TVL10M

Tirunelveli District Common Examinations
First Revision Test - January 2023

Standard 10

MATHEMATICS

Time: 3.00 Hrs. Marks: 100

PART - I

I. Choose the correct answer: **14×1=14**

1) If $f : A \to B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to ______.
a) 7 b) 49 c) 1 d) 14

2) The order pairs of $(a-11, 6)$ $(-5, 3a-b)$ are equal then (a, b) is
a) $(6, -12)$ b) $(-6, -12)$ c) $(6, 12)$ d) $(-6, 12)$

3) Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1}+F_{n-2}$ then F_5 is ______.
a) 3 b) 5 c) 8 d) 11

4) The value of $(1^3+2^3+3^3+\dots\dots+15^3) - (1+2+3+\dots\dots+15)$ is
a) 14400 b) 14200 c) 14280 d) 14520

5) Graph of a linear equation is a ______.
a) straight line b) circle c) parabola d) hyperbola

6) If α and β are the zeros of the polynomial x^2-5x+6 then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to ______.
a) $-5/6$ b) $-6/5$ c) $6/5$ d) $5/6$

7) 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

8) A tangent is perpendicular to the radius at the ______.
a) centre b) point of contact c) infinity d) chord

9) If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then slope of the perpendicular bisector of PQ is ______.
a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $\frac{1}{\sqrt{3}}$ d) 0

10) $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to ______.
a) $\sec\theta$ b) $\cot^2\theta$ c) $\sin\theta$ d) $\cot\theta$

11) If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}:1$, then the angle of elevation of the sum has measure.
a) 45° b) 30° c) 90° d) 60°

12) The total surface area of a hemi-sphere is how much times the square of its radius
a) π b) 4π c) 3π d) 2π

13) The range of the data 8, 8, 8, 8, 8, ……… 8 is
a) 0 b) 1 c) 8 d) 3

14) Which of the following is incorrect?
a) $P(A) > 1$ b) $0 \le P(A) \le 1$ c) $P(\phi) = 0$ d) $P(A)+P(\bar{A}) = 1$

PART - II

II. Answer any ten questions. Question No. 28 is compulsory: **10×2=20**

15) Let $A = \{1, 2, 3\}$ and $B = \{x/x$ is a prime number less than $10\}$. Find $A\times B$ and $B\times A$.

16) Find k if $fof(k) = 5$ where $f(k) = 2k-1$.

17) Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.

18) Find the sum $3+1+\frac{1}{3}+\dots\dots\infty$.

19) Simplify: $\frac{4x^2y}{2z^2}\times\frac{6xz^3}{20y^4}$

20) Find the value of a, b, c, d from the equation $\begin{pmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{pmatrix} = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$.

21) The length of the tangent to a circle from a point P, which is 25 cm away from the centre is 24 cm. What is the radius of the circle?

22) i) What is the slope of a line whose inclination is 30°?

ii) What is the inclination of a line whose slope is $\sqrt{3}$?

23) Prove that $\frac{\sec\theta}{\sin\theta} - \frac{\sin\theta}{\cos\theta} = \cot\theta$.

24) Find the angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of a tower of height $10\sqrt{3}$ m.

25) The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2. Find the diameter of the cylinder.

26) Find the coefficient of variation of 24, 26, 33, 37, 29, 31.

27) What is the probability of drawing either a king or queen in a single draw from a well shuffled pack of 52 cards?

28) Show that the straight lines $x-2y+3 = 0$ and $6x+3y+8 = 0$ are perpendicular.

PART - III

III. Answer any ten questions. Question No. 42 is compulsory: **10×5=50**

29) Let $A = \{x \in W / x < 2\}$, $B = \{x \in N / 1 < x \leq 4\}$ and $C = \{3, 5\}$. Verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

30) If the function $f : R \rightarrow R$ is defined by $f(x) = \begin{cases} 2x+7; & x < -2 \\ x^2 - 2; & -2 \leq x < 3 \\ 3x - 2; & x \geq 3 \end{cases}$, then find the values of (i) $f(4)$ (ii) $f(-2)$ (iii) $f(4)+2f(1)$ (iv) $\frac{f(1)-3f(4)}{f(-3)}$.

