

கணிதம்

Maths.

10

(Tamil medium & English Medium)

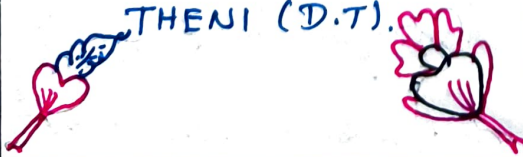
* மிகவும் எமல்வ கற்கும் மாணவர்களுக்காகவே தொகுக்கப்பட்டது.

* முந்தைய சிரசு பேராய - கனின் Answer key யின் அடிப்படையில் தயாரிக்கப்பட்டது.

* 2 மார்ச் & 5 மார்ச் கணக்குகளில் எமல்வ கற்கும் மாணவர்கள் நல்ல மதிப்பை எய்தினார்கள் என்று குறிப்பிடும்.

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THENI (D.T.)



UNIT - I.

$$1. A = \{2, -2, 3\}, B = \{1, -4\}$$

$$\begin{matrix} 2 \\ \boxed{1} \end{matrix} \begin{matrix} -2 \\ \boxed{-4} \end{matrix}$$

$$\begin{matrix} -2 \\ \boxed{1} \end{matrix} \begin{matrix} 3 \\ \boxed{-4} \end{matrix}$$

$$\begin{matrix} 3 \\ \boxed{1} \end{matrix} \begin{matrix} -2 \\ \boxed{-4} \end{matrix}$$

$$A \times B = \{(2, 1), (2, -4), (-2, 1), (-2, -4), (3, 1), (-3, -4)\}$$

$$A \times A = \{(2, 2)$$

$$(2, -2), (2, 3), (-2, 2)$$

$$(-2, -2), (-2, 3), (3, 2), (3, -2), (3, 3)\}$$

$$B \times A = \{(1, 2), (1, -2)$$

$$(1, 3), (4, 2), (4, -2), (4, 3)\}$$

$$2. A = B = \{P, Q\}$$

$$(i) A \times B = \{(P, P), (P, Q), (Q, P), (Q, Q)\}$$

$$(ii) A \times A = \{(P, P), (P, Q), (Q, P), (Q, Q)\}$$

$$(iii) B \times A = \{(P, P), (P, Q), (Q, P), (Q, Q)\}$$

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

$$A \times B = B \times A$$

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

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

$$\therefore A \times B \neq B \times A$$

$B = \{x/x \text{ is a prime no less } 10\}$
 $\{10 \text{ ுள்ள பிறவும்கூடுமான}\}$

$$A = \{3, 5\} \quad B = \{2, 4\}$$

(உரு நிலை உருவம்)

11. $f(x) = x^2 - 2$
 $x \in \{-2, -1, 0, 3\}$
- (i) list = $\{(-2, 2), (-1, -1), (0, 2), (3, 7)\}$
- (ii) f is a function.

12. $f(x) = 3x + 2$
 $f(1) = 3 + 2 = 5$
 $f(2) = 3(2) + 2 = 8$
 $f(3) = 3(3) + 2 = 11$
Range $f = \{5, 8, 11, \dots\}$

13. $A = \{1, 2, 3, 4\}$ $B = 4$
 $f(x) = x^3$
(i) Range = $\{1, 8, 27, 64\}$
 f is one - one and into

14. $f(x) = 2x + 5$
 $\frac{f(x+2) - f(2)}{x} = \frac{2x}{x} = 2$

15. $A = \{-2, -1, 0, 1, 2\}$
 $f(x) = x^2 + x + 1$
 $B = \{1, 3, 7\}$
 $0 \rightarrow 1$
 $1 \rightarrow 3$
 $2 \rightarrow 7$

16. $A = \{m, n\}$ $B = \emptyset$
 $A \times B = \{\}$
 $B \times A = \{\}$

$$A \times A = \{(m, m), (m, n), (n, m), (n, n)\}$$

17. $A = \{3, 4, 7, 8\}$ $B = \{1, 7, 10\}$

(i) $R_1 = \{(3, 7), (4, 7), (7, 10), (8, 10)\}$

ஒரு பம்பு $\{3, 4, 7, 8\}$

$\therefore$ Relation from A and B.

(ii) $R_2 = \{(3, 1), (4, 12)\}$

(ஒரு பம்பு 12 இல்லை)

not Relation from A to B.

(iii) $R_3 = \{(3, 7), (4, 10), (7, 7), (7, 8), (8, 11), (8, 7), (8, 10)\}$

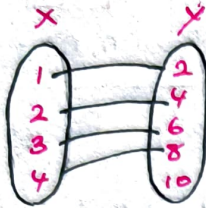
ஒரு பம்பு 11 இல்லை

$\therefore$ not Relation for A to B.

18. $A = \{1, 2, 3, 4, \dots, 45\}$
"is a square of numbers"
Domain = $\{1, 2, 3, 4, 5, 6\}$
Range = $\{1, 4, 9, 16, 27, 36\}$

19. $A = \{1, 2, 3, 4\}$ $B = \mathbb{N}$
 $f: A \rightarrow B, f(x) = x^3$
(i) Range = $\{1, 8, 27, 64\}$
(ii) one - one and into function.

20. $X = \{1, 2, 3, 4\}$ $Y = \{2, 4, 6, 8, 10\}$
 $R = \{(1, 2), (2, 4), (3, 6), (4, 8)\}$

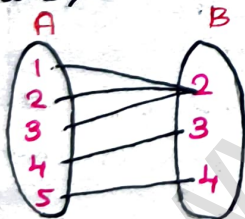


$\therefore R$ is a function.
 Domain = $\{1, 2, 3, 4\}$
 Co-Domain = $\{2, 4, 6, 8, 10\}$
 Range = $\{2, 4, 6, 8\}$

21. $f(x) = 3x - 5$. Find a and b ($a, 4$), ($1, b$).

$a = 3$
 $b = -2$

22. $f = \{(1, 2), (2, 2), (3, 2), (4, 3), (5, 4)\}$
 draw arrow diagram.



23. $f(x) = 3x + 2$
 Pre-image 29, 53
 $29 - 2 = \frac{27}{3} = 9$
 $53 - 2 = \frac{51}{3} = 17$

24. $f(m) = m^2 + 3 + 3$.
 It is a one-one function.

25. $f(x) = 3x + 2$.
 Pre-image 29, 53.
 $29 - 2 = 27$
 $53 - 2 = 51$
 $x = \frac{27}{3} = 9$, $x = \frac{51}{3} = 17$

UNIT - II.

