Compiled by: **M. Usman Rafiq** (M.PHIL Mathematics), KIPS College Samundri. 03090752390

Important Short Questions Mathematics from Past Papers for Inter Part-I

Chapter#01 (Number Systems)

i. Let $z\epsilon C$, show that $\overline{\overline{z}} = z$
ii. Find multiplicative inverse of $i - 2i$
iii. Simplify: $(2,6).(3,7)$
iv. State and prove golden rule of fraction.
v. State golden rule of fraction and rule for quotient of fractions.
vi. Find multiplicative inverse of $\left(\sqrt{2}, -\sqrt{5}\right)$
vii. Prove that the sum as well as product of two conjugate complex number is real.
viii. Simplify: $(a + bi)^{-2}$
ix. State trichotomy property of real number.
x. Express $\frac{i}{1+i}$ in the form of $a + bi$.
xi. Express the complex number $1 + i\sqrt{3}$ in polar form.
xii. Whether closed or not with respect to addition and multiplication is $\{1\}$?
xiii. Simplify: $(-1)^{-\frac{21}{2}}$
xiv. Show that $z\overline{z} = |z|^2$
xv. Find the multiplicative inverse of $-3 - 5i$
xvi. Does the set $\{1, -1\}$ possess? Closure property with respect to addition and subtraction.
xvii. Find the difference and product of two complex numbers $(8,9)$ and $(5, -6)$
xviii. Simplify by justifying each step mentioning each property: $\frac{\frac{a}{b}+\frac{c}{d}}{\frac{a}{b}-\frac{c}{d}}$
xix. Factorize $9a^2 + 16b^2$
xx. Show that $\forall\ z\epsilon C,\ z^2 + z^{-2}$ is a real number.
xxi. Simplify: $(-i)^{19}$
xxii. Simplify: i^{101}
xxiii. Separate into real and imaginary parts $\frac{i}{1+i}$
xxiv. Find multiplicative inverse of $\left(\sqrt{2}, -\sqrt{5}\right)$
xxv. Prove that $\overline{z} = z$ iff z is real.
xxvi. Show that $\forall\ z\epsilon C;\ z^2 + \overline{z}^2$ is a real number.
xxvii. Show that $\forall\ z\epsilon C;\ (z - \overline{z})^2$ is a real number.

Chapter#02 (Sets, Functions and Groups)

i. If a, b are elements of a group G, then show that $(ab)^{-1} = b^{-1}a^{-1}$
ii. Write the descriptive and tabular form of set $A = \{x: x\epsilon E \wedge 4 \leq x \leq 10\}$
iii. Find the converse and inverse of $q \rightarrow p$
iv. Define group.
v. If $C = \{a, b, c, d\}$, find $P(C)$.
vi. Let $U =$ the set of English alphabet, $A = \{x | x\ is\ a\ vowel\}$, $B = \{y | y\ is\ \ consonant\}$ verify DE Morgan's law for these sets.
vii. Construct the truth table for $\sim(p \rightarrow q) \leftrightarrow (p \wedge \sim q)$
viii. Find converse and inverse of $\sim p \rightarrow \sim q$
ix. Write $A = \{x | x\epsilon O \wedge 3 < x < 12\}$ in descriptive and tabular form.
x. Show that subtraction is non-commutative on 'N'.
xi. If $U = \{1,2,3,4,5, \dots, 20\}$ and $A = \{1,3,5, \dots, 19\}$, verify $A \cup A' = U$
xii. Show that the statement $\sim(p \rightarrow q) \rightarrow p$ is a tautology.
xiii. Find inverse of the given relation: $R = \{(x, y) |\ y^2 = 4ax,\ \ x \geq 0\}$
xiv. Write the inverse of the relation $\{(x, y) |\ y = 2x + 3,\ \ x\epsilon R\}$ is it inverse a function or not.
xv. Write the inverse and contrapositive of $\sim q \rightarrow \sim p$.

xvi. What is the difference between $\{a,b\}$ and $\{\{a,b\}\}$?

xvii. Write down the power set of $\{9,11\}$

xviii. Write down the power set of $\{+,-,\times,\div\}$

xix. Show that the set $\{1,w,w^2\}$, when $w^3=1$, is an Abelian group w.r.t ordinary multiplication.

xx. Show that the set $\{1,-1,i,-i\}$, is an Abelian group w.r.t ordinary multiplication.

xxi. Prepare a table of addition of the elements of the set of residue classes modulo 4.