31) Find the HCF of 396, 504, 636.

32) In a G.P the product of three consecutive terms is 27 and the sum of the product of two terms taken at a time is 57/2. Find the three terms.

33) If $A = \frac{2x+1}{2x-1}$, $B = \frac{2x-1}{2x+1}$ find $\frac{1}{A-B} - \frac{2B}{A^2-B^2}$.

34) If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ show that $A^2 - 5A + 7I_2 = 0$.

35) State and prove Pythagoras theorem.

36) Find the value of k, if the area of a quadrilateral is 28 sq.units. Whose vertices are taken in the order $(-4, -2)$, $(-3/4, k)$, $(3, -2)$ and $(2, 3)$.

37) If $\frac{\cos\theta}{1+\sin\theta} = \frac{1}{a}$, then prove that $\frac{a^2-1}{a^2+1} = \sin\theta$.

38) From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60°. If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}$ m.

39) 4 persons live in a conical tent whose slant height is 19m. If each person require 22m^2 of the floor area, then find the height of the tent.

40) Marks of the students in a particular subject of a class are given below. Find its standard deviation.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	8	12	17	14	9	7	4

41) Two unbiased dice are rolled once. Find the probability of getting.
(i) a doublet (ii) the product as a prime number (iii) the sum as a prime number (iv) the sum as 1.

42) A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold?

PART - IV

IV. Answer all the questions: **2×8=16**

43) a) Construct a triangle similar to a given triangle PQR with its sides equal to $7/4$ of the corresponding sides of the triangle PQR (scale factor $7/4 > 1$).

(OR)

b) Draw the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the lengths of the tangents.

44) a) Draw the graph of $xy = 24$, $x, y > 0$. Using the graph find (i) y when x = 3 and (ii) x when y = 6.

(OR)

b) Draw the graph of $y = x^2-4x+3$ and use it to solve $x^2-6x+9 = 0$.

I Revision Test

Std: X

Mathematics

I Choose:

1. a) 7
2. c) (6,12)
3. d) 11
4. c) 14280
5. a) Straight line
6. d) $5/6$
7. a) 1.4 cm
8. b) Point of contact
9. b) $-\sqrt{3}$
10. d) $\cot\theta$
11. d) 60°
12. c) 3π
13. a) 0
14. c) $P(A) > 1$

II Answer the following:

15. $A = \{1,2,3\}$ $B = \{2,3,5,7\}$

$A \times B = \{1,2,3\} \times \{2,3,5,7\}$

$= \{(1,2)(1,3)(1,5)(1,7)(2,2)(2,3)(2,5)(2,7)(3,2)(3,3)(3,5)(3,7)\}$

$B \times A = \{2,3,5,7\} \times \{1,2,3\}$

$= \{(2,1)(2,2)(2,3)(3,1)(3,2)(3,3)(5,1)(5,2)(5,3)(7,1)(7,2)(7,3)\}$

16. $f \circ f(k) = 5$ $f(k) = 2k-1$

$f \circ f(k) = f(f(k))$

$5 = f(2k-1)$

$5 = 2(2k-1) - 1$

$4k - 2 - 1 = 5$

$4k - 3 = 5$

$4k = 5+3$

$4k = 8$

$k = 8/4$

$\boxed{k = 2}$

17. The remainders are 4, & 5

$445 - 4 = 441$, $572 - 5 = 567$

$567 = 441 \times 1 + 126$

$441 = 126 \times 3 + 63$

$126 = 63 \times 2 + 0$

HCF of $441, 567 = 63$

Req. number $= 63$

18. $3 + 1 + \frac{1}{3} + \cdots \infty$

$a = 3$ $r = \frac{t_2}{t_1} = \frac{1}{3}$

$S_\infty = \frac{a}{1-r} = \frac{3}{1-\frac{1}{3}} = \frac{3}{\frac{3-1}{3}} = \frac{3}{2/3}$

$S_\infty = 3 \times \frac{3}{2} = \frac{9}{2}$

19. $\frac{\cancel{4}^{1} x^2 \cancel{y}}{\cancel{2} z^2} \times \frac{\cancel{6}^{3} x z^{\cancel{3}}}{\cancel{20} y^{\cancel{3}}_{5}} = \frac{3x^3 z}{5y^3}$