Find the sums
 கூடுதல் காண்க :-

1. $1 + 3 + 5 + \dots + 55$
 $= \left(\frac{55+1}{2}\right)^2 = \left(\frac{56}{2}\right)^2 = 28^2 = 784$

2. $1 + 3 + 5 + \dots$ to 40 terms
 $(40)^2 = 1600$

3. $2 + 4 + 6 + \dots + 80$
 $2[1 + 2 + 3 + \dots + 40]$
 $= 2 \left[\frac{40 \times 41}{2} \right] = 1640$

4. $1 + 2 + 3 + \dots + 60$
 $\frac{60 \times 61}{2} = 30 \times 61$
 $= 1830$

5. $3+6+9+\dots+96$
 $3(1+2+3+\dots+32)$
 $3\left(\frac{32 \times 33}{2}\right) = 3(528)$
 $= 1584$

6. $1+3+5+\dots+(71)$ odd
 $\left(\frac{71+1}{2}\right)^2 = \left(\frac{72}{2}\right)^2 = (36)^2$
 $= 1296.$

7. $1+2+3+\dots+k = 325$
 $1^3+2^3+3^3+\dots+k^3 = (325)^2$
 $= 105625.$

8. $1^3+2^3+\dots+k^3 = 44100$
 $1+2+3+\dots+k = \sqrt{44100}$
 $= 210.$

9. A man has 532 flower pots. Row contains 21 flower pots. How many rows are there?
 ஒரு நபரிடம் 532 பூக்களின் பாளையம் உள்ளது. 21 பூக்களின் பாளையம் உள்ளது. எத்தனை வரிசைகள் உள்ளன.

Rows = 25
 வரிசைகள் $\begin{array}{r} 532 \\ \times 21 \\ \hline 532 \\ + 1064 \\ \hline 11172 \end{array}$
 Pots பூக்களின் பாளையம் = 7 $\begin{array}{r} 532 \\ + 7 \\ \hline 539 \end{array}$

10. If d is (P-36)
 $d = 82x + 60y$
 $x = 2$ & $y = -1.$

11. $1+2+\dots+n = 666$ then find 'n'. (n காண்க)
 $n = 36.$
 $\begin{array}{r} 666 \\ 3 \overline{) 666} \\ \underline{333} \\ 333 \\ \underline{333} \\ 0 \end{array}$
 $37 \times 18 = 666$

12. $a^b \times b^a = 800.$
 $800 = 2^5 \times 5^2$
 $a = 2$ or $a = 5$
 $b = 5$ or $b = 2.$

13. $13824 = 2^a \times 3^b$
 find a & b (காண்க)
 $\begin{array}{r} 13824 \\ \div 2 \\ \hline 6912 \\ \div 2 \\ \hline 3456 \\ \div 2 \\ \hline 1728 \\ \div 2 \\ \hline 864 \\ \div 2 \\ \hline 432 \\ \div 2 \\ \hline 216 \\ \div 2 \\ \hline 108 \\ \div 2 \\ \hline 54 \\ \div 2 \\ \hline 27 \\ \div 3 \\ \hline 9 \\ \div 3 \\ \hline 3 \\ \div 3 \\ \hline 1 \end{array}$
 $a = 9$
 $b = 3$

14. In a theatre 20 seats 30 seats rows. find last row
 தியேட்டர் 20, 30 வரிசைகள் உள்ளது. கடைசி வரிசை எத்தனை இருக்கைகள் உள்ளன.

$t_n = a + (n-1)d$
 $= 20 + (29)(2)$
 $= 20 + 58 = 78.$

15. Find 15th term (15-வது சொல்)
 in A.P $-11, -15, -19, \dots$
 $a = -11$
 $d = -4$
 $t_n = a + (n-1)d$
 $= -11 - 72$
 $= -83$

16. Which term of an A.P. (செவ்வகம்) 2004)
16, 11, 6, 1, ... is -54?
 $(-)$ $16 - 1 = 15$
 $n = \frac{l - a}{d} + 1$
 $n = 15.$

17. If $8+k$, $18-k$, $5k+1$ find t_1 t_2 t_3 (கணக்கிடு) t_2 (கணக்கிடு)
 $t_2 - t_1 = t_3 - t_2$
 $k = 4.$

18. $x+6$, $x+12$, $x+15$ G.P find t_1 t_2 t_3 $(+18)$ x .
 $\frac{t_2}{t_1} = \frac{t_3}{t_2} \therefore x = -18.$

19. Find G.P which first term common ratios
முதல் உறுதி, விகிதம்
கணக்கிடு.
 $a = -7, r = 6$
 $= -7, -7 \times 6, \rightarrow 42 \times 6$
 $= -7, -42, -252$

20. Write AP
First term (முதல் உறுதி) 20
Common Ratio (விகிதம்) 8
 $= 20, 28, 36$
 $20, \frac{20}{8}, \frac{28}{8}$
 $28, 36.$

21. Find the number of terms is the A.P. (கொடுக்கப்பட்ட) $3, 6, 9, \dots, 111$
 $n = \frac{(l - a)}{d} + 1$ $\frac{111}{3} = 37$
 $n = 37.$

22. 12th term (2-வது) of A.P.
 $-2, -4, -6, \dots, -100.$
 $t_n = a + (n-1)d$
 $t_{12} = -2 + 11(-2)$
 $= -2 - 22$
 $t_{12} = -24$

23. Which term of an A.P.
113400.

$$P_1^{x_1} \times P_2^{x_2} \times P_3^{x_3} \times P_4^{x_4}$$

Prime number $2, 3, 5, 7.$
 $\rightarrow$ $3, 4, 2, 1$ $3, 4, 2, 1$

$$P_1 = 2, P_2 = 3, P_3 = 5, P_4 = 7$$

$$x_1 = 3, x_2 = 4, x_3 = 2, x_4 = 1$$

Answer:-

$$2^3 \times 3^4 \times 5^2 \times 7^1$$

UNIT - III.

Find the square root
கொடுக்கப்பட்ட வர்க்க சூத்திரம்
கொண்ட:-

(i) $\sqrt{25b(x-a)^8(x-b)^4(x-c)^{16}}$
 $\sqrt{(x-d)^{20}}$

$= 5b(x-a)^4(x-b)^2(x-c)^8(x-d)^5$

(ii) $\sqrt{\frac{144a^8b^{12}c^{16}}{81f^{12}g^4h^{14}}}$
 $= \frac{12}{9} \sqrt{\frac{a^4b^6c^8}{f^6g^2h^7}}$

(iii) $\sqrt{\frac{121(a+b)^8(x+y)^8(b-c)^8}{81(b-c)^4(a-b)^{12}(b-c)^4}}$
 $= \frac{11}{9} \sqrt{\frac{(a+b)^4(x+y)^4}{(a-b)^6}}$

2. Determine the quadratic
Equation. (கொடுக்கப்பட்ட சமன்பாடு
கொண்ட:-)

(i) Sum $\frac{5}{3}$ Product 4
கொடுக்கப்பட்ட
சமன்பாடு
கொண்ட:-
 $x^2 - \frac{5}{3}x + 4 = 0$

(i) Sum $-\frac{3}{2}$, Product -1
கொடுக்கப்பட்ட
சமன்பாடு
கொண்ட:-
 $x^2 - (-\frac{3}{2})x - 1 = 0$
 $x^2 + \frac{3}{2}x - 1 = 0$

