X MATHEMATICS

10 YEARS PAST PAPERS

S E T S

- **If U={x|x∈ℕ, x≤10}, A = {2, 4, 6, 8, 10 } and B = {3, 6, 9, 10}, then prove that (AUB)'=A'∩B'. (2012)**
- **If A = {1, 2, 3, 4} and B = {2, 4, 6, 8}, then show that (AUB)−(A∩B) = AΔB. (2011)**
- **If A = {1, 2, 3, 5, 6} and B = {2, 4, 6, 7}, find AΔB. (2010)**
- **If** $U=\{x/x\in N \wedge x\le 10\}$ $A=\{1,3,5,7\}$ *and* $B=\{1,5,6,8\}$ **Prove that** $(A\cap B)'=A'\cup B'$ **(2009)**
- **If** $U=\{x/x\in N \wedge x\le 20\}$, $A=\{2,4,6,.....20\}$ *and* $B=\{1,3,5,....,19\}$ **verify that** $(A\cap B)'=A'\cup B'$ **(2008)**
- **If** $U=\{x/x\in N \wedge x\le 12\}$ $A=\{2,4,6,8,10,12\}$ *and* $B=\{3,6,9,12\}$ **Prove that** $(A\cap B)'=A'\cup B'$ **(2007, 2004)**
- **If** $U=\{x/x\in N \wedge 1\le x\le 12\}$ $A=\{1,2,5,9\}$ $B=\{2,3,8,9,10\}$ **Prove that** $A'\cap B'$ **(2005)**
- **If** $U=\{x/x\in N \wedge x\le 10\}$ $A=\{2,3,5,7\}$ $B=\{2,4,6,8,10\}$ **verify that** $(A\cup B)'=A'\cap B'$ **(2006, 2002)**
- **If** $U=\{1,2,3,4,5,6\}$, $A=\{1,2\}$ *and* $B=\{2,4,6\}$ **Prove that** $(A\cap B)'=A'\cup B'$ **(2003)**
- **If** $U=\{x/x\in N \wedge 1\le x\le 12\}$, $A=\{2,4,6,8,10,12\}$ **and** $B=\{2,3,5,7,11\}$ **then find** $A'\cup B'$ **(2001)**
- $U=\{x/x\in N \wedge x\le 10\}$ $A=\{2,4,6,8\}$ **and** $B=\{2,3,5,7\}$ **Verify that** $(A\cup B)'=A'\cap B'$ **(2000)**
- **If** $A=\{0,1\}$ **and** $B=\{1,2\}$ **prove that** $A\times B\ne B\times A$ **(2003)**
- **If** $A=\{2,3,4\}$ **and** $B=\{a,b\}$ **find** $A\times B$ **(2009)**
- **If** $A=(a,b,c)$ **find** $P(A)$. **(2007, 2004)**
- **Find P (B) when** $B=\{x,y,z\}$ **(2008, 2009)**
- **If** $A=\{a,b\}$ $B=\{2,3\}$ **and** $C=\{3,4\}$ **Find the value of** $A\times(B\cup C)$ **(2006)**
- **If** $A=\{a,b\}$ $B=\{8,9\}$ **and** $C=\{9,10\}$ **then find** $(B\cup C)\times A$ **(2001)**
- **If** $(x+10,-4-y)=(2-3x,2y+2)$ **Find the values of** x **and** y **(2005)**
- **If** $S=\{1,2,3\}$ **then find P(S). (2002)**

B L A N K S

- **A∆B= ________: (AUB, A∩B, (A∩B) - (AUB), (AUB) - (A∩B))**
- **(A')' = _______: (A, A', Ø, U)**
- **If R={(1,2), (2,3), (3,4)} Domain R = ______: ({1}, {1,2}, {1,2,3}, {2,3})**
- **{0, 1, 2, . . .} is the set of ______: (Prime number, Even number, whole number, odd number)**
- **The null set is considered to be a SUBSET of every set.**
- $\{0,1,2,3....\}$ **is a set of WHOLE NUMBERS.**
- **If 'a' is a real number then the point (0, a) lies on Y-AXIS.**
- **If a relation is given by** $R=\{(0,1),(1,2),(3,4)\}$ **then Range is** $\{1,2,4\}$.

- The Y coordinate of every point on $x-axis$ is zero.
- If $A=\{a,b,c,d\}$ then P(A) has 16 elements.
- If a set has 3 elements the number of its possible subsets is 8.
- If set A has 2 elements and set B has 3 elements then $A\times B$ has 6 elements.
- The ordered pair $(3,-4)$ lies in IV quadrant.
- If the elements of P(A) are 16 then the number of elements of set $A=4$.

