angles
D. Supplementary angles

xii. How many points are sufficient for drawing a straight line?
A. One B. Two
C. Three D. Four

xiii. How many acute angles are there in an acute triangle?
A. One B. Two
C. Three D. None of these

xiv. The lines that bisect the sides of a triangle perpendicularly are called:
A. Medians
B. Bisectors of segments
C. Altitudes
D. Perpendicular bisectors

xv. Construction of triangle is possible when sides are:
A. 5cm, 5cm, 11cm
B. 10cm, 3cm, 6cm
C. 5cm, 5cm, 5cm
D. 2cm, 3cm, 6cm

Section – B (Marks 36)

Q2. Answer any TWELVE parts. All parts carry equal marks. (12 × 3 = 36)

i. Find the power sets of $\{+, -, \times, \div\}$

ii. If $A = \{1,2,4\}, B = \{1,3,5,7\}$ then write a binary relations R for A × B, when $R = \{(x,y) | x \in A \wedge y \in B \wedge y < x\}$

iii. If $U = \{x | x \in N \wedge x \leq 50\}$,
$A = \{4,10,15, \ldots \ldots \ldots, 50\}$,
$B = \{10,20,30, \ldots \ldots \ldots, 50\}$,
Then Show that $(A \cup B)^c = A^c \cap B^c$.

iv. Simplify: $\dfrac{b+\sqrt{b^2-a^2}}{b-\sqrt{b^2-a^2}}$.

v. Simplify: $\dfrac{(2)^{\frac{1}{3}} \cdot (27)^{\frac{1}{3}} \cdot (60)^{\frac{1}{2}}}{(180)^{\frac{1}{2}} \cdot (4)^{\frac{-1}{3}} \cdot (9)^{\frac{1}{4}}}$.

vi. If $a = \sqrt{3} - \sqrt{2}$ then evaluate $a - \frac{1}{a}$ and $a^4 + \frac{1}{a^4}$.

vii. Evaluate with the help of logarithms: $\frac{475.8}{13.72}$

viii. Convert the wavelength 4.5×10^5cm of blue light into meters and write in common form.

ix. Find the value of $4ab$, when $a + b = 15$, $a - b = 3$

x. If $x - \frac{1}{x} = 3$ then find the value of: $x^3 - \frac{1}{x^3}$

xi. Use formulae to find the product of: $(x - y + z)(x^2 + y^2 + z^2 + xy + yz - xz)$

xii. Factorize $1 + 2ab - (a^2 + b^2)$

xiii. Factorize $64a^3 - 343b^3 - 4a + 7b$

xiv. Find H.C.F by division method:
$x^4 + x^2 - 6x^2$; $x^4 - 9x^2$

xv. Simplify: $\frac{1}{x-1} + \frac{1}{x+1} - \frac{x+2}{x^2+x+1} - \frac{x-2}{x^2-x+1}$

xvi. If $A = \begin{bmatrix} 7 & 1 \\ -3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -3 \\ 4 & 1 \end{bmatrix}$ then prove that: $A^{-1}A = I$

xvii. Use Cramer rule to solve:
$0.8 - 0.6y = 1$;
$0.6 + 0.8y = 2$

xviii. Find the value of a when: $A = \begin{bmatrix} 2a & -4 \\ -1 & 5 \end{bmatrix}$, and $|A| = 16$.

Section – C (Marks 24)

Note: Attempt any THREE questions. All questions carry equal marks. (3 × 8 = 24)

Q3. Prove that an exterior angle of a triangle is greater in measure than either of its opposite interior angles.

Q4. Prove that a quadrilateral having two opposite sides parallel and congruent is a parallelogram.

Q5. Prove that the right bisectors of the three sides of a triangle are concurrent.

Q6. Draw medians of ΔXYZ in which $m\angle X = 60^0$, $m\angle Y = 45^0$ and $m\overline{XY} = 6.3\ cm$.

Federal Board SSC-I (2009)
MATHEMATICS SSC-I
SECTION-A (Marks 15)

Q1. Circle the correct option i.e. A / B / C / D. Each part carries one mark.