Chapter#03 (Matrices and Determinants)

i. If $A=\begin{bmatrix} i & 0 \\ 1 & -i \end{bmatrix}$ show that $A^4=I_2$

ii. If $A=\begin{bmatrix} 2 & 3 & -2 \\ -1 & 1 & 5 \end{bmatrix}, B=\begin{bmatrix} 2 & -3 & 1 \\ 5 & 4 & -1 \end{bmatrix}$ then solve $3X-2A=B$ for X.

iii. Define minor and cofactor of element of a matrix.

iv. If $A=\begin{bmatrix} i & 1+i \\ 1 & -i \end{bmatrix}$, show that $A-\left(\overline{A}\right)^t$ is skew Hermitian.

v. Evaluate $\begin{vmatrix} 1 & 2 & -3 \\ -1 & 3 & 4 \\ -2 & 5 & 6 \end{vmatrix}$

vi. If $A=\begin{bmatrix} 2i & i \\ i & -i \end{bmatrix}$, the find A^{-1}

vii. If $A=\begin{bmatrix} 1 & -1 \\ a & b \end{bmatrix}, A^2=\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find the value of a and b.

viii. Find x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix}=\begin{bmatrix} 2 & 1 \\ -3 & 2 \end{bmatrix}$

ix. If A and B are non-singular matrices, then show that $(AB)^{-1}=B^{-1}A^{-1}$

x. Let $\begin{vmatrix} 1 & 2 & 0 \\ 3 & 2 & -1 \\ -1 & 3 & 2 \end{vmatrix}$, show that $A+A^t$ is symmetric.

xi. Find the matrix A if, $\begin{bmatrix} 5 & -1 \\ 0 & 0 \\ 3 & 1 \end{bmatrix}A=\begin{bmatrix} 3 & -7 \\ 0 & 0 \\ 7 & 2 \end{bmatrix}$

xii. If $A=\left[a_{ij}\right]_{3\times 4}$, then sow that $I_3A=A$

xiii. Without expansion verify that $\begin{vmatrix} \alpha & \beta+\gamma & 1 \\ \beta & \gamma+\alpha & 1 \\ \gamma & \alpha+\beta & 1 \end{vmatrix}=0$

xiv. Find the multiplicative inverse of $A=\begin{bmatrix} 3 & -1 \\ 2 & 1 \end{bmatrix}$

xv. Without expansion show that $\begin{vmatrix} bc & ca & ab \\ \frac{1}{a} & \frac{1}{b} & \frac{1}{c} \\ a & b & c \end{vmatrix}=0$

xvi. Without expansion verify that $\begin{vmatrix} mn & l & l^2 \\ nl & m & m^2 \\ lm & n & n^2 \end{vmatrix}=\begin{vmatrix} 1 & l^2 & l^3 \\ 1 & m^2 & m^3 \\ 1 & n^2 & n^3 \end{vmatrix}$

xvii. Find inverse of $\begin{bmatrix} -2 & 3 \\ -4 & 5 \end{bmatrix}$

xviii. Without expansion show that $\begin{vmatrix} 6 & 7 & 8 \\ 3 & 4 & 5 \\ 2 & 3 & 4 \end{vmatrix}=0$

xix. If A and B are square matrices of the same order, then explain why in general $(A+B)(A-B)\neq A^2-B^2$

xx. If $A=\begin{bmatrix} 1 & 2 \\ a & b \end{bmatrix}, A^2=\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find the value of a and b.

xxi. Show that $\begin{vmatrix} a+l & a & a \\ a & a+l & a \\ a & a & a+l \end{vmatrix}=l^2(3a+l)$

xxii. Show that $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix}=(a-b)(b-c)(c-a)$

xxiii. Show that $\begin{vmatrix} a+\lambda & b & c \\ a & b+\lambda & c \\ a^2 & b & c+\lambda \end{vmatrix} = \lambda^2(a+b+c+\lambda)$