(ii) Sum = -9 Product 20
கொடுக்கப்பட்ட
சமன்பாடு
கொண்ட:-
 $x^2 + 9x + 20 = 0$

(iv) Sum = 9 Product 14
கொடுக்கப்பட்ட
சமன்பாடு
கொண்ட:-
 $x^2 - 9x + 14 = 0$

3. Find Sum and Product
கொடுக்கப்பட்ட (அ) சமன்பாடுகளின்

(i) $x^2 + 3x - 28 = 0$

Sum (கொடுக்கப்பட்ட) = $-\frac{3}{1}$

Product (கொடுக்கப்பட்ட) = $\frac{-28}{1}$

(ii) $x^2 + 3x = 0$

Sum (கொடுக்கப்பட்ட) = $-\frac{3}{1}$

Product (கொடுக்கப்பட்ட) = $\frac{0}{1} = 0$

(iii) $3y^2 - y - 4 = 0$

Sum (கொடுக்கப்பட்ட) = $\frac{1}{3}$

Product (கொடுக்கப்பட்ட) = $\frac{-4}{3}$

$$(iv) 2x^2 + 5x + 7 = 0$$

$$\text{Sum (மொத்தம்)} = -2/5$$

$$\text{Product (கூடுதல்/குறைவு)} = 7/2.$$

4. Determine the nature of the roots.

இருபடிச் சமன்பாட்டின் (பொருள்-
பெற்ற) தன்மை காண்க:-

$$(i) 15x^2 + 11x + 2 = 0$$

$$\Delta = b^2 - 4ac \quad \downarrow \text{(சுருது
அளவை)} \\ +ve$$

$\therefore$ Real & unequal
(சுருது அளவு & சமம் அல்ல)

$$(ii) x^2 - x - 1 = 0 \quad (\text{சுருது அளவை})$$

$$\Delta = b^2 - 4ac = (-)(-) \\ = (+ve)$$

$\therefore$ Real & unequal
அளவு & சமம் அல்ல

$$(iii) x^2 - x - 20 = 0 \quad (\text{சுருது
அளவை})$$

$$\Delta = b^2 - 4ac \\ = (-)(-) = +ve$$

$\therefore$ Real & unequal
அளவு & சமம் அல்ல.

$$(v) 2x^2 - 2x + 9 = 0$$

$\downarrow$
Same number.

$$\Delta = b^2 - 4ac$$

$$= (-)(+) = -ve$$

$\therefore$ not Real.
அளவு அல்ல.

$$(iv) 9x^2 - 24x + 16 = 0$$

Symbol $\rightarrow$ different (சுருது சமம்
அளவை)

$$\Delta = b^2 - 4ac$$

$\therefore$ Real & unequal
அளவு & சமம் அல்ல.

5. If the different between
and reciprocal
(மாத்தியங்கம் (6) தலைகீழ்)

$$24/5$$

The number = $x = 5$
(சுருது அளவு)

$$\text{Reciprocal} = \frac{1}{x} = \frac{1}{5}.$$

(தலைகீழ்)

6. Find the excluded value
அளவுகூறுகளை கண்டுபிடிக்க.

$$(i) \frac{y}{y^2 - 25} = (y+5)(y-5)$$

$$\therefore \text{Value (கூறு)} = 5, -5.$$

$$(ii) \frac{t}{t^2 - 5t + 6}$$

$$= 2 \times 3 = 6$$

$$\therefore \text{Value (கூறு)} = 2, 3.$$

7. Reduce.

$$(i) \frac{x-3}{x^2-9} = \frac{\cancel{x-3}}{(x+3)\cancel{x-3}} = \frac{1}{x+3}$$

$$(ii) \frac{x^2-16}{x^2+8x+16} = \frac{\cancel{x-4} (x+4)}{(x+4) \cancel{x+4}} = \frac{x-4}{x+4}$$

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

Multiply

$$(i) \frac{x^3}{9y^2} \text{ by } \frac{27y}{x^5} = \frac{x^3}{9y^2} \times \frac{27y}{x^5} = \frac{3}{x^2y}$$

$$(ii) \frac{x^2-16}{x+4} \div \frac{x-4}{x+4} = \frac{\cancel{x-4} (x+4)}{\cancel{x+4}} \times \frac{x+4}{\cancel{x-4}} = x+4$$

Matrix சமன்பாடு

1. Matrix has 18, 6, 16 elements (சமன்பாடுகளின் எண்ணிக்கை)

18 elements
எண்ணிக்கை1x18
2x9
3x6
6x3
9x2
18x1

6 elements

1x6, 2x3,
3x2, 6x1

16 elements

1x16, 16x1, 2x8,
8x2, 4x4.

$$2. \text{ if } A = \begin{pmatrix} 5 & 4 & 3 \\ 1 & -7 & 9 \\ 3 & 8 & 2 \end{pmatrix}$$

then find the transpose of A (தொகுப்பு எண்ணிக்கை மாற்றம்)

$$A^T = \begin{pmatrix} 5 & 1 & 3 \\ 4 & -7 & 8 \\ 3 & 9 & 2 \end{pmatrix}$$

$$3. A = \begin{pmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{pmatrix} \text{ Transpose of } -A.$$

தொகுப்பு எண்ணிக்கை மாற்றம்.

$$-A = \begin{pmatrix} -\sqrt{7} & 3 \\ \sqrt{5} & -2 \\ -\sqrt{3} & 5 \end{pmatrix}$$

$$(-A)^T = \begin{pmatrix} -\sqrt{7} & \sqrt{5} & -\sqrt{3} \\ 3 & -2 & 5 \end{pmatrix}$$

4. $A = \begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 1 \end{pmatrix}$ $B = \begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix}$

$$3A - 9B = 3 \begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 1 \end{pmatrix} - 9 \begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix}$$

$$= \begin{pmatrix} 0-63 & 12-27 & 27-72 \\ 24-9 & 9-36 & 21-81 \end{pmatrix}$$

$$= \begin{pmatrix} -63 & -15 & -45 \\ 15 & -27 & -60 \end{pmatrix}$$

5. Find x, y, z $\begin{pmatrix} 12 & 3 \\ x & 5 \end{pmatrix} = \begin{pmatrix} y & 2 \\ 3 & 5 \end{pmatrix}$

$$x = 3, y = 12, z = 3.$$

6. $A = \begin{pmatrix} 7 & 8 & 6 \\ 1 & 3 & 9 \\ -4 & 3 & -1 \end{pmatrix}$ $B = \begin{pmatrix} 4 & 11 & -3 \\ -1 & 2 & 4 \\ 7 & 5 & 0 \end{pmatrix}$

$$2A + B$$

$$= 2 \begin{pmatrix} 7 & 8 & 6 \\ 1 & 3 & 9 \\ -4 & 3 & -1 \end{pmatrix} + \begin{pmatrix} 4 & 11 & -3 \\ -1 & 2 & 4 \\ 7 & 5 & 0 \end{pmatrix}$$

$$= \begin{pmatrix} 14+4 & 16+11 & 12-3 \\ 2-1 & 6+2 & 18+4 \\ -8+7 & 6+5 & -2+0 \end{pmatrix}$$

