ஆட்சித்தமிழ் ஐ.ஏ.எஸ் அகாடெமி

குரூப் 4 கடைசித் திருப்புதல்
கணிதம் – தீர்வுகள் (Maths - Solution)

LCM & HCF

1. Sol:

2	108, 288, 360
2	54, 144, 180
3	27, 72, 90
3	9, 24, 30
	3, 8, 10

மீ.பொ.வ = 2x2x3x3 = 4x 9 = 36

2. Sol:

2	72, 108, 2100
2	36, 54, 1050
3	18, 27, 525
3	6, 9, 175
	2, 3, 175

மீ.சி.ம = 2x2x3x3x2x3x175
= 8x27x175
= 37800

3. Sol:

2	24, 36, 40
2	12, 18, 20
2	6, 9, 10
3	3, 9, 5
	1, 3, 5

மீ.சி.ம = 2x2x2x3x3x5
= 24x15
= 360

4. Sol:

இரு எண்களின் பெருக்கல் பலன் = மீ.சி.ம x மீ.பொ.வ

$6xy = 24$

$y = \frac{24}{6}$

$y = 4$

5. Sol:

HCF + LCM = 1150

LCM = 45 HCF

HCF + 45 HCF = 1150

46 HCF = 1150

$HCF = \frac{1150}{46}$

HCF = 25

LCM = 45 HCF = 45 x 25

$x \times y$ = HCF x LCM

125 x y = 25 x 45 x 25

$y = \frac{\cancel{25}^{5} \times 45 \times \cancel{25}}{\cancel{125}_{5}}$

y = 225

6. **Sol:**

x = 150

y = 225

HCF = 75 LCM = ?

150 x 225 = 75 x LCM

$LCM = \frac{\cancel{150}^{\cancel{30}^{2}} \times 225}{\cancel{75}_{\cancel{15}^{1}}} = 2 \times 225 = 450$

Ans: 450

7. Sol:

13 | 15x13, 11x13

15, 11

இரு எண்கள் = 15x13, 11x13

= 195, 143

எண்கள் = விகிதம் x மீ.பொ.வ

8. Sol:

மீ.சி.ம = மீ.பொ.வ x விகிதங்களின் பெருக்கல் பலன்

$மீ.பொ.வ = \frac{மீ.சி.ம}{விகிதங்களின் பெருக்கல் பலன்}$

$HCF = \frac{2400}{3 \times 4 \times 5} = 40$

9. Sol:

$2^4 x 3^2 x 5^3 x 7$

$2^3 x 3^3 x 5^2 x 7^2$

3x5x7x11

3x5x7 = 15x7

மீ.பொ.வ = 105

(∴சிறிய அடுக்கு பொதுவானது)

10. Sol:

35	x^5	y^3	z^4
49	x^2	y	z^3
14	x	y^2	z^2
7	x	y	z^2

7 | 35, 49, 14

5, 7, 2 மீ.பொ.வ = 7

(சிறிய அடுக்கு பொதுவான)

11. Sol:

$16x^3y^2 = 2^4x^3y^2$

$24xy^3z = 2^3 \times 3 \times xy^3z$

மீ.பொ.வ $\Rightarrow 2^3 \times x \times y^2$

12. Sol:

$y^3+1 = y^3+1^3 = (y+1)(y^2-y+1)$

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

மீ.பொ.வ = $(y+1)$

13. Sol:

Find G.C.D (or) H.C.F?

HCF means = Take low value number of the power

$= ab^4$

Ans : ab^4

14. Sol:

2^3x3^2x5x11

$2^4x3^4x5^2x7$

$2^5x3^5x5^3x7^2x11$

$2^5x3^4x5^3x7^2x11$ = மீ.சி.ம

(∴பெரிய அடுக்கு அனைத்தும் பொதுவானதும்)

15. Sol:

$4(x+1)$ and $2(x^2-1)$

find thd lcm of 4, 2

i) $(x+1)$

2, 1

2 | 4, 2

LCM = 4

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

$(x+1)(x-1)$

Ans: $4(x^2-1)$

16. Sol:

பின்னங்களின் மீ.பொ.வ $= \dfrac{\text{தொகுதி (மீ.பொ.வ)}}{\text{பகுதி (மீ.சி.ம)}}$

$= \dfrac{\text{2,8,64,10 ன் மீபொ.வ}}{\text{3,9,81,27 ன் மீ.சி.ம}}$

$= \dfrac{2}{81}$

2	2, 8, 64, 10
	1, 4, 32, 5

மீ.பொ.வ = 2

3	3, 9, 81, 27
3	1, 3, 27, 9
3	1, 1, 9, 3
	1, 1, 3, 1

மீ.சி.ம = 3x3x3x3 = 81

17. Sol:

0.63, 1.05, 2.1

(100 ஆல் பெருக்கி கடைசியில் 100 ஆல் வகுக்க)