SYSTEM OF REAL NUMBERS, EXPONENTS AND RADICALS

- Simplify: $\left(\frac{x^l}{x^m}\right)^{l+m}\times\left(\frac{x^m}{x^n}\right)^{m+n}\times\left(\frac{x^n}{x^l}\right)^{n+l}$ (2012)
- If P=3+2$\sqrt{2}$, find the value of $P^2+\frac{1}{P^2}$ (2012)
- Simplify: $\left(\frac{x^{2a}}{x^{a+b}}\right)\left(\frac{x^{2b}}{x^{b+c}}\right)\left(\frac{x^{2c}}{x^{c+a}}\right)$ (2011)
- Simplify: $\left(\frac{x^l}{x^m}\right)^{l+m}\times\left(\frac{x^m}{x^n}\right)^{m+n}\times\left(\frac{x^n}{x^l}\right)^{n+l}$ (2010)
- Simplify:
  $\left(\frac{x^{2a}}{x^{a+b}}\right)\left(\frac{x^{2b}}{x^{b+c}}\right)\left(\frac{x^{2c}}{x^{c+a}}\right)$ (2008, 2007)
- If $x=2+\sqrt{3}$, find the value of $x+\frac{1}{x}$ (2007, 2003)
- Simplify:
  $\left(\frac{x^a}{x^b}\right)^{a+b}\left(\frac{x^b}{x^c}\right)^{b+c}\div 4\left(x^c.x^a\right)^{a-c}$ (2006, 2009)
- $\left(\frac{(125)^2\times 8}{(64)^2}\right)^{1/3}$ (2005, 2004)
- $\left(\frac{x^{2p}}{x^{p+q}}\right)^{p+q}\left(\frac{x^{2q}}{x^{q+r}}\right)^{q+r}\left(\frac{x^{2r}}{x^{r+p}}\right)^{r+p}$ (2003)
- $\frac{(27)^{2n/3}\times(8)^{-n/6}}{(18)^{-n/2}}$ (2002)
- $\left(\frac{x^{2a}}{x^{a-b}}\right)^{a-b}\left(\frac{x^{2b}}{x^{b-c}}\right)^{b-c}\left(\frac{x^{2c}}{x^{c-a}}\right)^{c-a}$ (2001)
- $\left(\frac{x^a}{x^b}\right)^{a^2+ab+b^2}\left(\frac{x^b}{x^c}\right)^{b^2+bc+c^2}\left(\frac{x^c}{x^a}\right)^{c^2+ca+a^2}$ (2000)

BLANKS

- $[-1(-1)^5]^2$ = __________ (-1, 1, 0,2)
- Multiplicative inverse of $(a-b)$ is: (a+b, -a+b, $\frac{1}{a-b}$, $\frac{1}{a+b}$)
- If $x=2+\sqrt{3}$ *then* $x^2=$

- The additive inverse of $\frac{1}{-a-b}$ is $\frac{1}{a+b}$.
- The additive inverse of $a-b$ is $b-a$.
- $\left(7-2\sqrt{2}\right)\left(7+2\sqrt{2}\right)=$
- $\left(2\sqrt{2}+\sqrt{7}\right)\left(2\sqrt{2}-\sqrt{7}\right)=$
- $5^9 \div 5^8 = 5$
- π is an irrational number.
- $\left(49\right)^{1/2}\times\sqrt{121}=77$
- $8^{1/3}\times 36^{1/2}=8$
- $\frac{1}{15x^o}=\frac{1}{15}$
- Degree of polynomial $8x^2y^3-5x^2y^5-x^2y^7$ is
- $a\times a^{-1}=a$

LOGARITHMS

- With the help of log tables, find the value of $\frac{0.87}{(28.9)\times(0.785)}$. (2012)
- With the help of log tables, find the value of $\frac{6.735\times 48.27}{(16.18)^2}$. (2011)
- With the help of log tables, find the value of $\frac{85.7\times 2.47}{8.89}$. (2010)
- Find the value of $\frac{\left(86.2\right)^2\times\left(37.37\right)}{591}$ with the help of log tables. (2009, 2002)
- $\frac{0.87}{\left(28.9\right)\left(0.785\right)}$ (2008)
- $\frac{82.2\times 88.6}{2.25}$ (2007)
- $\frac{\left(780.6\right)^2\sqrt{3.0}}{4.0}$ (2006)
- $\left(\frac{9310}{\left(1.08\right)\left(62.4\right)^3}\right)^{1/3}$ (2005)
- $\frac{48.7}{\left(83.8\right)\left(3.14\right)}$ (2004)
- Solve $\frac{\left(0.96\right)\left(87.5\right)^2}{4850}$ (2003, 2001)
- Solve $\frac{\left(0.96\right)\left(87.5\right)^2}{4850}$ (2000)

BLANKS

- $\log_4 x = -\frac{3}{2}$, *then* $x =$ ________ $(\frac{1}{8}, 8, \frac{1}{6}, \frac{1}{9})$
- $\log_{10} 1000 = y$, *then* $y =$ ________ $(10, 3, 5, 0)$
- $\log_a \frac{x^3 y}{z^2} =$ ________ (A). $\log_a x^3 + \log_a y - \log_a z^2$ (B). $3\log_a x + \log_a y - 2\log_a z$
  (C). $3\log_a x - \log_a y + 2\log_a z$ (D). $\frac{3\log_a x - 2\log_a z}{\log_a y}$
- If $\log_{81} 9 = x$ *then* $x =$
- If $\log_x 32 = 5$ *then* $x =$
- If $\log_{81} x = -3/4$ *then* $x =$
- If $\log_x 81 = 4$ *then* x
- If $\log_8 x = 2/3$ *then* $x =$
- If $\log_x 49 = 2$ *then* $x =$
- The characteristic of 0.00396 is –3.
- log 3 + log 6 – log 2 = log 9
- If $\log_x 36 = 2$ *then* $x =$