i. In which quadrant the point (1, – 2) lies?
A. 1st B. 2nd
C. 3rd D. 4th

ii. $\forall x, y \in R, x > y$ or $x = y$ or $x < y$ **The property is known as:**
A. Trichotomy property
B. Transitive property
C. Multiplicative property
D. Reflexive property

iii. $(4^3)^2 =$ __________
A. 4^9 B. 4^6
C. 4^8 D. 4^4

iv. If $\log_{10} x = 2$ then $x =$ ________
A. 500 B. 100
C. 10 D. 1000

v. The base of common logarithm is:
A. 10 B. 1
C. e D. 2

vi. What should be added or subtracted in $4x^2 + 25y^2$ to make it perfect square?
A. 16xy B. 12xy
C. 24xy D. 20xy

vii. $a^3 - b^3 = (a - b)($________$)$
A. $a^2 + ab - b^2$ B. $a^2 - ab - b^2$
C. $a^2 + ab + b^2$ D. $a^2 - ab + b^2$

viii. The H.C.F. of $25x^4y^2$, $20x^3y^3$ and $5x^2y^2$ is ________
A. $5x^2y^2$ B. $2500x^9y^9$
C. $5xy$ D. $25x^4y^2$

ix. What will be factorization of $x^2 + x - 6$?
A. $(x-2)(x-3)$ B. $(x-2)(x+3)$
C. $(x+3)(x+2)$ D. $(x+5)(x+1)$

x. The matrix in which number of rows and columns are equal is called:
A. Row B. Square
C. Null D. Diagonals

xi. The product of $\begin{bmatrix} 3 \\ 1 \end{bmatrix} [1 \quad 2]$ is equal to:
A. $\begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix}$ B. $\begin{bmatrix} 3 & 6 \\ 1 & 2 \end{bmatrix}$
C. $\begin{bmatrix} 4 & 2 \\ 6 & 3 \end{bmatrix}$ D. $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

xii. How many lines can pass through one point?
A. One B. Two
C. Three D. Infinite

xiii. Triangle whose all sides are equal to each other is called:
A. Acute angle triangle
B. Equilateral triangle
C. Right angle triangle
D. Isosceles triangle

xiv. Given angle is acute and is facing the given shorter side is the case of:
A. Unique triangles
B. Congruent triangles
C. Similar triangles
D. Ambiguous case of triangle

xv. How many obtuse angles are there in a triangle?
A. At least one B. At most one
C. Two D. Three

Section – B (Marks 36)

Q2. Answer any TWELVE parts. All parts carry equal marks. (12 × 3 = 36)

i. Find the values of x and y if:
$(x - 1,\ y + 2) = (2x + 4,\ -4)$

ii. If $R = \{(x,y) | x, y \in W \wedge x + y = 7\}$ then write the domain and range of R.

iii. If $A = \{-1, 0, 1\}$, then Write three binary relations for A × A.

iv. If $x = 4 - \sqrt{15}$, then find the values of: $x + \frac{1}{x}$ and $x - \frac{1}{x}$

v. Simplify: $\left[\frac{18l^2m^6n^9}{6l\,m^4n^4}\right]^3$

vi. Simplify:
$\left(\frac{x^m}{x^n}\right)^{m+n-l} \times \left(\frac{x^n}{x^l}\right)^{n+l-m} \times \left(\frac{x^l}{x^m}\right)^{l+m-n}, \ x \neq 0$

vii. Write in scientific notation the radius 6400 km of the earth by converting into meters.

viii. Evaluate with the help of logarithm.
30.56 ÷ 4.105

ix. For what value of p the polynomial: $3x^3 - 7x^2 - 9x + p$ becomes exactly divisible by $x - 3$

x. Find the value of: $8xy(x^2 + y^2)$; when $x + y = 6$ and $x - y = 4$

xi. Use formulae to find the product:
$(x + 1)(x^2 + 1)(x - 1)(x^4 + 1)$

xii. Factorize: $x^8 + x^4 + 1$

xiii. Factorize with the help of factor theorem:
$x^3 - 7x + 6$

xiv. Find L.C.M. by factorization method:
$l^2 - m^2$, $l^4 - m^4$, $l^6 - m^6$

xv. Simplify: $\left[\frac{2x+y}{x+y} - 1\right] \div \left[1 - \frac{x}{x+y}\right]$

xvi. For what value of "m"
$x^4 + 4x^2 + m + \frac{8}{x^2} + \frac{4}{x^4}$ is a complete square where $x \neq 0$

xvii. If $A = \begin{bmatrix} -1 & 2 \\ -3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix}$
then find AB

xviii. Use cramer's rule to solve:
$5x + 2y = 1$;
$3x - y = -4$

Section – C (Marks 24)

Note: Attempt any THREE questions. All questions carry equal marks. (3 × 8 = 24)

Q3. Prove that if two sides of a triangle are congruent, then the angles opposite to these sides are also congruent.

Q4. Prove that if in the correspondence of the two right-angled triangles, the hypotenuse and one side of one triangle are congruent to the hypotenuse and the corresponding side of the other, then the triangles is congruent.

Q5. Prove that any point on the right bisector of a line segment is equidistant from its end points.

Q6. Draw altitudes of ΔLMN in which
$\overline{LM} = 5.3\ cm$, $\overline{MN} = 4.9$ and $\overline{NL} = 6.3\ cm$