

HMD

*Madurai dt*  
**HALF YEARLY EXAMINATION - 2023**  
*Y. Seenivasan, M.Sc. B. Ed.*

Time : 3.00 Hrs

10 - STD

MATHS

Marks : 100

**I Choose the correct answer.**

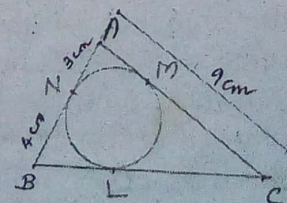
14 X 1 = 14

1. If  $n(A \times B) = 6$  and  $A = \{1, 3\}$  then  $n(B)$  is a) 1 b) 2 c) 3 d) 6
2. If  $n(A) = m$ ,  $n(B) = n$ , then the total number of relations that exist from A to B is  
a)  $2^{mn-1}$  b)  $2^{m-1}$  c)  $2^{mn}$  d)  $2^{m/n}$
3.  $7^{4k} \equiv \dots \pmod{100}$  a) 1 b) 2 c) 3 d) 4
4. 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
5. If  $(x-6)$  is the HCF of  $x^2 - 2x - 24$  and  $x^2 - kx - 6$  then the value of  $k$  is  
a) 3 b) 5 c) 6 d) 8
6. Graph of a linear equation is a .....  
a) straight line b) circle c) parabola d) hyperbola
7. In  $\triangle ABC$ , AD is the bisector of  $\angle BAC$ . If  $AB = 8\text{cm}$ ,  $BD = 6\text{cm}$  and  $DC = 3\text{cm}$ , The length of the side AC is a) 6cm b) 4 cm c) 3cm d) 8cm
8. The straight line given by the equation  $x = 11$  is a) parallel to X axis  
b) parallel to y-axis c) Passing through the origin d) Passing through the point (0, 11)
9. If a line with slope  $m$ ,  $m \neq 0$  makes  $x$  intercept  $d$ , then the equation of the straight line is  
a)  $x = m(y - d)$  b)  $y = m(x - d)$  c)  $y = mx$  d)  $y = d(x - m)$
10. If  $\sin \theta = \cos \theta$ , then the value of  $\tan \theta$  is  
a) 1 b)  $\sqrt{3}$  c)  $\frac{1}{\sqrt{3}}$  d) Not defined
11. The total surface area of a hemisphere is how much times the square of its radius  
a)  $\pi$  b)  $4\pi$  c)  $3\pi$  d)  $2\pi$
12. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is a) 1 : 2 : 3 b) 2 : 1 : 3 c) 1 : 3 : 2 d) 3 : 1 : 2
13. The range of the data 8, 8, 8, 8, 8 ..... 8 is a) 0 b) 1 c) 8 d) 3
14. A purse contains 10 notes of Rs. 2000, 15 notes of Rs. 500 and 25 notes of Rs. 200. One note is drawn at random. What is the probability that the note is either a Rs. 500 note or Rs. 200 note?  
a)  $\frac{1}{5}$  b)  $\frac{3}{10}$  c)  $\frac{2}{3}$  d)  $\frac{4}{5}$

**II Part - II Answer any 10 questions. Q.No. 28 is compulsory.**

10 X 2 = 20

15. If  $A = \{1, 2, 3\}$  and  $B = \{a, b\}$  then find  $A \times B$  and  $B \times A$ .
16. Find  $k$  if  $f \circ f(k) = 5$ ,  $f(k) = 2k - 1$ .
17. Today is Tuesday. My uncle will come after 45 days. In which day my uncle will be coming?
18. Find the 8<sup>th</sup> term of the h.p. 9, 3, 1 .....
19. Find the LCM of  $x^4 - 1$ ,  $x^2 - 2x + 1$ .
20. If -4 is a root of the equation  $x^2 + px - 4 = 0$  and if the equation  $x^2 + px + q = 0$  has equal roots, find the values of  $p$  and  $q$ .
21. Construct a 3 X 3 matrix whose elements are  $a_{ij} = i^2 j^2$ .
22. In the fig,  $\triangle ABC$  is circumscribing a circle. Find the length of BC



23. Find the intercepts made by the line  $4x - 9y + 36 = 0$  on the coordinate axes.
24. A cat is located at the point  $(-6, -4)$  in  $xy$  plane. A bottle of milk is kept at  $(5, 11)$ . The cat wish to consume the milk travelling through shortest possible distance. Find the equation of the path it needs to take its milk.
25. Prove that  $\sec \theta - \cos \theta = \tan \theta \sin \theta$ .
26. The radius of a spherical balloon increases from 12cm to 16cm as air being pumped into it. Find the ratio of the surface area of the balloons in the two cases.
27. Find the range and co-efficient of range of the data  
63, 89, 98, 125, 79, 108, 117, 68.
28. A garden roller whose length is 3m long and whose diameter is 2.8m is rolled to level a garden. How much area will it cover in 8 revolutions?