ALGEBRAIC EXPRESSIONS

- None. (2012)
- Find the value of $a^3 - \frac{1}{a^3}$ when $a - \frac{1}{a} = 4$. (2011)
- If a + b = 5 and a – b = 3, find the value of $a^2 + b^2$. (2010)
- If $a+b=9$, $ab=20$ then find the value of a^2+b^2. (2009, 2004)
- If $a+b+c=9$ and $a^2+b^2+c^2=29$ then find the value of $ab+bc+ca$. (2008)
- Find a^2+b^2 when $a+b=7$ and $ab=12$. (2007, 2003)
- If $a+b=8$ when $a-b=2$ find the values of a^2+b^2 *and* ab. (2005)
- Find $a+b$ when $a-b=5$ *and* $ab=21$. (2001)
- Find $x^3 = 1/x^3$ when $x - 1/x = -4$. (2006, 2002)
- Find the value of $x^2 + \frac{1}{x^2}$ *when* $x + \frac{1}{x} = 6$ (2000)

BLANKS

- Degree of the polynomial x^2+xy^2+y is: (2,3,4,1)
- x^2+64 can be made a perfect square by adding __________.
  (a) $4x^2$ (b) $8x^2$ (c) $2x^2$ (d) $16x^2$
- (x-4)(x-6) = ___________
  (a) $x^2+10x-24$ (b) $x^2-10x-24$ (c) $x^2+10x+24$ (d) $x^2-10x+24$
- If a+b=2 and a−b=2 then value of a^2+b^2 is:
  (a) -1 (b) 2 (c) 4 (d) $\frac{3}{2}$
- $(a+b)^2 - (a-b)^2 = 4ab$.
- $(a+b)^2 + (a-b)^2 = 2(a^2+b^2)$.

FACTORIZATION

- Resolve the following into factors: $r^2(s-t)+s^2(t-r)+t^2(r-s)$ (2012)
  x^6-64, $(ab+cd)^2-(ac-bd)^2$, $x^2+15x-100$ (2012)
- $18x^2+9x-20$, $27x^3-1+8y^6+18xy^2$: (2011)
- Resolve the following into factors: (2010)
  $x^2(y-z)+y^2(z-x)+z^2(x-y)$
- $10x^2-17x+6$. (2009)

- $ab + amx - bx - mx^2$. (2009, 2005, 2001, 2000)
- $x^2y^2 - 16xy + 64$. (2009)
- $a^6 - b^6$. (2009)
- $x^4 - 11x^2 + 1$. (2009)
- $14x^2 - 15xy - 9y^2$. (2003)
- $x^3 - x^2 + 2$. (2011, 2009, 2007, 2006, 2004)
- $x^2 - yz + xy - xz$. (2008, 2007, 2004)
- $4x^2 + 5x - 21$. (2008)
- $a^4 + 4$. (2011, 2008)
- $1 + 2ab - (a^2 + b^2)$. (2008, 2007, 2004)
- $x^3 - x - 2y + 8y^3$. (2008, 2001)
- $a^3 - b^3 - 27c^3 - 9abc$. (2008)
- $12x^2 + 5x - 2$. (2007, 2004)
- $x^4 + 64$. (2007, 2006, 2004, 2002)
- $x^3 - 8y^3 + 1 + 6xy$. (2007, 2004)
- $ax^3 + ax^2 - bx^2 - bx - cx - c$. (2006)
- $x^2y^2 - 16xy + 64$. (2006)
- $x^2 - x - 2y + 8y^3$. (2006)
- $27a^3 - 64b^6 - 1 - 36ab^2$. (2006)
- $12a^2 - 17ab - 5b^2$. (2005)
- $64 + 25m^2 + 80m$. (2005)
- $m^7n - n^5m^3$. (2005)
- $x^8 + x^4 + 1$. (2005, 2012)
- $27a^3 - 8b^3 + 1 + 18ab$. (2005)
- $16a^2 - 40ab + 25b^2$. (2003)
- $27x^3 + 64y^3$. (2003)
- $4y^4 + 1$. (2003)
- $x^2 + 4x + 4 - y^2$. (2003)
- $a^3 + 27b^3 + 8c^3 - 18abc$. (2003)
- $6a^2x^2 + 12b^2y^2 - 9b^2x^2 - 8a^2y^2$. (2002)
- $x^3 - 8y^3 - z^3 - 6xyz$. (2002)
- $2x^2 + x - 15$. (2002)
- $25a^2 + 9b^2 - 30ab$. (2002)
- $x^2y - xy^7$. (2002)
- $25a^2 + 4b^2 - 20ab$. (2001)
- $8a^3 + 1 + b^3 - 6ab$. (2001)
- $3a^2 - 7a - 6$. (2001)
- $4y^4 + 81$. (2001)
- $16a^2 - 40ab + 25b^2$. (2000)
- $27x^3 + 8y^3$. (2000)
- $x^2 + 2x + 1 - y^2$. (2000)
- $a^3 + 8b^3 + c^3 - 6abc$. (2000)

- $x^2 - 13xy + 30y^2$. (2000)