3	63,	105,	210	ன் மீ.சி.ம
7	21,	35,	70	
5	3,	5,	10	
	3,	1,	2	

= 3x7x5x3x2

= 21x30

= 630

தேவையான மீ.சி.ம $= \dfrac{630}{100}$

= 6.3

18. Sol:

தேவையான எண் = (6,7,8,9,12)ன் மீ.சி.ம + 1

3	6, 7, 8, 9, 12
2	2, 7, 8, 3, 4
2	1, 7, 4, 3, 2
	1, 7, 2, 3, 1

மீ.சி.ம = 3x2x2x7x2x3

= 504

தேவையான எண் = 504 + 1

= 505

19. Sol:

தேவையான எண் = (132- 62),(237 - 132) & (237 - 62) ன் மீ.பொ.வ

= 70, 105, 175 ன் மீ.பொ.வ

5	70, 105, 175
7	14, 21, 35
	2, 3, 5

மீ.பொ.வ = 5 x 7 = 35

20. Sol:

Co-prime (இணை பகா காரணி)

இரு எண்களின் மீ.பொ.வ 1 எனில், அது Co-prime ஆகும்.

18, 25ன் மீ.பொ.வ = 1

21. Sol:

தேவையான எண் = (91-43) (183-91) (183 - 43) ன் மீ.பொ.வ

= 48, 92, 140 ன் மீ.பொ.வ

= 4

2	48, 92, 140
2	24, 46, 70
	12, 23, 35

மீ. பொ.வ = 2 x 2 = 4

சரிபார்த்தல்

$\frac{43}{4}$ ⇒ மீதி 3

$\frac{91}{4}$ ⇒ மீதி 3

$\frac{183}{4}$ ⇒ மீதி 3

ஒரே மீதி வருகிறது.

22. Sol:

252, 308, 198 ன் மீ.சி.ம = 2772

2	252, 308, 198
2	126, 154, 99
3	63, 77, 99
7	21, 77, 33
3	3, 11, 33
11	1, 11, 11
	1, 1, 11

மீ.சி.ம = 2x2x3x7x3x11 = 12x21x11

= 252x11 = 2772

2772 வினாடி = 46 நிமிடம் 12 வினாடி

$[\therefore \frac{2772}{60}$ = 46 நிமிடம் + 12 வினாடி]

RATIO AND PROPORTION

23. Sol :

$32 = 3^2 + 2^2 = 9 + 4 = 13$

$29 = 2^2 + 9^2 = 4 + 81 = 85$

Ans : 85

24. Sol:

0.36 : 0.48 :: 0.48 : C

$$\frac{0.36}{0.48} = \frac{0.48}{C}$$

$$C = \frac{0.48 \times 0.48}{0.36} = \frac{0.48 \times 4}{3}$$

$$= 0.16 \times 4$$

$$= 0.64$$

எளியமுறை

$$C = \frac{b^2}{a}$$

$$= \frac{0.48 \times 0.48}{0.36} = 0.64$$

25. Sol:

$$x = \sqrt{ab}$$

$$= \sqrt{0.08 \times 0.18}$$

$$= \sqrt{\frac{8}{100} \times \frac{18}{100}}$$

$$= \sqrt{\frac{144}{100 \times 100}}$$

$$= \frac{12}{100}$$

$$x = 0.12$$

26. Sol:

a	b	c
5	9 →	9
4 ←	4	7

5x4 : 9x4 : 9x7

20 : 36 : 63

27. Sol:

a = 3, b = 4, c = 7 என்க

$$\frac{a+b+c}{c} = \frac{3+4+7}{7} = \frac{14}{7} = 2$$

28. Sol:

A		B		C		D
8		15	→	15	→	15
5	←	5		8	→	8
4	←	4	←	4		5

8x5x4 : 15x5x4 :15x8x4 : 15x8x5

A : D ⇒ $\overset{4}{\cancel{8}} \times \cancel{5} \times \cancel{4}$: $15 \times \overset{2}{\cancel{8}} \times \cancel{5}$