**III. Answer any 10 questions. Q.No. 42 compulsory.**

10 X 5 = 50

29. If  $f(x) = 2x + 3$ ,  $g(x) = 1 - 2x$  and  $h(x) = 3x$ . Prove that  $f \circ (g \circ h) = (f \circ g) \circ h$ .
30. A man repays a loan of Rs. 65000 by paying Rs. 400 in the first month and then increasing the payment by Rs. 300 every month. How long will it take for him to clear the loan?
31. Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm, ..... 24cm. How much area can be decorated with those colour papers?
32. If  $36x^4 - 60x^3 + 61x^2 - mx + n$  is a perfect square, find the values of  $m$  and  $n$ .

33. If  $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 5 & 8 \end{pmatrix}$ ,  $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$  verify that  $(AB)^T = B^T A^T$ .

34. State and prove basic proportionality theorem.
35. Find the area of the quadrilateral formed by the points  $(8, 6)$ ,  $(5, 11)$ ,  $(-5, 12)$  and  $(-4, 3)$ .
36. Find the equation of the perpendicular bisector of the line joining the points A  $(-4, 2)$  and B  $(6, -4)$ .
37. A pole 5m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point 'A' on the ground is  $60^\circ$  and the angle of depression of the point A from the top of a tower is  $45^\circ$ . Find the height of the tower. ( $\sqrt{3} = 1.732$ )
38. If the radii of the circular ends of a frustrum which is 45cm high are 28cm and 7cm, find the volume of the frustrum.
39. A metallic sheet in the form of a sector of a circle of radius 21cm has central angle of  $216^\circ$ . The sector is made into a cone by bringing the bounding radii together. Find the volume of the cone formed.
40. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that i) The student opted for NCC but not NSS. ii) The student opted for NSS but not NCC. iii) The student opted for exactly one of them.
41. Find the coefficient of variation of 24, 26, 33, 37, 29, 31.
42. Let  $f: A \rightarrow B$  be function defined by  $f(x) = \frac{x}{2} - 1$ , where  $A = \{2, 4, 6, 10, 12\}$ ,  $B = \{0, 1, 2, 4, 5, 9\}$  represent if by  
i) set of ordered pairs ii) a table iii) an arrow diagram iv) a graph

**IV Part - IV Answer both the questions choosing either of the alternatives. 2X8=16**

43. a) Draw a circle of diameter 6cm from a point P, which is 8cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths. (OR)  
b) Construct a  $\Delta PQR$  in which  $QR = 5$  cm,  $\angle P = 40^\circ$  and the median Ph from P to QR is of length 4.4cm. Find the length of the altitude from P to QR.
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 hence find the roots of  $x^2 + x + 1 = 0$ .



Madurai - dt

Y. Srinivasan, M.Sc, B.Ed.

(1 Mark)

1) c) 3

2) c)  $2^{mn}$

3) a) 1

4) b) 2

5) b) 5

6) a) straight line

7) b) 4cm

8) b) parallel to y-axis

9) b)  $y = m(x-d)$

10) a) 1

11) c)  $3\pi$

12) d) 3:1:2

13) a) 0

14) d)  $\frac{4}{5}$

(2 Mark)

15) soln

$A \times B = \{(1,a), (1,b), (2,a), (2,b), (3,a), (3,b)\}$  — 1m

$B \times A = \{(a,1), (a,2), (a,3), (b,1), (b,2), (b,3)\}$  — 2m

16) soln

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

$f(2k-1) - 1 = 5$  — 1m

$4k - 2 - 1 = 5 \Rightarrow 4k - 3 = 5$

$4k = 5 + 3$   
 $4k = 8$   $\boxed{k=2}$  — 2m

17) soln

After 45 days.  $45 \equiv x \pmod{7}$

$45 \equiv 3 \pmod{7}$  — 1m  $\begin{array}{r} 7 \overline{)45} \\ \underline{42} \\ 3 \end{array}$

After 3 days my uncle come.