20. $\begin{pmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{pmatrix} = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$

$a - b = 1$ $2a - b = 0 \Rightarrow 2a = b$

$a - 2a = 1$ $b = 2a$

$-a = 1$ $b = 2 \times -1$

$\boxed{a = -1}$ $\boxed{b = -2}$

$2a + c = 5$ $3c + d = 2$

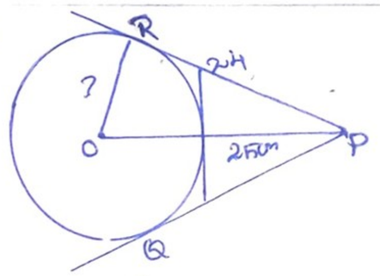
$2 \times -1 + c = 5$ $3 \times 7 + d = 2$

$c = 5 + 2$ $d = 2 - 21$

$\boxed{c = 7}$ $\boxed{d = -19}$

$\boxed{a = -1, b = -2, c = 7, d = -19}$

21.



In ΔOPR

$24^2 + r^2 = 25^2$

$r^2 = 625 - 576$

$r^2 = 49$

$r = \sqrt{49} = 7$ cm

22) i) $\theta = 30^\circ$

Slope $m = \tan\theta$

$m = \tan 30^\circ = \frac{1}{\sqrt{3}}$

ii) $m = \sqrt{3}$

$\tan\theta = \sqrt{3}$

$\theta = 60^\circ$

23) $\frac{\sec\theta}{\sin\theta} - \frac{\sin\theta}{\cos\theta} = \frac{\frac{1}{\cos\theta}}{\sin\theta} - \frac{\sin\theta}{\cos\theta}$

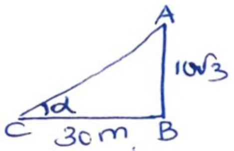
$= \frac{1}{\sin\theta\cos\theta} - \frac{\sin\theta}{\cos\theta}$

$= \frac{1-\sin^2\theta}{\sin\theta\cos\theta}$

$= \frac{\cos^{\cancel{2}}\theta}{\sin\theta\cancel{\cos\theta}} = \frac{\cos\theta}{\sin\theta}$

$= \cot\theta$

24)



$\tan\alpha = \frac{\cancel{10}\sqrt{3}}{\cancel{30}_3} = \frac{\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{1}{\sqrt{3}}$

$\tan\alpha = \frac{1}{\sqrt{3}}$

$\boxed{\alpha = 30^\circ}$

Angle of elevation $= 30^\circ$

25) CSA of the cylinder $= 88$

$2\pi r h = 88$

$2 \times \frac{22}{7} \times r \times 14 = 88$

$2r = \frac{88 \times 7}{22 \times 14}$

$2r = 2$ cm

Diameter $= 2$cm

26)

x	$d = x - \bar{x}$	d^2
24	-6	36
26	-4	16
33	3	9
37	7	49
29	-1	1
31	1	1

$\bar{x} = \frac{\Sigma x}{n} = \frac{180}{6} = 30$

$\sigma = \sqrt{\frac{\Sigma d^2}{n}} = \sqrt{\frac{112}{6}} = \sqrt{18.66} = 4.32$

C.V $= \frac{\sigma}{\bar{x}} \times 100 = \frac{4.32}{30} \times 100 = 14.4$

27) $n(S) = 52$

$n(A) = 4$

$P(A) = \frac{n(A)}{n(S)} = \frac{4}{52}$

$n(B) = 4$

$P(B) = \frac{n(B)}{n(S)} = \frac{4}{52}$

$P(A \cup B) = P(A) + P(B) = \frac{4}{52} + \frac{4}{52} = \frac{\cancel{8}^2}{\cancel{52}_{13}}$

$P(A \cup B) = \frac{2}{13}$

28) $x - 2y + 3 = 0$

$m_1 = \frac{-1}{-2} = \frac{1}{2}$

$6x + 3y + 8 = 0$

$m_2 = \frac{-6}{3} = -2$

$m_1 \times m_2 = \frac{1}{\cancel{2}} \times -\cancel{2} = -1$

Two straight lines are perpendicular

III Answer the following:

29) $A = \{0, 1\}$ $B = \{2, 3, 4\}$ $C = \{3, 5\}$

~~$B \cup C = \{2,3,4\} \cup \{3,5\}$~~

~~$= \{2, 3, 4, 5\}$~~

$B \cap C = \{2, 3, 4\} \cap \{3, 5\}$

$= \{3\}$

$A \times (B \cap C) = \{0, 1\} \times \{3\}$

$= \{(0,3)(1,3)\} \rightarrow (1)$

$A \times B = \{0, 1\} \times \{2, 3, 4\}$

$= \{(0,2)(0,3)(0,4)(1,2)(1,3)(1,4)\}$

$A \times C = \{0, 1\} \times \{3, 5\}$

$= \{(0,3)(0,5)(1,3)(1,5)\}$

$(A \times B) \cap (A \times C) = \{(0,3)(1,3)\} \rightarrow (2)$

from (1) & (2)

$A \times (B \cap C) = (A \times B) \cap (A \times C)$

30) i) $f(4) = 3x - 2 = 3(4) - 2 = 12 - 2 = 10$

ii) $f(-2) = x^2 - 2 = (-2)^2 - 2 = 4 - 2 = 2$

iii) $f(1) = x^2 - 2 = 1^2 - 2 = -1$

$f(4) + 2f(1) = 10 + 2 \times -1$

$= 10 - 2 = 8$

iv) $\frac{f(1) - 3f(4)}{f(-3)} = \frac{-1 - 3(10)}{+1} = \frac{-1-30}{1} = -31$

31. By Eulid's algorithm

$504 = 396 \times 1 + 108$

Remainder is $108 \neq 0$

$396 = 108 \times 3 + 72$

Remainder is $72 \neq 0$

$108 = 72 \times 1 + 36$

Remainder is $36 \neq 0$

$72 = 36 \times 2 + 0$

$\therefore$ HCF of 396, 504 is 36

$636 = 36 \times 17 + 24$

R is $24 \neq 0$

$36 = 24 \times 1 + 12$

Remainder is $12 \neq 0$

$24 = 12 \times 2 + 0$

$\therefore$ HCF of 636, 36 is 12

HCF of 396, 504 & 636 is 12

32. Three consecutive terms in a G.P are $\frac{a}{r}, a, ar$

$\frac{a}{\cancel{r}} \times a \times a\cancel{r} = 27$

$a^3 = 27$

$\boxed{a = 3}$

Sum of the product of terms taken two at a time is $\frac{57}{2}$

$\frac{a}{r} \times a + a \times ar + a\cancel{r} \times \frac{a}{\cancel{r}} = \frac{57}{2}$

$\frac{a^2}{r} + a^2 r + a^2 = \frac{57}{2}$

$a^2\left(\frac{1}{r} + r + 1\right) = \frac{57}{2}$

$3^2\left(\frac{1}{r} + r + 1\right) = \frac{57}{2}$

$\frac{1}{r} + r + 1 = \frac{57}{2 \times 9} = \frac{57}{18}$

$\frac{1 + r^2 + r}{r} = \frac{57}{18}$

$18 + 18r^2 + 18r = 57r$

$18r^2 + 18r - 57r + 18 = 0$

$\div 3, \; 6r^2 - 13r + 6 = 0$

$\left(r - \frac{2}{3}\right)\left(r - \frac{3}{2}\right) = 0$

$r = \frac{2}{3}$ or $r = \frac{3}{2}$

If $a = 3$ $r = \frac{2}{3}$

The three terms are $\frac{9}{2}, 3, 2$

If $a = 3$ $r = \frac{3}{2}$

The three terms are $2, 3, \frac{9}{2}$

33) $\frac{1}{A-B} - \frac{2B}{(A+B)(A-B)} = \frac{A+B-2B}{(A+B)(A-B)}$

$= \frac{\cancel{A-B}}{(A+B)\cancel{(A-B)}}$

$= \frac{1}{A+B}$

$A+B = \frac{2x+1}{2x-1} + \frac{2x-1}{2x+1}$

$= \frac{(2x+1)(2x+1) + (2x-1)(2x-1)}{(2x+1)(2x-1)}$

$= \frac{4x^2 + \cancel{4x} + 1 + 4x^2 - \cancel{4x} + 1}{(2x+1)(2x-1)}$

$A+B = \frac{8x^2+2}{4x^2-1} = \frac{2(4x^2+1)}{4x^2-1}$

$\frac{1}{A+B} = \frac{4x^2-1}{2(4x^2+1)}$

34) $A^2 = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix} = \begin{pmatrix} (9-1) & (3+2) \\ (-3-2) & (-1+4) \end{pmatrix}$