$$= \begin{pmatrix} 18 & 27 & 9 \\ 1 & 8 & 22 \\ -1 & 11 & -2 \end{pmatrix}$$

If $A = p \times q$

$$B = q \times r$$

$$\text{Order of } AB = p \times r$$

AB matrix exists

Order of AB = not defined

AB matrix exists. ~~for~~ ~~division~~

8. $A = \begin{pmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & 5/2 \\ 8 & 3 & 1 \end{pmatrix}$

$$A^T = \begin{pmatrix} 5 & -\sqrt{17} & 8 \\ 2 & 0.7 & 3 \\ 2 & 5/2 & 1 \end{pmatrix}$$

$$(A^T)^T = \begin{pmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & 5/2 \\ 8 & 3 & 1 \end{pmatrix}$$

$$(A^T)^T = A.$$

9. $A = \begin{pmatrix} 2 & 5 \\ 4 & 3 \end{pmatrix}$, $B = \begin{pmatrix} 1 & -3 \\ 2 & 5 \end{pmatrix}$

$$AB = \begin{pmatrix} 2 & 5 \\ 4 & 3 \end{pmatrix} \begin{pmatrix} 1 & -3 \\ 2 & 5 \end{pmatrix}$$

$$BA = \begin{pmatrix} 1 & -3 \\ 2 & 5 \end{pmatrix} \begin{pmatrix} 2 & 5 \\ 4 & 3 \end{pmatrix}$$

$$\therefore AB \neq BA.$$

$$10. A = \begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{pmatrix} \quad B = \begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix}$$

$$B - 5A = \begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix} - 5 \begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{pmatrix}$$

$$= \begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix} + \begin{pmatrix} 0 & -20 & -45 \\ -40 & -15 & -35 \end{pmatrix}$$

$$= \begin{pmatrix} 7 & -17 & -37 \\ -39 & -11 & -26 \end{pmatrix}$$

$$11. A = \begin{pmatrix} 2 & 1 \\ 1 & 3 \end{pmatrix} \quad B = \begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix}$$

$$AB = \begin{pmatrix} 2 & 1 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix}$$

$$BA = \begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} 2 & 1 \\ 1 & 3 \end{pmatrix}$$

$$AB \neq BA.$$

$$12. A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix} \quad B = \begin{pmatrix} 1 & -2 \\ -3 & 1 \end{pmatrix}$$

$$AB = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix} \begin{pmatrix} 1 & -2 \\ -3 & 1 \end{pmatrix}$$

$$BA = \begin{pmatrix} 1 & -2 \\ -3 & 1 \end{pmatrix} \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix}$$

$$\therefore AB = BA.$$

$$13. A = \begin{pmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix}$$

$$A A^T = \begin{pmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix} \begin{pmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{pmatrix}$$

$$= \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} = I.$$

$$14. A^2 = I, \quad A = \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$$

$$A^2 = A \times A.$$

$$= \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix} \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$$

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

$$A^2 = I$$

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1. b) (5, $\sqrt{5}$) and Origin.
(25, 40000)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1}{\sqrt{5}} //$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-\cos \theta}{\sin \theta} = -\cot \theta.$$

(iii) $(-6, 1)$ and $(-3, 2)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1}{3} \quad \checkmark$$

2 The line P, 'P Parallel to q'
 Poting 2016, Pq 2016 2016

$\therefore P \parallel Q. (P \text{ ~~is not~~ } Q)$

3. The line r , r Perpendiculars
(கோடு, r செங்குத்துகள் 8)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

4. Find $3x - 2y - b = 0$.

$\frac{x}{a} + \frac{y}{b} = 1$ (change symbol)
 $a = +2$ $b = -3$

5. $4x - 9y + 36 = 0$
 $\frac{x}{a} + \frac{y}{b} = 1$ (No change Symbol)
 $a = -9 \quad b = 4$

(ii) $x + 2y + 12 = 0$.
 $\frac{x}{a} + \frac{y}{b} = 1$ (change symbol)
 $a = -3$ $b = -4$

6 Slope = $-\frac{5}{4}$ Point $(-1, 2)$
Equation $y - y_1 = m(x - x_1)$
 $5x + 4y - 3 = 0$

7. Slope = $-\frac{5}{7}$ Point $(3, -4)$
 Find equation of line
 $y - y_1 = m(x - x_1)$
 $5x + 7y + 13 = 0$

8. x and y axes $4, -6$
 $\div \quad \div 2$
 $\frac{x}{a} + \frac{y}{b} = 1$
 $\frac{x}{2} + \frac{y}{-3} = 1$
 $\frac{x}{2} - \frac{y}{3} = 1$
 $3x - 2y - 12 = 0$

9. Slope and y intercept find?
 (4) $8x - 7y + 6 = 0$
 Find m and C .

① $8x - 7y + 6 = 0$
 $y = mx + C$
 $m = \frac{8}{7}, C = \frac{6}{7}$

10. $2x+3y-8=0$, $4x+6y+18=0$
 $\frac{3}{2} = \frac{6}{4} = \frac{8}{18}$

They are parallel.

இது இணைப்பானவை.

11. $x-2y+3=0$ & $6x+3y+8=0$
 $\frac{-2}{1} = \frac{3}{6} = \frac{8}{3}$

They are perpendicular.

இவை செங்குத்தானவை.

12. (i) slope 5 y intercept -9
 $5x - y - 9 = 0$

(ii) Inclination is 45° &
 y intercept is 11
 $x - y + 11 = 0$

13. Collinear (சேர்ந்திருக்கின்றன)
 $(a, b+c), (b, c+a), (c, a+b)$

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

$= \frac{1}{2} \begin{vmatrix} a & b+c \\ b & c+a \\ c & a+b \\ a & b+c \end{vmatrix} = 0$

(ii) $(-3, 5), (5, 6), (5, -2)$

Area of Δ (அளவைப்படுகிறது)

$= \frac{1}{2} \begin{vmatrix} x_1 & y_1 \\ x_2 & y_2 \\ x_3 & y_3 \\ x_4 & y_4 \end{vmatrix} = \frac{1}{2} \begin{vmatrix} -3 & 5 \\ 5 & 6 \\ 5 & -2 \\ -3 & 5 \end{vmatrix}$

$= 32 \text{ sq. units.}$

(iii) $(1, -1), (-4, 6), (-3, -5)$

Area of Δ (அளவைப்படுகிறது)

$\frac{1}{2} \begin{vmatrix} x_1 & y_1 \\ x_2 & y_2 \\ x_3 & y_3 \\ x_4 & y_4 \end{vmatrix} = \frac{1}{2} \begin{vmatrix} 1 & -1 \\ -4 & 6 \\ -3 & -5 \\ 1 & -1 \end{vmatrix}$

$= 24 \text{ sq. units}$
 (செங்குத்தானவை)

14. $(-1.5, 3), (6, -2), (-3, 4)$

Collinear (சேர்ந்திருக்கின்றன)

Area of $\Delta = 0$

அளவைப்படுகிறது

$\frac{1}{2} \begin{vmatrix} x_1 & y_1 \\ x_2 & y_2 \\ x_3 & y_3 \\ x_4 & y_4 \end{vmatrix} = \frac{1}{2} \begin{vmatrix} -1.5 & 3 \\ 6 & -2 \\ -3 & 4 \\ -1.5 & 3 \end{vmatrix} = 0$

15. $(2, 3), (4, a), (6, -3)$
Find a . (கனமானம்).