- For what values of a and b, $x^4+4x^3+10x^2+ax+b$ will be a perfect square? (2012)
- For what values of 'q', $4x^4+12x^3+25x^2+24x+q$ will be a perfect square? (2011)
- What should be added to $x^4 + 4x^3 + 10x^2 + 14x + 5$ to make it a perfect square? (2009)
- What should be subtracted from $x^4 + 2x^3 + 3x^2 + x - 2$ so that it becomes a perfect square? Find the value of x also. (2008, 2006, 2002)
- If $4x^4 + 12x^3 + 21x^2 + ax + 9$ is a perfect square. Find the value of $'a'$? (2007, 2003)
- For what values of a and b will the expression $4x^4 + 12x^3 + 21x^2 + ax + b$ be a perfect square? (2005)
- For what values of a and b will the expression $4x^4 - 12x^3 + 25x^2 - ax + b$ be a perfect square? (2004)
- If $x^4 + 4x^2 + q + \frac{8}{x^2} + \frac{4}{x^4}$ is a perfect square then find the value of q. (2001)
- For what value of p will the expression $4x^4 - 16x^3 + 24x^2 - 16x + p$ become a perfect square. (2000)

REMAINDER THEOREM

- $x^3-x^2-14x+24$ (2012)
- $x^3+3x2+4x-28$ (2011)
- $x^3 - 11x^2 + 36x - 36$ (2010)
- $x^3 + 5x^2 - 2x - 24$. (2009, 2004, 2001)
- $x^2 - x^2 - 14x + 24$. (2008)
- $x^3 - 6x^2 + 11x - 6$. (2007, 2003)
- $x^3 - 6x^2 + 32$. (2006)
- $2x^3 + 5x^2 - 4x - 3$. (2005)
- $x^3 - 17x + 26$. (2002)

SIMPLIFY

- $\left(1 - \frac{a+b}{a-b}\right) \div \frac{4a}{2a^2 - 2ab}$. (2009)
- $\frac{4x - 3y}{9x^2 - 4y^2} - \frac{1}{3x - 2y}$. (2008)
- $\frac{1}{a-b} - \frac{b}{a^2 - b^2} - \frac{a}{a^2 + b^2}$. (2007, 2004)
- $\frac{1}{1 - a + a^2} - \frac{1}{1 + a + a^2} - \frac{2a}{1 + a^2 + a^4}$. (2006)
- $\left(1 + \frac{x+y}{x-y}\right) \div \frac{4xy}{2x^2 - 2xy}$. (2005)
- $\frac{1}{x^2 - 4y^2} + \frac{1}{x - 2y} + \frac{1}{x - 2y}$. (2000)
- $\frac{1}{a + 2b} + \frac{1}{a - 2b} + \frac{1}{a^2} - 4b^2$. (2002)
- Find the second polynomial when one polynomial is $x^2 - 5x - 14$, G.C.D is $x - 7$ and L.C.M. $= x^3 - 10x^2 + 11x + 70$. (2001)

B L A N K S

- G.C.D of $18x^5y^2$ *and* $12x^3y^4$ *is*
- x^4+64 can be made perfect square by adding $16x^2$.
- $\frac{9}{4}$ should be added to a^2-3a to make it a perfect square.
- L.C.M. of $4x^2$ *and* $5x$ is
- $2x^2$ should be added to x^4+4 to make it a perfect square.
- b^2 should be added to $16a^2+8ab$ to make it a perfect square.
- $2y$ should be added to y^2+1 to make it a perfect square.
- $4b^2$ should be added to a^4-4ab to make it a perfect square.
- To make x^2-8x a perfect square 16 should be added.

MATRICES

- By using Cramer's Rule, solve the equations: (2012)
  2x+5y=9, 4x-2y=1
- If A=$\begin{bmatrix}3 & 2\\1 & 0\end{bmatrix}$; prove that: $A.A^{-1}=I$ (2011)
- Apply Cramer's Rule to solve the given equations:
  $4x+y=2$
  $7x+2y=3$
- If $A=\begin{pmatrix}-3 & 2\\5 & 6\end{pmatrix}$ find A^{-1} and PROVE THAT $AA^{-1}=I$. (2009, 2008)
- If $A=\begin{pmatrix}2 & -1\\-3 & 2\end{pmatrix}$ find A^{-1}. (2007, 2003)
- If $A=\begin{pmatrix}6 & 2\\4 & 3\end{pmatrix}$ find A^{-1} and PROVE THAT $AA^{-1}=I$. (2006, 2002)
- If $A=\begin{pmatrix}5 & -3\\2 & -1\end{pmatrix}$ then find A^{-1} and PROVE THAT $AA^{-1}=I$. (2001)

Solve the following equations with the help of matrices.

- $2x-3y=1$ (2004)
  $x+4y=6$
- $2x-y=-2$ (2005)
  $x+2y=3$
- $x+2y=5$ (2000)
  $x+3y=7$

BLANKS

- If A=$\begin{bmatrix}1 & 2\\3 & p\end{bmatrix}$ is a singular matrix, the value of p is: (5,6,1,-1)
- Scalar matrix is :
  (a) $\begin{bmatrix}3 & 0\\0 & 3\end{bmatrix}$ (b) $\begin{bmatrix}1 & 0\\0 & 1\end{bmatrix}$ (c) $\begin{bmatrix}0 & 3\\3 & 3\end{bmatrix}$ (d) $\begin{bmatrix}0 & 1\\1 & 1\end{bmatrix}$
- If number of rows and columns is not equal then matrix is called rectangular matrix.
- If $A=\begin{pmatrix}1 & 2\\3 & p\end{pmatrix}$ *then* $p=$

- If $\begin{pmatrix} 2 & 3 \\ 4 & x \end{pmatrix}$ is a singular matrix then $x =$
- If $A = \begin{pmatrix} 1 & -2 \\ 3 & -4 \end{pmatrix}$ *and* $B = \begin{pmatrix} -1 & 2 \\ -3 & 4 \end{pmatrix}$ then A + B is a 0 matrix.
- If $A = \begin{pmatrix} a \\ b \end{pmatrix}$ *and* $B = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ *then* $A - B = \begin{pmatrix} a-1 \\ b-2 \end{pmatrix}$.