$\therefore$  my uncle will come Friday — 1m

18) soln

G.P. 9, 3, 1, ...

$a=9$   $r = \frac{3}{9} = \frac{1}{3}$   $\boxed{r = \frac{1}{3}}$

$T_n = ar^{n-1}$  — 1m

$T_8 = 9 \times \left(\frac{1}{3}\right)^{8-1} = 9 \times \frac{1}{3^7}$   
 $= 3^2 \times \frac{1}{3^7} = \frac{1}{3^5}$

$\boxed{T_8 = \frac{1}{243}}$  — 1m

19) soln

$a^2 - b^2 = (a+b)(a-b)$   
 $(x^4 - 1) = (x^2 + 1)(x^2 - 1)$  — 1/2 m

$= (x^2 + 1)(x+1)(x-1)$

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

LCM  $[(x^4 - 1), (x^2 - 2x + 1)] = (x^2 + 1)(x+1)(x-1)^2$  — 1m

20) soln

$(-4)^2 + p(-4) - 4 = 0$

$16 - 4p - 4 = 0 \Rightarrow 4p = 12$

$\boxed{p=3}$  — 1m

$(-4)^2 + 3(-4) + 2 = 9$   $D = b^2 - 4ac$

$16 - 12 + 2 = 6$

$D = p^2 - 4 \times 1 \times 2 = 0$

$p^2 - 4 \times 2 = 0 \Rightarrow 3^2 - 4 \times 2 = 0$

$9 = 8$   $\boxed{q = \frac{4}{9}}$  — m

21) soln

$a_{ij} = i^2 j^2$

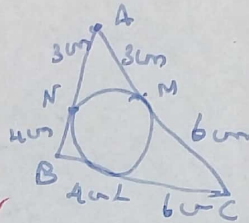
$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$$

$a_{11} = 1 \times 1 = 1$ ,  $a_{12} = 1^2 \times 2^2 = 4$  (1m)  
 $a_{13} = 1 \times 9 = 9$ ,  $a_{21} = 4 \times 1 = 4$   
 $a_{22} = 4 \times 4 = 16$ ,  $a_{23} = 4 \times 9 = 36$   
 $a_{31} = 9 \times 1 = 9$ ,  $a_{32} = 9 \times 4 = 36$   
 $a_{33} = 9 \times 9 = 81$

$$A = \begin{bmatrix} 1 & 4 & 9 \\ 4 & 16 & 36 \\ 9 & 36 & 81 \end{bmatrix} \quad \text{--- 1m}$$

22) Soln

$BN = BL$   
 $4 \text{ cm} = 4 \text{ cm}$   
 MC  
 $AC = AN$   
 $= 9 - 3 \text{ cm}$  (1m)



$MC = 6 \text{ cm}$        $MC = LC$

$BC = BL + LC$  (1m)  
 $= 4 + 6 = 10 \text{ cm}$

23) Soln

$4x - 9y + 36 = 0$

$4x - 9y = -36$  ( $\div -36$ ) on both sides

$\frac{4}{-36}x - \frac{9}{-36}y = \frac{-36}{-36}$  (1m)

$\frac{x}{-9} + \frac{y}{4} = 1$        $\frac{x}{a} + \frac{y}{b} = 1$

$\therefore$  x intercept with  $a = -9$   
 y intercept with  $b = 4$  (1m)

24)

Two-point form      C(-6, -4)      H(5, 11)

$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$        $(x_1, y_1) = (-6, -4)$ ,  $(x_2, y_2) = (5, 11)$

$\frac{y + 4}{15} = \frac{x + 6}{11}$  (1m)

$\frac{y + 4}{15} = \frac{x + 6}{11}$

$11(y + 4) = 15(x + 6)$  (15/11)

$11y + 44 = 15x + 90$

$15x - 11y + 90 - 44 = 0$  (1m)

$15x - 11y + 46 = 0$

25) Soln

LHS.  $\sec \theta - \cos \theta = \frac{1}{\cos \theta} - \cos \theta$

$= \frac{1 - \cos^2 \theta}{\cos \theta}$  (1m)