Area of $\Delta = 0$
கனமானம் 0 ஆக

$$\frac{1}{2} \begin{vmatrix} 2 & 3 \\ 4 & a \\ 6 & -3 \end{vmatrix} = 0$$

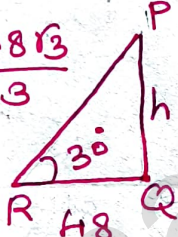
$$a = 0.$$

UNIT - 6:

1. foot of the tower - 48m
angle 30° find height?
கோட்டத்தின் அடிப்பகுதி - 48 மீ
கோணம் 30° , உயரம் காண்க?

$$h = \frac{48\sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{48\sqrt{3}}{3}$$

$$= 16\sqrt{3} \text{ m.}$$

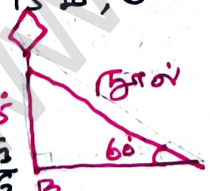


2. A kite, height 75m
Angle 60° .
கூடு, உயரம் 75 மீ, கோணம் 60°

length = $75 \times \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{2}$

$$= \frac{150\sqrt{3}}{3} = 50\sqrt{3} \text{ m}$$

$$\sin 60^\circ = \frac{\sqrt{3}}{2}$$

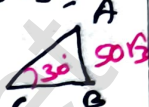


3. கோட்டத்தின் உயரம், 30m, height $10\sqrt{3}$ m.
Find the angle of elevation?
கோட்டத்தின் உயரம், 30
- 

$$\tan \theta = \frac{10\sqrt{3}}{30} = \frac{\sqrt{3}}{3} = \frac{1}{\sqrt{3}}$$

$\theta = 30^\circ.$

4. rock $50\sqrt{3}$ high, angle 30° .
கோட்டத்தின் உயரம் $50\sqrt{3}$ - A
கோணம் 30° .
[$\tan 30^\circ = \frac{1}{\sqrt{3}}$]
distance = $50\sqrt{3} \times \sqrt{3}$
அதிகாரம்

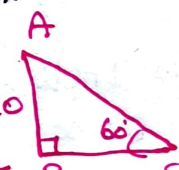
$$= 50(3) = 150 \text{ m}$$
- 

5. A player, height 20m,
angle 60° .
விளையாட்டில் வீரர், 20m
உயரம் கோணம் 60° .

distance = $\frac{20}{\sqrt{3}}$
அதிகாரம்

$$= \frac{20\sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{20\sqrt{3}}{3} \text{ m}$$

$$\tan 60^\circ = \sqrt{3}$$



6. 1.5m tall 28.5 m
tower (கோட்டம்) 30m.

$$\tan \theta = \frac{28.5}{20.5} = 1$$

$$\therefore \theta = 45^\circ$$

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UNIT - 8.

1. 43.5, 43.6, 18.9, 38.4, 61.4, 29.8.
- Range $R = L - S = 61.4 - 13.6 = 47.8$
- CR $= \frac{47.8}{75} = 0.64$
- (ii) 25, 67, 48, 53, 18, 99, 44.
- Range $R = 67 - 18 = 49$
- CR $= \frac{49}{85}$
- (iii) 63, 89, 98, 125, 79, 108, 117, 68.
- Range $R = 125 - 63 = 62$

2.

400-450	450-500	500-550
8	12	30
550-600	600-650	
21	6	

$R (\text{Range}) = L - S = 650 - 400 = 250$

3.

16-18	18-20	20-22
0	4	6
22-24	24-26	26-28
8	2	2

$$\text{Range } R = L - S$$

$$= 28 - 18 = 10 \text{ years}$$

3. Range 36.8 Small Value: 13.4

(R) $L = ?$ [L' க்கு L-ஐ R+8 க்கு L-ஐ]

$$L = 36.8 + 13.4 = 50.2$$

(ii) Range 13.67, Large Value 70.08

Small Value (கிடைக்க வேண்டும்?)

$$S = 70.08 - 36.8 = 33.28$$

4. S.D = 21 or $n = 21$

$$\sigma = \sqrt{\frac{n^2 - 1}{12}} = \sqrt{\frac{21^2 - 1}{12}}$$

$$= \sqrt{\frac{441 - 1}{12}} = \sqrt{\frac{440}{12}}$$

5. S.P = 3.6, n.v = ? NSD = ?

$\div 3$ (3 ஆல் வகுக்கவும்)

$$\sigma = 3.6$$

$$= \frac{3.6}{3} = 1.2$$

$$\sigma^2 = (1.2)^2 = 1.44$$

6. S.P = 4.5, decreased 5
new S.D = ?

no change
மாற்றமில்லை.

$$\text{new S.D} = 4.5.$$

7. (i) $\sigma = 12$, C.V = 25.6
 $\bar{x} = ?$

$$\text{C.V} = \frac{\sigma}{\bar{x}} \times 100\%$$

$$\bar{x} = 4.7\%$$

8. (ii) $\bar{x} = 15$, C.V = 48 $\sigma = ?$

$$\text{C.V} = \frac{\sigma}{\bar{x}} \times 100\%$$

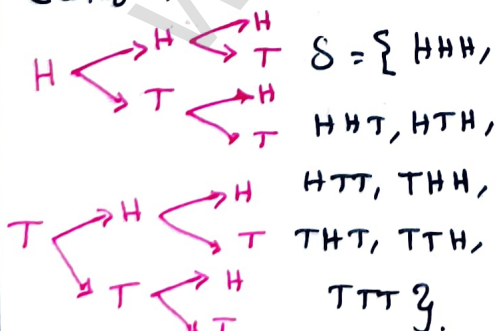
$$\sigma = 7.2$$

- (iii) $\bar{x} = 25.6$, C.V = 18.75
 $\sigma = ?$

$$\text{C.V} = \frac{\sigma}{\bar{x}} \times 100\%$$

$$\sigma = 4.8.$$

8. Three coins tree diagram
மூன்று நாணயப் பதில்கள்.



9. A coin is thrice tails?
நாணயம் 3 தலைகள் வந்தால்?

$$n(S) = 8, n(A) = 3$$

$$P(A) = \frac{3}{8}$$

10. Blue - 5, Green - 4
Blue - 5, Green - 4
 $n(S) = 9$ (5B + 4G)

(i) Blue (நீலம்)

$$P(A) = \frac{\text{Blue}}{n(S)} = \frac{5}{9}$$

(ii) not blue (நீலமில்லை)

$$P(B) = \frac{\text{not blue}}{n(S)} = \frac{4}{9}.$$

11. சனி மற்றும் சனி தலைகள் (Saturdays)
(leap year)

$$\text{leap year} = 366$$

$$= 52 + 2 \text{ days}$$

$$n(S) = ?$$

$$P(A) = \frac{2}{7} \text{ (1 week)}$$

12. $P(A) = \frac{2}{3}$, $P(B) = \frac{2}{5}$,
 $P(A \cup B) = \frac{1}{3}$ (A or B)

$$P(A \cap B) = \frac{2}{5} + \frac{1}{3}$$

$$= \frac{6+5}{15} = \frac{11}{15}$$

$$P(A \cap B) = \frac{11}{15}.$$

13. $P(A) = 0.42$, $P(B) = 0.48$,
 $P(A \cap B) = 0.16$.