$A^2 = \begin{pmatrix} 8 & 5 \\ -5 & 3 \end{pmatrix}$

$5A = 5\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix} = \begin{pmatrix} 15 & 5 \\ -5 & 10 \end{pmatrix}$

$7I_2 = 7\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} 7 & 0 \\ 0 & 7 \end{pmatrix}$

$A^2 - 5A + 7I_2 = \begin{pmatrix} 8 & 5 \\ -5 & 3 \end{pmatrix} + \begin{pmatrix} -15 & -5 \\ 5 & -10 \end{pmatrix} + \begin{pmatrix} 7 & 0 \\ 0 & 7 \end{pmatrix}$

$A^2 - 5A + 7I_2 = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$

ii) Area of the quadrilateral = 28

$$\frac{1}{2}\begin{vmatrix} -4 & 3 & 3 & 2 & 4 \\ -2 & k & 2 & 3 & 2 \end{vmatrix} = 28$$

$$[(-4k+6+9-4)-(6+3k-4-12)] = 56$$

$$11-4k-(-10+3k) = 56$$

$$-7k+21 = 56$$

$$-7k = 56-21$$

$$-7k = 35$$

$$\boxed{k = -5}$$

37. $\dfrac{\cos\theta}{1+\sin\theta} = \dfrac{1}{a}$

$$a = \frac{1+\sin\theta}{\cos\theta}$$

$$a^2 = \frac{(1+\sin\theta)^2}{\cos^2\theta}$$

$$= \frac{1+\sin^2\theta+2\sin\theta}{\cos^2\theta} \longrightarrow (1)$$

$$a^2-1 = \frac{1+\sin^2\theta+2\sin\theta}{\cos^2\theta} - 1$$

$$= \frac{1+\sin^2\theta+2\sin\theta-\cos^2\theta}{\cos^2\theta}$$

$$= \frac{\sin^2\theta+2\sin\theta+1-\cos^2\theta}{\cos^2\theta}$$

$$= \frac{\sin^2\theta+2\sin\theta+\sin^2\theta}{\cos^2\theta}$$

$$= \frac{2\sin^2\theta+2\sin\theta}{\cos^2\theta} \longrightarrow (2)$$

$$a^2+1 = \frac{1+\sin^2\theta+2\sin\theta+1}{\cos^2\theta}$$

$$= \frac{1+\sin^2\theta+2\sin\theta+\cos^2\theta}{\cos^2\theta}$$

$$= \frac{1+1+2\sin\theta}{\cos^2\theta}$$

$$= \frac{2+2\sin\theta}{\cos^2\theta}$$

$$\frac{a^2-1}{a^2+1} = \frac{\dfrac{\cancel{2}\sin\theta\cancel{(\sin\theta+1)}}{\cancel{\cos^2\theta}}}{\dfrac{\cancel{2}\cancel{(1+\sin\theta)}}{\cancel{\cos^2\theta}}}$$

$$= \sin\theta = \text{RHS}$$

38)

$$\tan 30^\circ = \frac{AB}{BC}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{x}$$