ALGEBRAIC SENTENCES

Solve graphically the following sets of equations. (Find four ordered pairs)

(1) $5x + 7y = 13$, $7x + 6y = 3$ (2010)

(2) $4x - y = 5$, $x + 5y = 17$ (2009)

(3) $3x = 7 + 2y$, $5x + y = 3$ (2008, 2006, 2001)

(4) $x - 3y = -5$, $2x + 7y = 3$ (2007, 2004)

(5) $3x + 5y = 21$, $4x + y = 11$ (2005)

(6) $8x - y = 29$, $2x + y = 11$ (2003)

(7) $x + 2y = 12$, $3x - 2y = -4$ (2002)

(8) $7x - y = 3$, $x + 3y = 13$ (2002)

(9) $x - 2y = -3$, $2x + y = 14$ (2011)

(10) $4x - y - 10 = 0$, $3x + 5y - 19 = 0$ (2012)

Solve the following equations:

- $\left|\frac{2x+5}{6}\right| - 3 = 1$, (2011)
- $\left|\frac{8x+5}{2}\right| - 1 = 3$ (2009)
- $\sqrt{25x - 6} = 4\sqrt{x + 3}$ (2011, 2009, 2007, 2006, 2004)
- $x^2 + 10x - 24 = 0$ (2009)
- $\left|\frac{2x-1}{3}\right| - 2 = 0$ (2008, 2002)
- $\frac{\sqrt{3x - 5}}{2} + 2 = 10$ (2008)
- $x^2 + 6x - 40 = 0$ (2008, 2007, 2004)

- $\frac{|2x+3|}{3}-2=8$ (2007, 2006, 2004)
- $5(x+1)-2(x-2)=17$ (2006, 2003)
- $|5x-3|-6=3$ (2005, 2001)
- $\sqrt{4(3x-1)}=2\sqrt{x+8}$ (2005, 2001)
- $2x^2-7x-15=0$ (2005)
- $x^2+8x+15=0$ (2003)
- $2x^2-7x+6=0$ (2010)
- $\sqrt{4x-5}=\sqrt{3x+7}$. (2010)
- $\sqrt{3x-5}+1=8$ (2003, 2000)
- $2x-3>6+x,\ x\in N$ (2002)
- $3x^2-10x+2=0$ (2002)
- $3x^2-10x+6=0$ (2001)
- $6x^2+5x+1=0$ (2000)
- $\left|\frac{2a-1}{3}\right|-2=5$ (2000)

BLANKS

- Sol set of $|4x|=-2$ *is* $\{\ \}$
- Sol set of $|2x+2|=-3$ *is* $\{\ \}$

ELIMINATION

- **Find a relation independent of 't' from the following equation:** **(2012)**

  $x=\frac{a(1-t^2)}{1+t^2},\ y=\frac{b(1-t^2)}{2t^2}$
- **Find a relation independent of 'x' from the following equation:** **(2011)**

  $x+\frac{1}{x}=2a,\ x^3+\frac{1}{x^3}=b^3$
- **Eliminate 'x' from the following equations and find the new relationship:** **(2010)**

  $x+\frac{1}{x}=2p$

  $x-\frac{1}{x}=2q+1$
- **Find relation free of x** **(2009)**

  $\frac{x}{a}+\frac{a}{x}=2b$

  $\frac{x}{a}-\frac{a}{x}=2c$
- **Eliminate t**

  $x=at^2,\ y=bt^3$ **(2008)**
- **If $x^2+\frac{1}{x^2}=p=2$ and $x-\frac{1}{x^2}+q=3$ find relation free from x.** **(2006)**
- **Eliminate t** **(2005)**

  $x=t\sqrt{5}$ *and* $y=7t\sqrt{2}$
- **Find relation independent of x.** **(2004)**

  $x+\frac{1}{x}=t$

$x-\frac{1}{x}=\frac{t}{2}$

- If $x+\frac{1}{x}=t+2$ *and* $x-\frac{1}{x}=t-2$ find the relation free from x. (2003)
- Eliminate $x: x+\frac{1}{x}=2p$. (2002)

$x-\frac{1}{x}=2q+1$

- Eliminate x: (2001)

$x-\frac{1}{x}=2a$

$x^2+\frac{1}{x^2}=b^2$

- Eliminate x: (2000)

$x-\frac{1}{x}=2p$ *and* $x^2+\frac{1}{x^2}=q^2$

RATIO AND PROPORRTION

- If $\frac{a}{b+c}=\frac{b}{c+a}=\frac{c}{a+b}$ and a+b+c≠ 0, prove that a=b=c (2012)
- If $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}$, prove that $(a^2+c^2+e^2)(b^2+d^2+f^2)=(ab+cd+ef)^2$ (2011)
- If $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}$, prove that $\frac{a^4b^2+a^2e^2-e^4f}{b^6+b^2f^2-f^5}=\frac{a^4}{b^4}$. (2010)