$$P(\text{not } A) = 1 - 0.42 = 0.58$$

$$P(\text{not } B) = 1 - 0.48 = 0.52$$

$$P(A \cup B) = 0.42 + 0.48 - 0.16 \\ = 0.90 - 0.16 = 0.74.$$

14. A is 0.5, B is 0.3
 neither A nor B = 0.2

15. A and B occur 0.6
 Probability $\left(\begin{matrix} \text{நிகழ்தகவு} \\ \text{0.2} \end{matrix} \right) \times \left(\begin{matrix} \text{0.6} \\ \text{0.2} \end{matrix} \right)$
 $P(A) + P(B) = 1.2$

16. $P(\text{not } A) = 0.45$,
 $P(A \cup B) = 0.65$, $P(B) = ?$
 $(\text{0.65}) 0.5 = 1$
 $P(B) = 0.1$

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UNIT - 8. Five Mark

1. Find Mean & Variance of 'n' natural numbers.
 இவ்வாறான எண்கள்,
 சராசரி & சதரேகை.

$$\bar{x} = \frac{n+1}{2}, \sigma^2 = \frac{n^2-1}{12}.$$

2. $n(S) = 36$.

(i) equal to 4
 சமமான

$$P(A) = \frac{3}{36} = \frac{1}{12}.$$

(ii) greater than 10
 பெரியதாக

$$P(B) = \frac{3}{36} = \frac{1}{12}.$$

(iii) less than 13
 குறைவாக

$$P(C) = 36/36 = 1.$$

3. $n(S) = 36$.

(i) Doublet (2,2) (3,3) (4,4) (5,5) (6,6)

$$P(A) = 6/36.$$

(ii) sum as faces as 4.
 கூடுதல் 4.

$$P(B) = \frac{3}{36} \quad \begin{matrix} (1,3), (3,2) \\ (3,1) \end{matrix}$$

7. $n(S) = 26.$

[5 Red, 6 white, 7 Green,
8 black]

(i) white (செவ்வெண்)

$$P(A) = 6/26 = 3/13.$$

(ii) Black or Red
கருப்பு-5

$$P(B) = 13/26 = 1/2.$$

(iii) not white (செவ்வெண் தவிர)
(R + G + B)

$$P(C) = \frac{5+7+8}{26} = \frac{20}{26} = \frac{10}{13}.$$

(iv) neither white nor Black
(செவ்வெண், கருப்பு தவிர)

Red: $P(D) = \frac{5+7}{26} = \frac{12}{26} = \frac{6}{13}.$
Green

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UNIT-2

Five Mark.

1. Find 300 -- 600 divide 7
எடுத்துக்.

301, 308, 595

$$\begin{matrix} 301 \\ +4 \end{matrix}$$

$$n = \left(\frac{l-a}{d} \right) + 1$$

$$= 43$$

$$S_n = \frac{n}{2} [a+l]$$

$$= 19264.$$

2. middle terms of A.P
(நடுவெண்)

9, 15, 21, 27, 183.

$$+ \text{கூடு } 21+9=30$$

$$\begin{matrix} a=9 \\ d=6 \end{matrix} \quad n = \left(\frac{l-a}{d} \right) + 1$$

$$= 30$$

$$t_{15} = a + (n-1)d = 93$$

$$t_{16} = 99.$$

3. 6th and 8th term 7:9
எடுத்து

Find 9th to 13th term (எடுத்து)

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

$$t_6 : t_8 = 7 : 9$$

$$\frac{a+5d}{a+7d} = \frac{7}{9} \Rightarrow a=2d$$

$$t_9 : t_{13} = 5 : 7$$

4. $3 + 33 + 333 + \dots$ to n term

$$= 3[1 + 11 + 111 + \dots \text{ } n \text{ term}]$$

$$= \frac{3}{9}[(10-1) + (100-1) + \dots \text{ } n \text{ term}]$$

$$= \frac{3}{9}[(10 + 100 + \dots \text{ } n \text{ term}) - n]$$

$$= \frac{3}{9}\left[\frac{10(10^n - 1)}{9} - n\right] //$$

5. $5 + 55 + 555 + \dots$

$$= 5[1 + 11 + 111 + \dots \text{ } n \text{ term}]$$

$$= \frac{5}{9}[(10-1) + (100-1) + \dots \text{ } n \text{ term}]$$

$$= \frac{5}{9}[(10 + 100 + \dots \text{ } n \text{ term}) - n]$$

$$= \frac{5}{9}\left[\frac{10(10^n - 1)}{9} - n\right] //$$

6. Find the sum of

$$15^2 + 16^2 + 17^2 + \dots + 28^2$$

$$= \frac{n(n+1)(2n+1)}{6}$$

$$= \frac{28 \times 29 \times 57}{6} - \frac{14 \times 15 \times 29}{6}$$

$$= 6699.$$

7. $10^3 + 11^3 + \dots + 20^3$

$$= \left[\frac{n(n+1)}{2}\right]^2$$

$$= \left(\frac{20 \times 21}{2}\right)^2 - \left(\frac{9 \times 10}{2}\right)^2$$

$$= 42075.$$

8. Rekha is square (855 cm 65 cm) 855 cm

10 cm, 11 cm, 12 cm, ..., 24 cm.

$$10^2 + 11^2 + 12^2 + \dots + 24^2$$

$$= \frac{n(n+1)(2n+1)}{6}$$

$$= \frac{24 \times 25 \times 49}{6} - \frac{9 \times 10 \times 19}{6}$$

$$= 4615.$$

9. $t_n = a + (n-1)d$

$$9t_9 = 15t_{15}$$

$$9[a + 8d] = 15[a + 14d]$$

$$\Rightarrow t_{24} = 0 \text{ (given)}$$

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UNIT-3
FIVE MARK.

1. If $A = \begin{pmatrix} 1 & -1 & 2 \end{pmatrix}$, $B = \begin{pmatrix} 1 & -1 \\ 2 & 1 \\ 1 & 3 \end{pmatrix}$

$C = \begin{pmatrix} 1 & 2 \\ 2 & -1 \end{pmatrix}$ $(AB)C = A(BC)$

LHS:-
 $(AB)C = (9, -2)$

RHS:-
 $A(BC) = (9, -2)$
LHS = RHS.