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

$= \frac{\sin \theta}{\cos \theta} \times \sin \theta$

$= \tan \theta \cdot \sin \theta$  (1m)  $\leftarrow$  RHS

26)

Surface area of sphere =  $4\pi r^2$

$\frac{r_1}{r_2} = \frac{3}{4} = \frac{3}{4}$  (1m)

ratio of surface area =  $\frac{4\pi r_1^2}{4\pi r_2^2} = \left(\frac{3}{4}\right)^2$

$= \frac{9}{16} \Rightarrow 9:16$  (1m)

27) Soln

Range = L - S

$= 125 - 63$

$R = 62$

Co-efficient of range =  $\frac{L - S}{L + S}$

$= \frac{125 - 63}{125 + 63}$

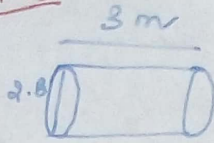
$= \frac{62}{188}$

$= \frac{31}{94}$

$= 0.3299$

Computers

$d = 2.8 \text{ m}$



$r = 1.4 \text{ m}$

CSA of cylinder =  $2\pi rh$  sq. units

$= 2 \times \frac{22}{7} \times 1.4 \times 3$

$= 44 \times 0.6$

$\text{CSA} = 26.4 \text{ m}^2$  — 1m

Area covers 8 revolution =  $8 \times 26.4$

$= 211.2 \text{ m}^2$  — 1m

(5 Mark)

29) Soln

$g \circ h = g(h(x))$

$= g(3x)$

$= 1 - 2(3x)$

$(g \circ h)(x) = 1 - 6x$

$f \circ (g \circ h) = f(g \circ h)$

$= f(1 - 6x)$

$= 2(1 - 6x) + 3$

$= 2 - 12x + 3$  — 2m

$= 5 - 12x$  — ①

RHS

$f \circ g = f(g(x))$

$= f(1 - 2x) = 2(1 - 2x) + 3$

$= 2 - 4x + 3 = 5 - 4x$

$(f \circ g) \circ h = 5 - 4(3x)$  — 2m

$= 5 - 12x$  — ②

$f \circ (g \circ h) = (f \circ g) \circ h$  — 1m

30) Soln

In A.P.

1st month, 2nd month ...

400, 700, 1000, 1300, 1600 ...

$= 65,000$

$T_n = a + (n-1)d$

$a = 400$

$d = 700 - 400$

$d = 300$

$a + (n-1)d = 65,000$

$400 + (n-1)300 = 65,000$

$400 + 300n - 300 = 65,000$

$300n + 100 = 65,000$

$300n = 65,000 - 100$

$= 64,900$

9

31) Soln

Rakha has 15 square colour papers,  $10^2, 11^2, 12^2, \dots, 24^2$ .

$10^2 + 11^2 + 12^2 + \dots + 24^2$  — 1m

$= (1^2 + 2^2 + \dots + 24^2)$  —

$(1^2 + 2^2 + \dots + 9^2)$

$n=24 \quad n=9$   
 $= \frac{n(n+1)(2n+1)}{6} - \frac{n(n+1)(2n+1)}{6}$

$= \frac{4}{24}(25)(49) - \frac{3}{9}(10)(19)$

$= 4200 - 285$

$= 4615 \text{ cm}^2$  — 1m

Area of decorated colour papers.

32) Soln

Polynomial long division:

$$\begin{array}{r} 6x^2 - 5x + 3 \\ 6x^2 - 6x^3 + 6x^2 - mx + n \\ \hline 12x^2 - 5x \\ 12x^2 - 6x^3 + 25x^2 \\ \hline 36x^2 - mx + n \\ 36x^2 - 30x + 9 \\ \hline (-m+30) = 0 \quad | \quad (n-9) = 0 \\ m=30 \quad | \quad n=9 \end{array}$$