4 : 15

Shortcut Method

கூட்டு விகிதம் காணல்

$\frac{A}{B} \times \frac{B}{C} \times \frac{C}{D}$

$\frac{\cancel{8}}{15} \times \frac{\cancel{5}}{\cancel{8}} \times \frac{4}{\cancel{5}}$

$\frac{4}{15}$

⇒ 4 : 15

29. Sol:

விகிதம் ⇒ $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

2,3,4¡ e.C.ñ = 12

$\frac{1}{2} \times 12 : \frac{1}{3} \times 12 : \frac{1}{4} \times 12$

சரியான விகதம் ⇒ 6:4:3

சுற்றளவு = 104

$6x + 4x + 3x$ = 104

$13x$ = 104

$x = \frac{104}{13}$

x = 8

பெரிய பாக்கம் = $6x$

= 6x8

= 48 செ.மீ

30. Sol:

மூன்று மாணவர்களின் வயதுகள் $3x, 5x, 7x$,

மூன்று மாணவர்களின் சராசரி = 25

$$\frac{3x+5x+7x}{3} = 25$$

$$3x + 5x + 7x = 3x25$$

$$15x = 75$$

$$x = \frac{75}{15}$$

$$x = 5$$

சிறிய மாணவன் $\Rightarrow$ $3x$

சிறிய மாணவன் = 3x5

= 15 ஆண்டுகள்

31. Sol:

இரு எண்கள் = $3x$, $4x$

x என்பது மீ.பொ.வ

மீ.சி.ம = மீபொவ x விகிதங்களின் பெருக்கல்பலன்

$$180 = x \times 3 \times 4$$

$$x = \frac{180}{3 \times 4}$$

$$= \frac{60}{4}$$

$$x = 15$$

முதல் எண் = $3x = 3 \times 15 = 45$

மற்றொறு முறை

HCF | 3 , 4

LCM = 3x4xHCF

180 = 3x4xHCF

HCF = $\frac{180}{3 \times 4} = 15$

முதல் எண் = 3x15 = 45

32. Sol:

$$a + b = 6k$$
$$b + c = 7k$$
$$c + a = 8k$$

$$2(a + b + c) = 21\,k$$

$$2 \times 14 = 21k$$

$$k = \frac{2 \times 14}{21} = \frac{2 \times 2}{3} = \frac{4}{3}$$

$$a + b = 6 \times \frac{4}{3} = 8$$
$$b + c = 7 \times \frac{4}{3} = \frac{28}{3}$$
$$c + a = 8 \times \frac{4}{3} = \frac{32}{3}$$