2. $A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$

$(AB)^T = B^T A^T$

LHS:-
 $(AB)^T = \begin{pmatrix} 0 & 5 \\ 9 & -4 \end{pmatrix}$

RHS:-
 $B^T A^T = \begin{pmatrix} 2 & -1 & 0 \\ -1 & 4 & 2 \end{pmatrix} \begin{pmatrix} 1 & 2 \\ 2 & -1 \\ 1 & 1 \end{pmatrix}$
 $= \begin{pmatrix} 0 & 5 \\ 9 & -4 \end{pmatrix}$

LHS = RHS.

3. $A = \begin{pmatrix} \cos \theta & 0 \\ 0 & \cos \theta \end{pmatrix}$, $B = \begin{pmatrix} \sin \theta & 0 \\ 0 & \sin \theta \end{pmatrix}$

$A^2 = \begin{pmatrix} \cos \theta & 0 \\ 0 & \cos \theta \end{pmatrix} \begin{pmatrix} \cos \theta & 0 \\ 0 & \cos \theta \end{pmatrix}$
 $= \begin{pmatrix} \cos^2 \theta & 0 \\ 0 & \cos^2 \theta \end{pmatrix}$

$B^2 = \begin{pmatrix} \sin \theta & 0 \\ 0 & \sin \theta \end{pmatrix} \begin{pmatrix} \sin \theta & 0 \\ 0 & \sin \theta \end{pmatrix}$
 $= \begin{pmatrix} \sin^2 \theta & 0 \\ 0 & \sin^2 \theta \end{pmatrix}$

$\therefore A^2 + B^2 = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} = I.$

4. $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ $A^2 - 4A + 5I_2 = 0$

LHS:-
 $= \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix} \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix} - 4 \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix} + 5 \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
 $= \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$
 $= \text{RHS.}$

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

LHS:- $A^2 - 5A + 7I_2$
 $= \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix} - 5 \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix} + 7 \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
 $= \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$
 $= \text{RHS.}$

6. $\begin{pmatrix} x+y+z \\ x+z \\ y+z \end{pmatrix} = \begin{pmatrix} 9 \\ 5 \\ 7 \end{pmatrix}$

$x+z=5$ $y+z=7$ $x+y+z=9$
 $x=2$ $y=4$ $z=3$

2 ஸ்டீபிள் 3 ஸ்டீபிள்

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

LHS:-

$$(AB)^T = \begin{pmatrix} 5 & 2 & 4 & 3 \\ 30 & 3 \end{pmatrix}$$

RHS:-

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

$$= \begin{pmatrix} 5 & 2 & 4 & 3 \\ 30 & 3 \end{pmatrix}$$

8. $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

$$A^2 - (a+d)A = (bc-ad)I_2$$

LHS:- $A^2 - (a+d)A$

$$= \begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} a & b \\ c & d \end{pmatrix} - (a+d) \begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

$$= (bc-ad)I_2$$

1. $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

$$A^2 - (a+d)A = (bc-ad)I_2$$

Same sum

2. $A = \begin{bmatrix} 3 & 1 \\ -2 & 2 \end{bmatrix}$ $A^2 - 5A + 7I_2 = 0$

$a=3, b=1, c=-2, d=2$

$A^2 - (a+d)A = (bc-ad)I_2$

$A^2 - (3+2)A = (-1-6)I_2$

$A^2 - 5A + 7I_2 = 0$

kindly send me your key Answers to our email id - padasalai.net@gmail.com

UNIT-5 FIVE MARK.

1. Find the area of quadrilateral.

$(-9, -2), (-8, -4), (2, 2)$

$(1, -3) \rightarrow (35 \text{ சதுர அலகுகள்})$

Area of quadrilateral

$$= \frac{1}{2} \begin{vmatrix} x_1 & y_1 \\ x_2 & y_2 \\ x_3 & y_3 \\ x_4 & y_4 \\ x_1 & y_1 \end{vmatrix} = \frac{1}{2} \begin{vmatrix} -9 & -2 \\ -8 & -4 \\ 2 & 2 \\ 1 & -3 \\ -9 & -2 \end{vmatrix}$$

$= 35 \text{ sq. units (சதுர அலகுகள்)}$

(ii) $(-9, 0), (-8, 6), (-1, -2), (-6, -3)$

$$= \frac{1}{2} \begin{vmatrix} x_1 & y_1 \\ x_2 & y_2 \\ x_3 & y_3 \\ x_4 & y_4 \\ x_1 & y_1 \end{vmatrix} = \frac{1}{2} \begin{vmatrix} -9 & 0 \\ -8 & 6 \\ -1 & -2 \\ -6 & -3 \\ -9 & 0 \end{vmatrix}$$

$= 34 \text{ sq. units.}$

$(34 \text{ சதுர அலகுகள்})$

2. $A(1, -4), B(2, -3), C(4, -7)$

The slope of AB = 1

The slope of AC = -1

AB $\perp$ AC

Slope of AB $\times$ AC = $1 \times -1 = -1$

Right angle triangle

2. $\Rightarrow (8, 6), (5, 11), (-5, 12)$
 $(-4, 3).$

$$= \frac{1}{2} \begin{vmatrix} x_1 & y_1 \\ x_2 & y_2 \\ x_3 & y_3 \\ x_4 & y_4 \\ x_1 & y_1 \end{vmatrix} = \frac{1}{2} \begin{vmatrix} 8 & 6 \\ 5 & 11 \\ -5 & 12 \\ -4 & 3 \\ 8 & 6 \end{vmatrix}$$

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

(சதுர பரப்பளவு)

3. A(3, -4) B(9, -4) C(5, -7)
 D(7, -7) Trapezium (பரிமாணம்)

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

எழுவா

$$\text{slope of AB} = 0$$

எழுவா

$$\text{slope of CD} = 0$$

எழுவா

$$\text{slope of BC} = \frac{3}{4}$$

எழுவா

$$\text{slope of DA} = -\frac{3}{4}$$

எழுவா

$\therefore$ slope of AB = slope of CD
 எழுவா.

$\therefore$ ABCD is a Trapezium
 அடிக்கோடுகள் சமம்.

UNIT - 6.
 TWO MARK.

1. P.T. $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$

RHS:-

$$= \sqrt{\frac{1+\cos\theta \times 1-\cos\theta}{(1-\cos\theta)(1-\cos\theta)}}$$

$$= \operatorname{cosec}\theta + \cot\theta$$

$$= \text{RHS.}$$

2. P.T. $\frac{\cos\theta}{1+\sin\theta} = \sec\theta - \tan\theta$

LHS:- $\frac{\cos\theta}{1+\sin\theta} \times \frac{1-\sin\theta}{1-\sin\theta}$

$$= \sec\theta - \tan\theta.$$

3. $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta.$

RHS:-

$$= \sqrt{\frac{1+\sin\theta}{1-\sin\theta} \times \frac{1-\sin\theta}{1-\sin\theta}}$$