33) Soln

$$\begin{aligned} \text{LHS} \\ AB &= \begin{pmatrix} 5 & 2 & 9 \\ 1 & 5 & 8 \end{pmatrix} \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix} \\ &= \begin{pmatrix} 5+2+45 & 35+4-9 \\ 1+5+40 & 7+10-8 \end{pmatrix} \\ &= \begin{pmatrix} 52 & 30 \\ 46 & 9 \end{pmatrix} \\ (AB)^T &= \begin{pmatrix} 52 & 46 \\ 30 & 9 \end{pmatrix} \end{aligned}$$

$$\text{RHS} \\ B^T = \begin{pmatrix} 1 & 1 & 5 \\ 7 & 2 & -1 \end{pmatrix}$$

$$A^T = \begin{pmatrix} 5 & 1 \\ 2 & 5 \\ 9 & 8 \end{pmatrix}$$

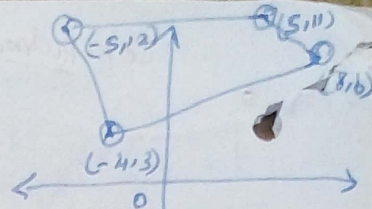
$$B^T A^T = \begin{pmatrix} 1 & 1 & 5 \\ 7 & 2 & -1 \end{pmatrix} \begin{pmatrix} 5 & 1 \\ 2 & 5 \\ 9 & 8 \end{pmatrix}$$

$$= \begin{pmatrix} 5+2+45 & 1+5+40 \\ 35+4-9 & 7+10-8 \end{pmatrix}$$

$$B^T A^T = \begin{pmatrix} 52 & 46 \\ 30 & 9 \end{pmatrix}$$

$$(AB)^T = B^T A^T \quad \text{H.P.}$$

35) Soln



taking point counter-clock wise,  
A(8,6) B(5,11) C(-5,12) D(-4,3)

$$\text{Area of quadrilateral} = \frac{1}{2} \begin{vmatrix} x_1 & x_2 & x_3 & x_4 & x_1 \\ y_1 & y_2 & y_3 & y_4 & y_1 \end{vmatrix}$$

$$= \frac{1}{2} \begin{vmatrix} 8 & 5 & -5 & -4 & 8 \\ 6 & 11 & 12 & 3 & 6 \end{vmatrix}$$

$$= \frac{1}{2} \left\{ (88+60-15-24) - (30-55-48+24) \right\}$$

$$= \frac{1}{2} \left\{ (109) - (-49) \right\}$$

$$= \frac{1}{2} \left\{ 109 + 49 \right\}$$

$$= \frac{1}{2} (158)$$

$$= 79 \text{ sq. units.}$$

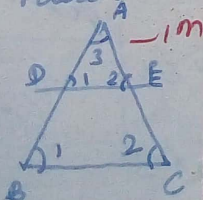
34) Soln

Statement:

A straight line drawn parallel to a side of a triangle intersecting the other two sides, divides the sides in the same ratio.

Proof:

$$\frac{AD}{DB} = \frac{AE}{EC}$$



Construction - 1 m

3b) Soln

Find mid point A(-4,2)

$$m = \left( \frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right)$$

$$= \left( \frac{-4+6}{2}, \frac{2-4}{2} \right)$$

$$= \left( \frac{2}{2}, \frac{-2}{2} \right) \Rightarrow M(1, -1)$$

To find slope,  $m_1 = \frac{y_2 - y_1}{x_2 - x_1}$

$$m_1 = \frac{-4-2}{6+4} = \frac{-6}{10} = \frac{-3}{5}$$

$$m_1 \times m_2 = -1$$



$-\frac{3}{5} \times m_2 = -1$  — 1m

$m_2 = \frac{5}{3}$

Point Slope form  $m_2 = \frac{5}{3}$

M(1, -1)

$y - y_1 = m(x - x_1)$  — 1m

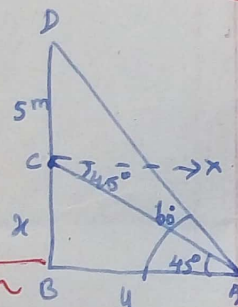
$y + 1 = \frac{5}{3}(x - 1)$

$3(y + 1) = 5x - 5$  — 1m

$3y + 3 = 5x - 5 \Rightarrow 5x - 3y - 8 = 0$

37) soln

BC = height of tower  
 CD = height of pole  
 BC = x AB = y.