INFORMATION HANDLING

- Marks obtained by some students in a computer science exam are given below. Find the median of their marks: (2012)

Marks Obtained	20 – 24	25 – 29	30 – 34	35 – 39	40 – 44	45 – 49
No. of Students	25	28	32	25	13	12

- The marks obtained by 84 students in an examination are given below. Find mean. (2011)

Marks Obtained	25 - 29	30- 34	35 – 39	40 – 44	45 – 49
No. of Students	9	18	35	17	5

- The marks obtained by some students in a Chemistry examination are given below. Find the median of their marks: (2010)

Marks Obtained	25 – 29	30 – 34	35 – 39	40 – 44	45 – 49
No. of Students	9	18	35	17	5

- Find variance from the given information. (2009)

$\bar{x}=12.5,\ \sum x^2=6666$

- The marks obtained by some students in a subject are below. Find mean. (2009)

Marks Obtained	15-19	20-24	25-29	30-34	35-39
No. of Students	9	18	35	17	5

- Find the variance of the following set of numbers. (2008, 2000)

$X=3,5,7,9,11,13$

- The following are the marks obtained by 10 students in Mathematics: (2008)

$X=23,15,35,48,41,5,8,9,11,51$. Find the median of the marks of the students.

- The marks obtained by 60 students in an examination are given below. Find their mode. (2007)

Marks	40-42	43-45	46-48	49-51	52-54
No. of Students	10	12	30	6	2

- **A hospital is six storied. The number of rooms in each storey is 35, 32, 31, 34, 38, 33. Find the standard deviation of the data. (2007)**
- **The marks obtained by 100 students are given below. Find their arithmetic mean. (2006,03,01)**

Marks	30-34	35-39	40-44	43-49	50-54	55-59
No. of Students	14	16	18	23	18	11

- **The weight measurements of 12 medicines (in grams) are 43, 54, 45, 44, 58, 47, 50, 52, 51, 45, 48, 46. Calculate their standard deviation. (2006)**
- **Ten students took a test in Mathematics (out of 100) they got 66, 46, 50, 52, 60, 63, 64, 51, 61 and 55 marks. Find the variance of their marks. (2005)**
- **A set of data contains the values as 148, 145, 160, 157, 156 and 160. Prove that Mode > Median > Mean. (2005)**
- **The following are the marks obtained by 10 students in English. Find standard deviation of marks. (2004)**
  46, 50, 52, 60, 63, 64, 51, 55, 66
- **Following are the heights of 40 students in inches: Find the mode of the heights of students. (2004)**

Heights (inches)	48-50	50-52	52-54	54-56	56-58	58-60
No. of Students	5	7	10	9	6	3

- **The heights of 11 players of a football team are as under. Find variance of the heights. (2003)**
  57, 61, 60, 64, 59, 55, 58, 63, 65, 61, 56
- **Find S.D from the following information: (2002)**
  $\overline{x} = 19.5,\ \sum x = 195,\ \sum x^2 = 5555$
- **The following are the marks obtained by 10 students in English. Find the median. (2002)**
  $X = 23, 15, 48, 41, 5, 8, 9, 11, 51, 3$
- **Find the variance** $X = 5, 13, 15, 25, 12, 18, 17, 19, 20, 16, 3$ **(2001)**
- **On the prize distribution day 84 students of a school brought pocket money with them as under. Find A.M. (2000)**

Rupees	15-19	20-24	25-29	30-34	35-39
No. of Students	9	18	35	17	5

BLANKS

- **The median of 0,2,4,6,8,9 is ________. (4,6,8,5)**
- **Of –2, –1, 0, 1, 2, the mean is 0.**
- **In series 0, 1, 4, 6, 7, 9, 12 the median is 6.**
- **The variance is the square of the standard deviation.**
- **The sum of 5 observations is 125, the mean is 25.**
- $\sum x / n$ **is the formula of arithmetic mean.**
- **The median of 2, 4, 6, 8, 10, 12 is 7.**
- **3 median – 2 mean = mode.**
- **The value which appears most in the data is called MODE.**
- **If the arithmetic mean of 20 numbers is 100 then their sum is 2000.**
- $\begin{pmatrix} 4 & -6 \\ 2 & 8 \end{pmatrix} + \begin{pmatrix} 5 & 6 \\ 7 & -4 \end{pmatrix} = \begin{pmatrix} 9 & 0 \\ 9 & 4 \end{pmatrix}$
- **The median 2, 4, 6, 8, 10, 12 is 7.**

TRIGONOMETRY

- **Prove that:** $\cot\beta + \tan\beta = \cot\beta \sec^2\beta$ **(2012)**

- Prove that: $\sin^2\theta + \cos^2\theta = 1$ (2011)
- Find the value of the trigonometric ratios of 30^o. (2010)
- Find all the trigonometric ratios of 45^o. (2009, 2004)
- Find the trigonometric ratios of 30^o. (2005)
- Find the trigonometric ratios of 60^o. (2006)
- Prove that:

  $\frac{Sin\theta}{1-\cos\theta} = \frac{1+\cos\theta}{\sin\theta}$ (2009)
- $\sin 260^o + \cos 260^o = 1$. (2008)
- $\left(\cos\theta - \sin\theta\right)^2 + 2\sin\theta.\cos\theta = 1$. (2007)
- $\frac{1-\cos\theta}{\cos\theta} = \frac{\cos\theta}{1} + \sin\theta$ (2006)
- $\left(\tan\theta + \cot\theta\right)\sin\theta\cos\theta = 1$. (2005, 2002)
- $\left(\text{cosec}^2\theta - 1\right)\sin^2\theta = \cos^2\theta$. (2004)
- $1 + \cot^2\theta = \text{cosec}^2\theta$. (2003)
- Derive $\sin^2\theta + \cos^2\theta = 1$. (2001)
- The foot of a tower is at a distance of 210 dm from a point on the earth. The angle of elevation of the tower from the point is 60^o. Find the height of the tower. (2008)
- A tree 90 dm high on the bank of a river makes an angle of 30^o from a point directly on the opposite bank of a river. Find the width of a river. (2002, 2000)
- A ladder makes an angle of 60^o with the floor and reaches a height of 6 meters on the wall. Find the length of the ladder. (2001)
- Solve the triangle ABC in which m<C = 90^o, m<B = 60^o and b = 4 cm. (2007)

BLANKS

- The reciprocal of $\sin\theta = \text{cosec}\,\theta$.
- If in a rt. Triangle ABC m<B = 90o and measures of sides a, b, c are 6, 10 and 8 respectively then tan m<A = ¾.
- $Cosec^2\theta - 1 = \cot 2\theta$

(1) $Cosec\,60^o = \frac{2}{\sqrt{3}}$ (2) $Sin\theta.Sec\theta =$ (3) $\tan 60^o = \sqrt{3}$

(4) $\tan\theta.\cot\theta = 1$ (5) $\text{cosec}\,\theta.\tan\theta = \sec\theta$ (6) $\cot 60^o = \frac{1}{\sqrt{3}}$

(7) $\sqrt{1-\cos^2\theta} = \sin\theta$ (8) $Cosec\,30^o = 2$ (9) $\tan 30^o = \frac{1}{\sqrt{3}}$

BLANKS FROM GEOMETRY (10 Years)

- The sum of all angles of a cyclic triangle is 360^o.
- A line cannot be PARALLEL to two intersecting lines.
- Each of the supplementary angles can be a right angle.
- The angle inscribed in major arc is an acute angle.
- The line which meets circle in only one point is called TANGENT.

- An angle inscribed in a semi circle is right angle.
- The angle inscribed in minor arc is obtuse.
- If a st. line intersects a circle in two points the st. line is called SECANT.
- A line segments whose end points lie on circle is called CHORD.
- The measure of each angle of an equilateral triangle is 60^o.
- The vertical angles formed by two intersecting lines are Congruent.
- The circle passing through the vertices of a triangle is called Circum circle.
- A chord passing through the centre of a circle is called the DIAMETER of a circle.
- If the sum of measures of two angles is 180^o then the angles are called SUPPLEMENTARY.

IMPORTANT QUESTIONS

- **CHAPTER # 1:** Examples 1.22, 1.6 Ex. 1.1 (6, 9) Ex. 1.2 (12, 14, 17, 18, 20) Ex. 1.3 (1, 3, 5) MISCELL. (4, 11, 12)
- **CHAPTER # 2:** Examples (pg. 20, 3 (pg. 39), 2, 3 (pg. 43), 1, 2, 3 (pg 44-45) 2 (pg. 47) Ex.2.1 (3) Ex. 2.3 (10, 11, 12, 13) Ex. 2.4 (7-12) Ex. 2.6 (10-14) 2.7 (5-14) Ex.2.8 (2-10) Miscellaneous Ex. (6, 8, 10)
- **CHAPTER # 3:** Examples 3, 4 (pg. 55) 5, 6 (very important) (pg. 56) 1 (pg. 62) 2, 3 (pg. 64) 2 (pg. 66) 3, 1 (pg. 67) 2.3 (pg. 68).
  Ex. 3.1 (Objectives 1 – 12) Ex.3.2 (11-25 especially 20, 21, 22) Ex.3.4, 3.5, 3.6 Miscellaneous Ex. (5, 6, 7, 8, 10)
- **CHAPTER # 4:** Example 1 (pg. 84) 2, 3 (pg. 85) 4 (pg. 86) 3, 4 (pg. 87) 3, 4 (pg. 89) 2 (pg.92) Ex. 4.1 (4) Ex. 4.4 (9-12) Ex. 4.5 (3) Ex. 4.7
  Ex. 4.8 (2) Ex. 4.9 (2-5) Ex. 4.10 (7, 8, 9) Miscell. (4, 6, 8, 9, 11, 12)
- **CHAPTER # 5:** Examples 2, 3, 4, 5, 6 (pg. 96-97) 1, 2 (pg. 98) 1, 2 (pg. 100) 1, 2, 3 (pg.101-102) 1, 2 (pg. 103-104) 1, 2 (pg. 106) 1, 2 (pg. 118) 2 (pg. 120) 1(pg.122), 3, 4 (pg.127-128) Ex.5.1 to Ex.5.7, Ex.5.10 (11-15) 5.11(4, 5, 6, 8), 10 (2, 3, 4, 5) 11(1, 2, 3) 12 (1, 3).
  Ex. 5.12 (1, 4, 5) Ex. 5.14 (9-14) Miscell. (1, 2, 3, 5, 6, 7, 10, 11)
- **CHAPTER # 6:** Example 1 (pg.148) example (pg. 154) example (pg.156) example 1 (pg. 159) example 1 (pg.163) Ex.6.4 (4, 5, 6) Ex. 6.5 (By Cramer's Rules) Miscell. (1, 8).
- **CHAPTER # 1:** Examples 1 (pg.1) 2 (pg.5) 3 (pg.6) 1 (pg.7) 2 (pg.8) example (pg.9) 3 (pg.10) 4 (pg.11) 1, 2 (pg.13) 1, 2 (pg.14-15) 1 (pg.17) 2 (pg.18) Ex.1.1 (1) 1.2, 1.3, 1.4, 1.5 (1-10) 1.6 (9-16) 1.8 Miscell. (1, 2, 3, 4, 10).
- **CHAPTER # 2:** Example 1 (pg.21) 4, 1 (pg.4) 1, 2 (pg. 24-25) Ex.2.1 {1 (i, iv, v) 2, 3, 4 (i, ii, iii, iv), 5, 7(i, ii), 8}
- **CHAPTER # 3:** Example (pg.30) 1, 2, 3 (pg.3) 1, 2, 4, 5 (pg.40-41) 1, 2, 3 (pg.43-44) Ex.3.1 (2, 3, 9, 10, 11, 12, 16, 17) Ex. 3.2, Ex. 3.3 (1-7) Miscell. (8, 15, 17).
- **CHAPTER # 4:** Examples 1 (pg.72), 2 (pg.73) 3, 4 (pg.74) 10 (pg.78) 1, 2 (pg.80-81) 3, 4(pg.82) 1, 2 (pg.84) 3, 4 (pg.85) 1 (93) Ex.4.3 (2, 4, 6, 7, 8, 10) Ex. 4.4 (1, 2, 4, 6, 9) Miscell. (4, 12 (i, ii, iii), 19, 21).
- **CHAPTER # 8:** Ratios of 60^o, Examples 1, 2, 3, 4 (pg.174-175) 1, 2, 3, 4 (pg.176-179) 1, 2, 3, 4, 7 (pg.181-185) Ex.8.3 (2(ii, ii, vi, vii, viii, ix, xi), 3, 4) Ex. 8.4 (2, 3) Ex.8.5 (1, 2, 3, 4, 5, 7, 8, 10, 11, 13, 14, 17, 18) Miscell. (2(iv,vi), 3, 4, 5, 7, 8)