$$a + b + c = 14$$
$$8 + c = 14$$
$$c = 14 - 8$$
$$\boxed{c = 6}$$

33. Sol:

A	B	C
5	4	$\boxed{4}$
$\boxed{9}$	9	10
5 x 9	: 4 x 9	: 4 x10
45	: 36	: 40

ஒரு பங்கு $\Rightarrow \frac{1210}{(45+36+40)} = \frac{1210}{121}$

ஒரு பங்கு = 10

Cன் பங்கு = 40

= 40 x 10

= ரூ400

34. Sol:

ஆல்கஹால் (ம) நீர் அளவு = $4x$, $3x$

$\frac{4x}{3x+5} = \frac{4}{5}$

$(4x)\ 5 = 4(3x+5)$

$20x = 12x + 20$

$20x - 12x = 20$

$8x = 20$

$x = \frac{20}{8}$

$= \frac{5}{2}$

$x = 2.5$

ஆல்கஹால் அளவு = $4x = 4 \times 2.5$

= 10லிட்டர்

35. Sol:

A, B, C - ன் சம்பளம் $2x$, $3x$, $5x$

A - ன் புதிய சம்பளம் $= \frac{115}{100}$ of $2x$

$= \frac{115}{100} \times 2x$

$= \frac{23}{20} \times 2x = \frac{23x}{10}$

B - ன் புதிய சம்பளம் $= \frac{110}{100}$ of $3x$

$= \frac{110}{100} \times 3x = \frac{33x}{10}$

C - ன் புதிய சம்பளம் $= \frac{120}{100}$ of $5x$

$= \frac{120}{100} \times 5x$

$= 6x$

புதிய விகிதம் $= \frac{23x}{10} : \frac{33x}{10} : 6x$

= 23 : 33 : 60

36. Sol:

10% of B = 1/4 G

$$\frac{1\cancel{0}}{10\cancel{0}} \times B = \frac{1}{4} G$$

$$\frac{B}{G} = \frac{1}{4} \times 10$$

$$\frac{B}{G} = \frac{5}{2}$$

B : G $\Rightarrow$ 5 : 2

37. **Sol. :**

இரு எண்களின் விகிதம் 4:7

$$\frac{4x-10}{7x-10} = \frac{1}{2}$$

$2(4x - 10) = 7x - 10$

$8x - 20 = 7x - 10$

$8x - 7x = -10 + 20$

$x = 10$

பெரிய எண் $= 7x$

$= 7(10)$

Ans. = 70

38. **Sol. :**

$Black\ \frac{1}{8}$; While $\frac{1}{2}$; $Blue\ \frac{7}{2}$

Total length of pencil = x

$Black\ part\ \frac{1}{8}$

Remaining part = $x - \frac{x}{8} \Rightarrow \frac{8x - x}{8} = \frac{7x}{8}$

$white\ part = \frac{1}{2}\left(\frac{7x}{8}\right) = \frac{7x}{16}$

Blue part = Total length - (length of black part + length of white part)

$$3\frac{1}{2} = x - \left(\frac{x}{8} + \frac{7x}{16}\right)$$

$$\frac{7}{2} = x - \left(\frac{2x + 7x}{16}\right)$$

$$\frac{7}{2} = x - \frac{9x}{16} \Rightarrow \frac{16x - 9x}{16} = \frac{7x}{16}$$

$$\frac{7}{2} = \frac{7x}{16}$$

$$x = \frac{\cancel{7}}{\cancel{2}} \times \frac{\overset{8}{\cancel{16}}}{\cancel{7}}$$

Ans. : x = 8 cm

39. **Sol. :**

Option A $5 : 7 = 5 + 7 = 12 \Rightarrow 72/12$

விகிதமாக இருக்கமுடியும்

Option B $3 : 5 = 3 + 5 = 8 \Rightarrow 72/8$

விகிதமாக இருக்கமுடியும்

Option C $3 : 4 = 3 + 4 = 7 \Rightarrow 72/7$

விகிதமாக இருக்கமுடியாது

Option D $4 : 5 = 4 + 4 = 9 \Rightarrow 72/9$

விகிதமாக இருக்கமுடியும்

Ans. 3 : 4

40. **Sol. :**

$3x \times 4x \times 7x = 18144$

$84x^3 = 181244$

$x^3 = \frac{181244}{84} = 216 = 6^3$

$x = 6$

$3 \times 6, 4 \times 6, 7 \times 6 = 18,\ 24,\ 42$

Ans : 18, 24, 42

41. **Sol. :**

$7x$ - boys $\Rightarrow$ no. of boys = 2800

$4x$ - girls $\Rightarrow$ no. of girls = ?

Total students = ?

$7x = 2800$

$x = \frac{2800}{7} = 400$

$x = 400$

$4x = 4 \times 400 = 1600$

$2800 + 1600 \Rightarrow 4400$

Ans : 4400

42. **Sol. :**

$$\frac{1x+7}{2x+7} \neq \frac{3}{5}$$

$5x + 35 = 6x + 21$

$x = 14$

$2x = 2(14) = 28$

PERCENTAGE

43. Sol:

$$\frac{18}{7.2 \times 1000} \times 100$$

$$\frac{18}{72\cancel{00}} \times 1\cancel{00}$$

(∴ 1கி.கி = 1000 கிராம் / 1kg = 1000 g)

$$\frac{1}{4} = 0.25\%$$

44. Sol:

$$= \frac{0.01}{0.1} \times 100 \qquad = \frac{1}{0.1} = 10\%$$

45. Sol:

1 மெட்ரிக் டன் = 1000 கிலோ = 10 குவிண்டால்

(1 Metric ton = 1000 kg = 10 Quintal)

(∴ 1குவிண்டால் = 100 கிலோ)

(1 Quintal = 100 kg)

$$= \frac{40}{20} \times 100$$

$$= 200\%$$

46. Sol:

ஓர் எண் = x என்க

$$65\% \text{ of } x = \frac{4}{5}x - 21$$

$$\frac{65}{100} \times x = \frac{4}{5}x - 21$$

$$\frac{4}{5}x - \frac{65x}{100} = 21$$

$$\frac{4}{5}x - \frac{13x}{20} = 21$$

$$\frac{16x - 13x}{20} = 21$$

$3x = 21 \times 20$

$$x = \frac{21 \times 20}{3} \qquad = 7 \times 20 = 140$$

Shortcut :