In right angled  $\Delta ABC$   
 $\angle BAC = 45^\circ$

$\tan \theta = \frac{O.S}{A.S} \Rightarrow \tan 45^\circ = \frac{x}{y}$  — 1m

$1 = \frac{x}{y} \Rightarrow x = y$  — 1m

In right angle  $\Delta ABC$ ,  $\angle BAD = 60^\circ$

$\tan \theta = \frac{O.S}{A.S} \Rightarrow \tan 60^\circ = \frac{BC + CD}{AB}$

$\sqrt{3} = \frac{x + 5}{y}$  — 1m

$\sqrt{3}y = x + 5$  ( $\because x = y$ )

$\sqrt{3}x = x + 5 \Rightarrow \sqrt{3}x - x = 5$

$x(\sqrt{3} - 1) = 5 \Rightarrow x = \frac{5}{\sqrt{3} - 1}$  — 1m

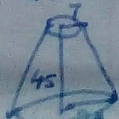
$x = \frac{5(1.732 + 1)}{3 - 1} = \frac{5 \times 2.732}{2}$

$x = 6.83 \text{ m} = \text{height of the tower}$  — 1m

38) soln

An that  $h = 45 \text{ cm}$   $R = 28 \text{ cm}$

$r = 7 \text{ cm}$



Volume =  $\frac{1}{3} \pi (R^2 + Rr + r^2) h$  cu. unit — 2m  
 $= \frac{1}{3} \times \frac{22}{7} (28^2 + (28 \times 7) + 7^2) \times 45$   
 $= \frac{1}{3} \times \frac{22}{7} \times 1029 \times 45$   
 $= 48510 \text{ cm}^3$  — 2m

Volume of the frustum 48510 cm<sup>3</sup> — 1m

40)

soln

$n(S) = 50$

Let A - events of student NCC

B - events of students NSS

$n(A) = 28$   $n(B) = 30$   $n(A \cap B) = 18$

$P(A) = \frac{28}{50}$   $P(B) = \frac{30}{50}$   $P(A \cap B) = \frac{18}{50}$  — 2m

i)  $P(A \cap \bar{B}) = P(A) - P(A \cap B)$   
 $= \frac{28}{50} - \frac{18}{50} = \frac{10}{50}$  — 1m

ii)  $P(\bar{A} \cap B) = P(B) - P(A \cap B)$   
 $= \frac{30}{50} - \frac{18}{50} = \frac{12}{50}$  — 1m

iii)  $P(A \cap \bar{B}) \cup P(\bar{A} \cap B)$   
 $= P(A \cap \bar{B}) + P(\bar{A} \cap B)$   
 $= \frac{10}{50} + \frac{12}{50} = \frac{22}{50}$  — 1m

41)

soln

Arranged in Ascending order.

24, 26, 29, 31, 33, 37  $\bar{x} = \frac{24+26+29+31+33+37}{6}$

$\bar{x} = 30$

x	$d_i = x - A$	$d_i^2$
24	-5	25
26	-3	9
29	0	0
31	2	4
33	4	16
37	8	64
$\Sigma d_i$	6	118

$\sigma = \sqrt{\frac{\Sigma d_i^2}{n} - \left(\frac{\Sigma d_i}{n}\right)^2}$

$= \sqrt{\frac{118}{6} - \left(\frac{6}{6}\right)^2}$

$\sigma = 4.32$

$$C.V = \frac{5}{x} \times 100\%$$

$$= \frac{4.32}{80} \times 100\%$$

$$C.V = 14.4\%$$

43)  
a)42) solnCompulsory

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

$$f(2) = \frac{2}{2} - 1 = 0, \quad f(4) = \frac{4}{2} - 1 = 1$$

$$f(6) = \frac{6}{2} - 1 = 2, \quad f(10) = \frac{10}{2} - 1 = 4$$

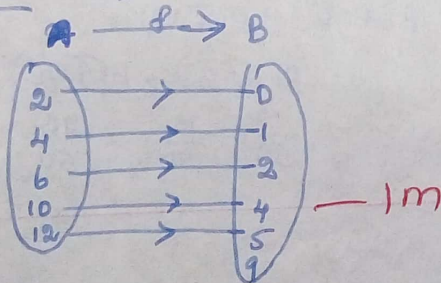
$$f(12) = \frac{12}{2} - 1 = 5 \quad \text{--- 1m}$$

i) Set of ordered pairs

$$A = \left\{ (2, 0), (4, 1), (6, 2), (10, 4), (12, 5) \right\} \quad \text{--- 1m}$$

ii) A table

x	2	4	6	10	12
f(x)	0	1	2	4	5

iii) An arrow diagram --- 1miv) A graph