FORMULAE

- $(A\cup B)' = A'\cap B'$
- $(A\cap B)' = A'\cup B'$
- NO. OF SUBSETS = 2^n
- NO. OF BINARY RELATIONS: $m \times n$

- A Δ B = $A\Delta B=\left(A\bigcup B\right)-\left(A\bigcap B\right)$
- $a^{o}=1$
- $a^{-1}=\dfrac{1}{a}$
- $\dfrac{1}{a^{-1}}=a$
- $\log_a m+\log_a n=\log_a mn$
- $\log_a m-\log_a n=\log_a \dfrac{m}{n}$
- $\log_a m^n=n\log_a m$
- $\dfrac{\log_n a}{\log_n b}=\log_b a$
- $\left(a+b\right)^2+\left(a-b\right)^2=2\left(a^2+b^2\right)$
- $\left(a+b\right)^2-\left(a-b\right)^2=4ab$
- $\left(a+b\right)^2=\left(a-b\right)^2+4ab$
- $\left(a-b\right)^2=\left(a+b\right)^2-4ab$
- $\left(a+b+c\right)^2=a^2+b^2+c^2+2ab+2bc+2ca$
- $a^3+b^3=\left(a+b\right)\left(a^2-ab+b^2\right)$
- $a^3-b^3=\left(a-b\right)\left(a^2-ab+b^2\right)$
- $\left(a+b\right)^3=a^3+b^3+3ab\left(a+b\right)$
- $\left(a-b\right)^3=a^3-b^3-3ab\left(a-b\right)$
- $a^3+b^3+c^3-3abc=\left(a+b+c\right)\left(a^2+b^2+c^2-ab-bc-ca\right)$

PRODUCT OF POLYNOMIALS = H.C.F × L.C.M

$A^{-1}=Adj\ A/\left|A\right|$

DETERMINANT OF MATRIX = ad – bc

- **Quadratic Formula:** $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$
- **Arithmetic mean for grouped data** $\sum fx/\sum f$
- **Median for grouped data** $l+h/f\left(\dfrac{n}{2}-c\right)$
- **Mode for grouped data** $\dfrac{l+\left(fm-f1\right)\times h}{\left(fm-f1\right)+\left(fm-f2\right)}$
- **Mean for ungrouped data =** $\sum x/n$
- **Median for ungrouped data = If** n **is odd then Median** $=\dfrac{n+1}{2}$
- **If** n **is even then Median =** $\dfrac{1}{2}\left\{\left(\dfrac{n}{2}\right)th+\left(\dfrac{n+2}{2}\right)th\right\}$ **item.**
- $Sin\theta=\dfrac{1}{\operatorname{cosec}\theta}$
- $Cos\theta=\dfrac{1}{\sec\theta}$
- $Tan\theta=\dfrac{\sin\theta}{\cos\theta}$
- $Sin^2\theta+\cos^2\theta=1$
- $1+\tan^2\theta=\sec^2\theta$
- $1+\cot^2\theta=\operatorname{cosec}^2\theta$