Chapter#04 (Quadratic Equations)

i. Solve $x^2+7x+12=0$ by factorization.
ii. Discuss the nature of the roots of equation $2x^2+5x+1=0$
iii. Find two consecutive numbers, whose product is 132.
iv. Find k if $x^3+kx^2-7x+6=0$ reminder has -4, when divided by $x-2$.
v. If α, β are roots of $5x^2-x+2=0$, find $\frac{3}{\alpha}+\frac{3}{\beta}$
vi. Find three cube roots of unity.
vii. If α, β are roots of $5x^2-x-2=0$, find $\frac{3}{\alpha}+\frac{3}{\beta}$
viii. Show that roots of equation $(p+q)x^2-px-q=0$, are rational.
ix. Find roots of equation of quadratic formula $(x-a)(x-b)+(x-b)(x-c)+(x-c)(x-a)=0$
x. Find the four fourth roots of 625.
xi. Find the condition that $\frac{a}{(x-a)}+\frac{b}{(x-b)}=5$, may have roots equal in magnitude but opposite in sign.
xii. Evaluate $(1+w+w^2)^8$.
xiii. When the polynomial x^3+2x^2+kx+4 is divided by $x-2$, the reminder is 14. Find value of k.
xiv. If α, β are roots of $3x^2-2x+4=0$, then find the value $\frac{1}{\alpha^2}+\frac{1}{\beta^2}$.
xv. Use the reminder theorem to find reminder when first polynomial is divided by second polynomial
xvi. $x^2+3x+7,\ x+1$
xvii. Find the equation that one root of the equation $x^2+px+q=0$ is multiplicative inverse of the other.
xviii. Discuss the nature of roots of the equation $2x^2+5x-1=0$
xix. Solve the equation by completing square $x^2+4x-1085=0$
xx. Prove that $\left(\frac{1+\sqrt{-3}}{2}\right)^9+\left(\frac{1-\sqrt{-3}}{2}\right)^9=-2$
xxi. When $x^4+2x^3+kx^2+3$ id divided by $'x-2'$; the reminder is 1, find the value of k.
xxii. If α, β are roots $x^2-px-p-c=0$, prove that $(1+\alpha)(1+\beta)=1-c$

Chapter#05 (Partial Fractions)

i. Define rational fraction.
ii. Resolve into partial fraction $\frac{x^2+x+1}{(x+2)^3}$
iii. $\frac{3x^2+1}{x-2}$, Is an improper fraction convert into proper fraction?
iv. Define partial fraction resolution.
v. Write only partial fractions form of $\frac{x^2+1}{x^3+1}$, without finding constants.
vi. Resolve $\frac{7x+5}{(x+3)(x+4)}$ into partial fraction.
vii. Resolve $\frac{3x-11}{(x^2+1)(x+3)}$, into partial fractions without finding constants.
viii. Change $\frac{6x^3+5x^2-7}{2x^2-x-7}$, into proper rational fraction.
ix. Resolve $\frac{x^2+1}{(x+1)(x-1)}$, into partial fraction.
x. Define conditional equation and identity equation with one example.

Chapter#06 (Sequences and Series)

i. Define arithmetic progression.
ii. Find three A.M's between $\sqrt{2}$ and $3\sqrt{2}$
iii. Sum the series $2+(1+i)+\left(\frac{1}{i}\right)+\cdots$ to 8 terms.
iv. Find the 9th term of the H.P $\frac{1}{3},\frac{1}{5},\frac{1}{7},\ldots$
v. Define sequence.
vi. If the 5th term of an A.P is 13 and 17th term is 49, find its general term.

vii. Find vulgar fraction equivalent to $1.\dot{5}\dot{3}$ recurring decimal.

viii. Find the 12th term of Harmonic sequence $\frac{1}{3}, \frac{2}{9}, \frac{1}{6}, \ldots$

ix. Find a_8 for the sequence $1, 1, -3, 5, -7, 9, \ldots$

x. Sum the series $(-3) + (-1) + 1 + 3 + \cdots + a_{16}$

xi. Find the nth term of H.P $\frac{1}{2}, \frac{1}{5}, \frac{1}{8}, \ldots$

xii. Find the sum of infinite geometric series $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \cdots$

xiii. If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in A.P, show that the common difference is $\frac{a-c}{2ac}$.

xiv. Find A.M between $1 - x + x^2$ and $1 + x + x^2$.

xv. How many terms of series $-1 + (-5) + (-3) + \cdots$ amount to? 65.

xvi. Find vulgar fraction equivalent to the recurring decimal $1.\dot{3}\dot{4}$

xvii. If 5 is H.M between 2 and b find b.

xviii. Find the 13th term of the sequence $x, 1, 2 - x, 3 - 2x, \ldots$

xix. Show that the reciprocal of the terms of the geometric sequence $a_1, , a_1 r^2, a_1 r^4, \ldots$ form another geometric sequence.

xx. If $1 + \frac{x}{2} + \frac{x^2}{4} + \cdots$ show that $x = 2(\frac{y-1}{y})$

xxi. Find the indicated term of the sequence $1, -3, 5, -7, 9, -11, \ldots, a_8$

xxii. If $a_{n-3} = 2n - 5$ find the nth term of the sequence.