$$= \sec\theta + \tan\theta$$

$$= \text{LHS.}$$

UNIT-6 5 MARK

1. If
- $\operatorname{cosec} \theta + \cot \theta = P$
- , P.T.

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

$$\operatorname{cosec} \theta + \cot \theta = P$$

$$\operatorname{cosec} \theta - \cot \theta = \frac{1}{P}$$

$$\therefore \cos \theta = \frac{P^2 - 1}{P^2 + 1} \text{ } \checkmark$$

2. If
- $\frac{\cos \theta}{1 + \sin \theta} = \frac{1}{a}$
- P.T.

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

$$\therefore \sec \theta + \tan \theta = a$$

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

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

$$\therefore a = \sec \theta + \tan \theta$$

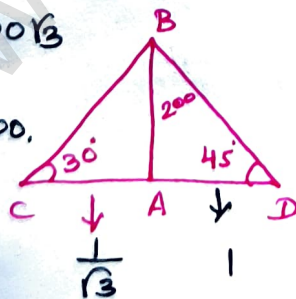
$$\frac{1}{a} = \sec \theta - \tan \theta$$

$$\therefore \sin \theta = \frac{a^2 - 1}{a^2 + 1} \text{ Hence proved.}$$

3. Two ships,
- $30^\circ, 45^\circ$
- height
-
- (200 m) distance
-
- between two ships.
-
- (200 m distance between two ships)

$$(i) AC = 200\sqrt{3}$$

$$(ii) AD = 200$$



$$\therefore CD = 200\sqrt{3} + 200$$

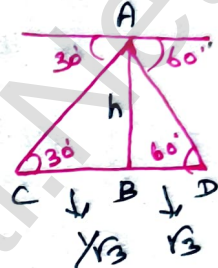
$$= 200(\sqrt{3} + 1)$$

$$= 200(2.732)$$

$$CD = 546.4 \text{ m.}$$

4. Top of light house
- $30^\circ, 60^\circ$
-
- Borai Borai distance

$$Ah/\sqrt{3} \text{ m.}$$



$$(i) BC = h\sqrt{3}$$

$$(ii) BD = h/\sqrt{3}$$

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

$$= 4h/\sqrt{3} \text{ m. } \checkmark$$

UNIT - 7.

1. cylindrical drum
-
- $h = 20 \text{ cm}$
- ,
- $r = 14 \text{ cm}$
- .

$$C.S.A = 2\pi rh$$

$$= 2 \times \frac{22}{7} \times 14 \times 20$$

$$= 1760 \text{ cm}^2$$

$$T.S.A = 2\pi r(h + r)$$

$$= 2 \times \frac{22}{7} \times 14 \times 34$$

$$= 2992 \text{ cm}^2$$

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2. Right circular cylinder.

சுருள் வட்டக் குழாய்

$h = 14 \text{ cm}$ C.S.A = 88

$d = ?$

$d = 2r$

$2\pi rh = 88$

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

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

$2r = 2$

$\therefore d = 2 \text{ cm}$

3. Cone $r = 7 \text{ cm}$ T.S.A = 704

குழாய்

புரத்தையுறுப்பு

$\pi r(l+r) = 704$

$l = 25 \text{ cm}$

4. sphere (கோளம்)

SA. (கோளத்தின் பரப்பளவு)
 $= 154$ $d = ?$

$4\pi r^2 = 154$

$r^2 = \frac{154}{4} \times \frac{7}{22}$

$r^2 = 49/4$

$r = 7/2$

$d = 2r$

$\therefore 2r = 2 \times 7/2$

$d = 7 \text{ m}$

UNIT - 5.

1. $A(1, -4)$ $B(2, 3)$ $C(4, -7)$

slope of AB = 1

slope of BC = -2

slope of AC = -1

slope of AB $\times$ slope of AC = 1

$\therefore AB \perp AC$

$\therefore \Delta ABC$ is a right angles

2. $A(2.5, 3.5)$ $B(10, -4)$

$C(2.5, -2.5)$ $D(-5, 5)$

Middle point of AC = $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right)$

நடுப்புள்ளி AB = $\left(\frac{5}{2}, \frac{1}{2} \right)$

Mid point of BD = $\left(\frac{5}{2}, \frac{1}{2} \right)$

$\therefore$ Mid point of AC = Mid Point of BD

$\therefore ABCD$ is a parallelogram.

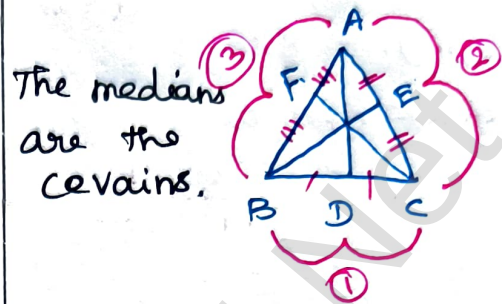
கோணங்கள் சமம்.

4. $A(3, -4)$ $B(9, -4)$ $C(5, -7)$
 $D(7, -7)$
 $ABCD$ is a trapezium.
 Slope of $AB = \frac{y_2 - y_1}{x_2 - x_1} = 0$.
 Slope of $BC = \frac{3}{4}$.
 Slope of $CD = 0$.
 Slope of $DA = \frac{3}{4}$.
 $\therefore$ Slope of $AB =$ Slope of CD .
 Slope of $BC \neq$ Slope of DA .
 $\therefore ABCD$ is a trapezium.

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UNIT - 4.

1. S.T. in a Δ , the medians are concurrent.



D is mid point of BC, $BD = DC$.

$$\Rightarrow BD = DC.$$

$$\therefore \frac{BD}{DC} = 1 \quad \text{--- (1)}$$

E is mid point of CA, $CE = EA$.

$$\Rightarrow CE = EA.$$

$$\therefore \frac{CE}{EA} = 1 \quad \text{--- (2)}$$

F is mid point of AB, $AF = FB$.

$$\Rightarrow AF = FB.$$

$$\therefore \frac{AF}{FB} = 1 \quad \text{--- (3)}$$

from (1), (2), (3).

$$\therefore \frac{BD}{DC} \times \frac{CE}{EA} \times \frac{AF}{FB} = 1.$$

Ceva's Thm is satisfied.

$\therefore$ The medians are concurrent.

2. $4(AQ^2 + BP^2) = 5AB^2$.

LHS:-

$4[AQ^2 + BP^2]$

$= 4[5x^2 + 5y^2]$ $\begin{matrix} B & y & Q & y & C \\ & & y^2 & & \end{matrix}$

$= 20x^2 + 20y^2$.

RHS:-

$5AB^2$.

$= 5(4x^2 + 4y^2)$

$20x^2 + 20y^2$.

$\therefore LHS = RHS$.

3. $8AE^2 = 3AC^2 + 5AD^2$.

LHS:-

$8AE^2$.

$= 8(x^2 + 4y^2)$

$= 8x^2 + 32y^2$.

RHS:-

$3AC^2 + 5AD^2$

$= 8x^2 + 32y^2$.

$\therefore LHS = RHS$.

1. State & prove Thales theorem. (தேர்ச்சி தேற்றம்)

2. S & P, Angle Bisector Theorem (கோண இருசம வைய தேற்றம்).

3. S & P, Pythagoras theorem. (பிதாகரஸ் தேற்றம்).

(தேற்றம்: Statement)

நிரூபணம் (Proof)

3க்கில்
6400 மருத்தான் புகை.

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