Take (A) option

விடைகளிலிருந்து தேர்வு செய்தல்

65% of $140 = \frac{4}{5} \times 140 - 21$

$91 = 112 - 21 = 91$

47. Sol:

அதிகரிப்பு சதவீதம் $= -x + y - \frac{xy}{100}$

$$= -10 + 30 - \frac{10 \times 30}{100}$$

$$= 20 - \frac{300}{100}$$

$$= 20 - 3$$

$$= 17\%$$

மற்றொரு முறை

அடக்க விலை (C.P.) = ரூ 100 என்க

i) $10\% \downarrow = 100 \times \frac{10}{100} = 10$

$100 - 10 = 90$

ii) $30\% \uparrow \quad 90 \times \frac{30}{100} = 27$

$90 + 27 = 117$

$100 \rightarrow 117 \ (117 - 100 = 17)$

எனவே $17\% \uparrow$(increase)

48. Sol:

குறைவு (அ)

அதிகரிப்பு சதவீதம் $= x + y + \frac{xy}{100}$

$x = 10; y = -10$

$$= 10 - 10 - \frac{10 \times 10}{100}$$

$$= 0 - \frac{100}{100} = -1$$

$= 1\%$ குறைவு

மாற்றுமுறை

அடக்கவிலை (C.P.) = ரூ 100 என்க

i) 10% ↑, $100 \times \frac{10}{100} = 10$

$100 + 10 = 110$

ii) 10% ↓ $110 \times \frac{10}{100} = 11$

$110 - 11 = 99$

$100 \rightarrow 99$ $(99 - 100 = -1)$

1% ↓ (decrease)

49. Sol:

Population after N year = $P\left(1+\frac{R}{100}\right)^N$

P = 176400; R = 5; N = 2

2 ஆண்டிற்கு பிறகு மக்கள்தொகை $= 176400\left(1+\frac{\cancel{5}^{1}}{\cancel{100}_{20}}\right)^2$

$= 176400 \times \left(\frac{21}{20}\right)^2$

$= 176400 \times \frac{21}{20} \times \frac{21}{20}$

$= 194481$

குறிப்பு :

Population before 2 years

2 ஆண்டிற்கு முன் மக்கள்தொகை $= \frac{176400}{\left(1+\frac{5}{100}\right)^2}$

$= \frac{176400}{\left(\frac{21}{20}\right)^2}$

$= 176400 \times \frac{20}{21} \times \frac{20}{21} = 16000$

50. Sol:

	A	B
	125	100
தேவையான சதவீதம்	$\frac{25}{125} \times 100$	

$$\frac{1}{5} \times 100 = 20\%$$

எளிய முறை

தேவையான $\left(\frac{25}{(100+25)} \times 100\right)\% = \frac{25}{125} \times 100$