xxiii. Find the nth term of the geometric sequence if $\frac{a_5}{a_3} = \frac{4}{9}$ and $a_2 = \frac{4}{9}$

xxiv. Find A, G, H and verify that $A > G > H, (G > 0)$ if $a = 2$ and $b = 8$

xxv. Find the next two terms of $1, 3, 7, 15, 31, \ldots$

xxvi. If $S_n = n(2n - 1)$, then find the series.

xxvii. Find G.M between $-2i$ and $8i$.

xxviii. Find vulgar fraction equivalent to the recurring decimal $0.\dot{7}$

xxix. If the numbers $\frac{1}{k} + \frac{1}{2k+1}$ and $\frac{1}{4k-1}$ are in harmonic sequence find k.

xxx. Find the nth term of the sequence $\left(\frac{4}{3}\right)^2, \left(\frac{7}{3}\right)^2, \left(\frac{10}{3}\right)^2, \ldots$

xxxi. Determine whether -19 is the term of the A.P $17, 13, 9, \ldots$ or not.

xxxii. If $5, 8$ are two A.Ms between a and b, find a and b.

xxxiii. If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in G.P. show that the common ratio is $\pm\sqrt{\frac{a}{c}}$

xxxiv. If both x and y are positive distinct real numbers, show that the geometric mean between x and y is less than their arithmetic mean.

xxxv. If $1 + 2x + 4x^2 + 8x^3 + \cdots$ show that $x = (\frac{y-1}{2y})$

xxxvi. If $y = \frac{x}{2} + \frac{x^2}{4} + \frac{x^3}{8} + \cdots$ and if $0 < x < 2$, show that $x = \frac{2y}{1+y}$

xxxvii. If $y = \frac{2}{3}x + \frac{4}{9}x^2 + \frac{8}{27}x^3 + \cdots$ and if $0 < x < \frac{3}{2}$, show that $x = \frac{3y}{2(1+y)}$

Chapter#07 (Permutation, Combination, and Probability)

i. Evaluate $\frac{8!}{4!2!}$

ii. Define sample space.

iii. Find the number of diagonals of a 6 −sided figure.

iv. Evaluate $\frac{10!}{7!}$

v. Find the value of n if ${}^{n}C_r = \frac{12\times11}{2!}$

vi. Evaluate $\frac{8!}{6!}$

vii. How many signals can be formed with 4-different flags when any number of them are to be used at a time?

viii. Find the value of n, ${}^{n}C_5 = {}^{n}C_4$

ix. How many arrangements of the letters of the word ‘MATHEMATICS’, taken all together, can be made?

x. There are 5 green and 3 red balls in a box. One ball is taken out, find the probability that ball taken out is red.
xi. Find the value of n when ${}^{n}P_5 : {}^{n}P_3 = 9:1$
xii. Find the value of n when ${}^{n}P_2 = 30$
xiii. A die is rolled. What is the probability that the dots on the top are greater than 4.
xiv. If the sample space $= \{1,2,3,\dots,9\}$, events $A = \{2,4,6,8\}$, and $B = \{1,3,5,\}$, find $P(A \cup B) =?$
xv. Define fundamental principle of Counting.

Chapter#09 (Fundamentals of Trigonometry)

i. Define radian.
ii. Express the angle $75^o 6' 30''$ in radian measure.
iii. If $cos\theta = -\frac{\sqrt{3}}{2}$ and the terminal arm of the angle is in III quadrant, find the value of $sin\theta$ and $tan\theta$.
iv. Verify that $cos2\theta = 2cos^2\theta - 1$ when $\theta = 30^o$
v. Find l, when $\theta = 65^o 20',\ r = 18mm$
vi. Verify that $cos2\theta = cos^2\theta - sin^2\theta$ when $\theta = 30^o, 45^o$
vii. Prove the identity $cot^4\theta + cot^2\theta = cosec^4\theta - cosec^2\theta$
viii. For $\theta = -\frac{71}{6}\pi$, find the value of $sin\theta$ and $cos\theta$.
ix. Prove the identity $\frac{2tan\theta}{1+tan^2\theta} = 2sin\theta cos\theta$
x. Find θ, when $l = 1.5cm;\ \ r = 2.5cm$
xi. Verify $sin60^0 cos30^0 - cos60^0 sin30^0 = sin30^0$
xii. Find l, when $\theta = \pi\ radian,\ r = 6cm$
xiii. Verify $sin^2\frac{\pi}{6} + sin^2\frac{\pi}{3} + tan^2\frac{\pi}{4} = 2$
xiv. What is the circular measure of angle between the hands of watch at 4 O'clock?
xv. Find x if $tan^2 45^o - cos^2 45^o = x.sin45^o cos45^o tan60^o$
xvi. Prove that $sec^2\theta - cosec^2\theta = tan^2\theta - cot^2\theta$.
xvii. Prove that $2cos^2\theta - 1 = 1 - 2sin^2\theta$
xviii. Prove that $\frac{1-cos\alpha}{sin\alpha} = tan\frac{\alpha}{2}$
xix. Show that the area of a sector of a circular region of radius r is $\frac{1}{2}r^2\theta$.
xx. Define the angle in standard position.
xxi. Define co-terminal angle or general angle.
xxii. Verify $sin^2\frac{\pi}{6} : sin^2\frac{\pi}{4} : sin^2\frac{\pi}{3} : sin^2 1 : 2 : 3 : 4$