$$x = \sqrt{3}h$$

$$\tan 60^\circ = \frac{AB}{BD}$$

$$\sqrt{3} = \frac{h}{y}$$

$$y = \frac{h}{\sqrt{3}}$$

Distance btn ships = $BC + BD$

$$= x+y$$

$$= \sqrt{3}h + \frac{h}{\sqrt{3}}$$

$$= \frac{3h+h}{\sqrt{3}} = \frac{4h}{\sqrt{3}}$$

39) $l = 19\text{m}$

Base area $= \pi r^2$

$$\pi r^2 = 4\times 22$$

$$\frac{22}{7} r^2 = 4\times 22$$

$$r^2 = \frac{4\times \cancel{22}\times 7}{\cancel{22}}$$

$$r^2 = 28\text{ cm}$$

$$l = 19\text{ m}$$

$$h = \sqrt{l^2-r^2} = \sqrt{19^2-28}$$

$$= \sqrt{361-28} = \sqrt{333}$$

$$\boxed{h = 18.25\text{ m}}$$

40) ~~A = 3~~

$A = 35$

40) A = 35

Marks	Mid value x	f_i	$d_i = x - A$	$d_i = \frac{x-A}{c}$	$f_i d_i$	$f_i d_i^2$
0 - 10	5	8	-30	-3	-24	72
10 - 20	15	12	-20	-2	-24	48
20 - 30	25	17	-10	-1	-17	17
30 - 40	35	14	0	0	0	0
40 - 50	45	9	10	1	9	9
50 - 60	55	7	20	2	14	28
60 - 70	65	4	30	3	12	36
		71			-30	210

$$S.D(\sigma) = C \times \sqrt{\frac{\Sigma f_i d_i^2}{N} - \left(\frac{\Sigma f d_i}{N}\right)^2}$$

$$= 10 \times \sqrt{\frac{210}{71} - \left(\frac{-30}{71}\right)^2} = 10\sqrt{\frac{210}{71} - \frac{900}{5041}}$$

$$= 10 \times \sqrt{2.779}$$

$$\sigma = 16.67$$

41) $n(S) = 36$

i) Let A be the event of getting a doublet

$A = \{(1,1)(2,2)(3,3)(4,4)(5,5)(6,6)\}$

$n(A) = 6$

$P(A) = \frac{n(A)}{n(S)} = \frac{6}{36} = \frac{1}{6}$

ii) Let B be the event of getting a product as a prime number

$B = \{(1,2)(2,1)(1,3)(3,1)(1,5)(5,1)\}$

$n(B) = 6$

$P(B) = \frac{n(B)}{n(S)} = \frac{6}{36} = \frac{1}{6}$

iii) Let C be the event of getting the sum as a prime number

$C = \{(1,1)(1,2)(1,4)(1,6)(2,1)(2,3)$
$(2,5)(3,2)(3,4)(4,1)(4,3)$
$(5,2)(5,6)(6,1)(6,5)\}$

$n(C) = 15$

$P(C) = \frac{n(C)}{n(S)} = \frac{15}{36} = \frac{5}{12}$

iv) Let D be the event of getting the sum as 1

$D = \{\ \}$

$P(A) = 0$

42) $r = \frac{3}{2}$ m $\quad h = 9$ mm

Vol. of a capsule = Vol. cyli + 2 Vol. of hemis

$= \pi r^2 h + 2 \times \frac{2}{3}\pi r^3$

$= \frac{22}{7} \times \frac{3}{2} \times \frac{3}{2} \times 9 + 2 \times \frac{2}{3} \times \frac{22}{7}\left(\frac{3}{2}\right)^3$

$= \frac{22}{7}\left(\frac{3}{2}\right)^2\left[9 + 2 \times \frac{2}{3} \times \frac{3}{2}\right]$

$= \frac{22}{7} \times \frac{9}{4}\left[9 + 2\right]$

$= \frac{11}{7} \times \frac{9}{2} \times 11$

Vol of a capsule $= 77.79 \text{ mm}^3$

46) a)

x	1	2	3	4	6
y	[illegible]	12	8	6	4

x increases, y decreases

It is indirect variation

xy = k, k is proportionality const

i) x = 2, y = 12

ii) when y = 6, x = 4

b) $y = x^2 - 4x + 3$

x	-2	1	0	1	2	3	4
x^2	4	1	0	1	4	9	16
$4x$	8	4	0	4	-8	12	16
+3	3	3	3	3	3	3	3
y	15	8	3	0	-1	0	3

$y = \cancel{x^2} - 4x + 3$

$0 = \cancel{x^2} - 6x + 9$

$y = +2x - 6$

x	0	1	2	3	4	5
$2x$	0	2	4	6	8	10
-6	-6	-6	-6	-6	-6	-6
y	-6	-4	-2	0	2	4

Soln : $\{(3, 0)\}$