Chapter#10 (Trigonometric Identities Sum and Difference of Angles)

i. Without using tables, write the value of $cos315^o$ and $sin540^o$
ii. If α, β and γ are the angles of a triangle ABC, then prove that $\tan(\alpha + \beta) + tan\gamma = 0$
iii. Prove that $\sin(\alpha + \beta)\sin(\alpha - \beta) = sin^2\alpha - sin^2\beta$
iv. Show that $\cos(\alpha + \beta)\cos(\alpha - \beta) = cos^2\beta - sin^2\alpha$
v. Prove that $cot\alpha - tan\alpha = 2cot2\alpha$
vi. Prove that $\frac{sin3x - sinx}{cosx - cos3x} = cot2x$
vii. Show that $cos330^o sin600^o + cos120^o sin150^o = -1$
viii. Prove that $sin2\alpha = 2sin\alpha cos\alpha$
ix. Express $2\sin 7\theta \sin 2\theta$ as a sum or difference.
x. Prove that $\sin(180^o + \alpha)\sin(90^o - \alpha) = -sin\alpha cos\alpha$
xi. Prove that $\tan\left(\frac{\pi}{4} - \theta\right) + \tan\left(\frac{3\pi}{4} + \theta\right) = 0$
xii. Prove the identity $\frac{sin3\theta}{sin\theta} - \frac{cos3\theta}{cos\theta} = 2$
xiii. If α, β and γ are the angles of a triangle ABC, then prove that $\sin(\alpha + \beta) = sin\gamma$
xiv. Prove that $cos(\alpha + 45^o) = \frac{1}{\sqrt{2}}(cos\alpha - sin\alpha)$
xv. Express $2\sin(3\theta)cos\theta$ as a sum or difference.
xvi. Without using tables, write the value of $\sin(-300^o)$
xvii. Prove that $cos2\alpha = cos^2\alpha - sin^2\alpha$

xviii. Show that $\frac{sin2\theta}{1+cos2\theta} = tan\theta$

xix. Find the distance between the points $P(cosx, cosy),\ Q(sinx, siny)$

xx. Prove that $\frac{cos8^o - sin8^o}{cos8^o + sin8^o} = tan37^o$

xxi. Prove that $\frac{cos11^o + sin11^o}{cos11^o - sin11^o} = tan56^o$

Chapter#11 (Trigonometric Functions and their Graphs)

i. Write the domain and range of $sin\theta$

ii. Find the period of $tan\frac{x}{3}$

iii. Draw the graph of $y = sinx$ from 0 to π.

iv. What is the domain and range of $y = cosx$

v. Find the period of $3cos\frac{x}{5}$.

vi. Draw the graph of $y = sin3x$ from $0 \leq x \leq 360^o$

vii. Find the period of $sin\frac{x}{5}$

viii. Define period of trigonometric function.

ix. Find the period of $tan\frac{x}{7}$

x. Find the period of $tan4x$

xi. Find the period of $cot8x$

Chapter#12 (Application of Trigonometry)

i. A kite flying at a height of 67.2m is attached to fully stretched string inclined at an angle of 55^o to the horizental. Find length of the string.

ii. In a triangle ABC if $b = 95,\ c = 34,\ \alpha = 52^o$ find a.

iii. Find area of triangle in which $a = 4.8,\ \alpha = 83^o42',\ \gamma = 37^o12'$

iv. At the top of the cliff 80m high, the angle of depression of the boat is 12^o, how far the boat from the cliff is.

v. Find area of triangle in which $b = 21.6,\ c = 30.2,\ \alpha = 52^o40'$,

vi. Find measure of greatest angle of sides of tringle are $a = 16,\ b = 20,\ c = 33$

vii. Find area of triangle in which $b = 37,\ c = 45,\ \alpha = 30^o50'$

viii. Prove that $r_1r_2r_3 = rs^2$

ix. In a triangle if $a = 36.21,\ c = 30.4,\ \beta = 78^o10'$, then find angle γ.

x. If area of triangle $\Delta = 2437,\ a = 79,\ c = 97$ then find angle β.

xi. Show that $r_2 = s\tan\frac{\beta}{2}$

xii. A vertical pole is 8m high and the length of its shadow is 6m. What is the angle of elevation of the sun at that moment?

xiii. Prove that $rr_1r_2r_3 = \Delta^2$

xiv. Define angle of Elevation.

xv. State any two Law of Cosines.

xvi. Prove that $\Delta = 4Rr\cos\frac{\alpha}{2}\cos\frac{\beta}{2}\cos\frac{\gamma}{2}$

xvii. State law of Sine.

xviii. In triangle $\alpha = 35^o17', \beta = 45^o13',\ b = 421$ then find a.

xix. Find area of triangle in which $a = 200,\ c = 120,\ \gamma = 150^o$

xx. If $\gamma = 90^o,\ c = 10,\ b = 5$ find a and α.

xxi. If $a = 13,\ b = 14,\ c = 15$ then find R.

xxii. Prove $r = \frac{\Delta}{s}$

xxiii. Find area of triangle ABC if $a = 18,\ b = 24,\ c = 30$

xxiv. Prove that $R = \frac{abc}{4\Delta}$

Chapter#13, 14 (Inverse Trigonometric Functions; Solutions of Trigonometric Equations)

i. Find the value of $\sin(\cos^{-1}\frac{\sqrt{3}}{2})$

ii. Define trigonometric equation with one example

iii. Prove that $2\tan^{-1}A = \tan^{-1}\frac{2A}{1-A^2}$

iv. Find the solution of equation $secx = -2 \quad x\epsilon[0, 2\pi]$

v. Find the solution of equation $cosecx = -2 \quad x\epsilon[0, 2\pi]$

vi. Solve the equation $sinx + cosx = 0$

vii. Show that $\cos(2\sin^{-1} x) = 1 - 2x^2$

viii. Solve the trigonometric equation $cosec^2\theta = \frac{4}{3}$ in $[0, 2\pi]$

ix. Find the value of $\tan(\cos^{-1}\frac{\sqrt{3}}{2})$

x. Find solution of the equation $sinx = -\frac{\sqrt{3}}{2}$ which lies in $[0, 2\pi]$

xi. Solve $\cot\theta = \frac{1}{\sqrt{3}}$ where $\theta\epsilon[0, 2\pi]$

xii. Show that $\sin(2\cos^{-1} x) = 2x\sqrt{1 - x^2}$

xiii. Solve the equation $1 + cosx = 0$

xiv. Prove that $\tan^{-1}\frac{1}{4} + \tan^{-1}\frac{1}{5} = \tan^{-1}\frac{9}{19}$

xv. Solve the equation $4cos^2x - 3 = 0$ where $x\epsilon[0, 2\pi]$

xvi. Find the solution of equation $cosec\theta = 2 \quad \theta\epsilon[0, 2\pi]$

xvii. Show that $\cos(\sin^{-1} x) = \sqrt{1 - x^2}$

xviii. Show that $\tan(\sin^{-1} x) = \frac{x}{\sqrt{1-x^2}}$

xix. Find value of $\cos(\sin^{-1}\frac{1}{\sqrt{2}})$

xx. Without using calculator / table, show that $2\cos^{-1}\frac{4}{5} = \sin^{-1}\frac{24}{25}$

xxi. Without using calculator / table, show that $\cos^{-1}\frac{4}{5} = \cot^{-1}\frac{4}{3}$

xxii. Define the principal sin function.

xxiii. Solve the equation $\sin x = \frac{1}{2}$

xxiv. Find the values of θ, satisfying the eqaution $2sin^2\theta - sin\theta = 0,\ \ \theta\epsilon[0, 2\pi]$

xxv. Show that $cos^{-1}(-x) = \pi - cos^{-1}(x)$

xxvi. Find the value of $\sec\left(\sin^{-1}\left(-\frac{1}{2}\right)\right)$