சதவீதம் = $1/5 \times 100 = 20\ \%$

51. Sol:

ஓர் எண் = x என்க

75% of $x + 75 = x$

$\frac{75}{100} \times x + 75 = x$

$\frac{3}{4}x + 75 = x$

$x - \frac{3}{4}x = 75$

$\frac{4x - 3x}{4} = 75$

$x = 4 \times 75$

$x = 300$

Shortcut Method

விடைகளிலிருந்து தேர்ந்தெடுத்தல் எளிது

75% of $300 + 75 = 300$

$\frac{75}{100} \times 300 + 75 = 300$

$225 + 75 = 300$

$300 = 300$

52. Sol:

ஒரு கிலோ உளுந்தம் பருப்பின் விலை 'x' என்க

20% உயர்வுக்கு பின்

$x + \frac{20x}{100} = 96$

$\frac{100x + 20x}{100} = 96$

$\frac{120x}{100} = 96$

$x = \frac{96 \times 100}{120}$

$x = 80$

எளிய முறை

$120\% \rightarrow 96$

$1\% \rightarrow \frac{96}{120}$

$100\% \rightarrow \frac{96}{120} \times 100 =$ ரூ.80

உங்களுக்கு தெரியுமா

'A' என்ற அளவை $x\%$ அதிகரித்தால், அதிகரிக்கும் அளவு

$$I \text{ (Increase)} = \left(1+\frac{x}{100}\right) A$$

'A' என்ற அளவை $x\%$ குறைத்தால் குறையும் அளவு

$$D \text{ (Decrease)} = \left(1-\frac{x}{100}\right) A$$

53. Sol:

மக்கள்தொகை அதிகரிப்பு

= 25,000 - 20,0000 = 5,000

மக்கள்தொகை அதிகரிப்பு சதவீதம்

$= \frac{5000}{20000} \times 100 = 25\%$

54. Sol:

அந்த எண் x எண்க

$60\% \; x - 60 = 60$

$\frac{60}{100} x - 60 = 60$

$\frac{60x}{100} = 60 + 60$

$\frac{6x}{10} = 120$

$x = \frac{120 \times 10}{6}$

$x = 200$

55. Sol:

மிதிவண்டியின் விற்றவிலை (S.P.) = 4275

நட்டம் (Loss) = 5%

∴ அடக்கவிலை $= \frac{100}{(100 - \text{நட்டம்\%})} \times$ விற்றவிலை

$$\text{C.P. \%} = \frac{100}{100 - \text{Loss}} \times \text{S.P.}$$

$$= \frac{100}{95} \times 4275 = 4500$$

அடக்கவிலை 4500 மற்றும் விரும்பிய லாபம் = 5%

∴ விரும்பிய விற்ற விலை

$= \frac{(100 + \text{லாபம்\%})}{100}$ x அடக்கவிலை

$= \frac{(100 + 5)}{100}$ x 4500

= 105 x 45

விரும்பிய விற்பனை விலை = 4725

எளிய முறை

நட்டம் (Loss) 5%

95% → 4275

100% → $\frac{4275}{95}$ x 100

அடக்கவிலை (C.P.) → 4500

லாபம் (Profit) 5%

105% → ?

→ $\frac{4500}{100}$ x 105

விற்பனை விலை (S.P.) → 4725

56. Sol:

90% → 820

1% → $\frac{820}{90}$

அடக்கவிலை (C.P) 100% → $\frac{82\cancel{0}}{9\cancel{0}}$ x 100

→ $\frac{8200}{9} = 911.1$

= 911

57. Sol:

குறித்த விலை = ரூ.1200

தள்ளுபடி (discount) = 15% x 1200

= $\frac{15}{1\cancel{00}}$ x 12$\cancel{00}$

= 180

S.P. = C.P - Discount

விற்பனை விலை= 1200 - 180

= ரூ.1020

58. Sol:

10% லாபம் = 110%

110% = 1320

1% = 1320/110

அடக்கவிலை100% $= \frac{132\cancel{0}}{11\cancel{0}} \times 100,$

$= \frac{132}{11} \times 100$

= 1200

59. Sol:

மொத்த தள்ளுபடி $= -10 - 20 + \frac{10 \times 20}{100}$

= -30 + 2

= -28

28% தள்ளுபடி எனில்

விற்றவிலை 72%

72% $\Rightarrow$ 14400

1% $\Rightarrow \frac{14400}{72}$

100% $\Rightarrow \frac{14400}{72} \times 100$

$\Rightarrow$ 200 x 100

= 20,000

குறித்த விலை = ரூ.20,000

60. Sol:

84% x - 16% x = 476

68% of x = 476

$\frac{68}{100} \times x = 476$

$x = \frac{476}{68} \times 100 = 700$

61. Sol:

Marked price = 1500

Selling price = 1350

Amount of discount = Marked price - Selling price

= 1500-1350=150

Discount for 100 = $\frac{\cancel{15}\cancel{0}}{\cancel{15}\cancel{0}\cancel{0}} \times 10\cancel{0} = 10\%$

Ans : 10%

62. Sol:

N= $N_0(1+r)^n$

$r = \frac{5}{100}$

$= 176400(1+0.05)^2$

$= 176400(1.05)^2 = 194481$

Ans : 194481

63. Sol:

x -16% of $x = 42$

$x - \frac{16xx}{100} = 42$

$x - \frac{16x}{100} = 42$

$\frac{100x - 16x}{100} = 42$

$84x = 4200$

$x = \frac{4200}{84} = 50$

Ans : $x = 50$

64. Sol:

Number of men = $\frac{40}{1\cancel{0}\cancel{0}}$ x $32,0\cancel{0}\cancel{0}$ = 12,800 men

Women = $\frac{25}{1\cancel{0}\cancel{0}}$ x $320\cancel{0}\cancel{0}$ = 8000

Children = 32000-(12800+800)

= 32000 - 20800

=11200 Children

Ans : 12800 men, 11200 children

65. Sol:

Original price = 15,00,000

Change = 12,00,000

Decrease = 15,00,000 -12,00,000 = 3,00,000

percentage = $\frac{\overset{2}{\cancel{3,0}}0,\cancel{000}}{\cancel{15},\cancel{00},\cancel{000}}$ x $1\cancel{00}$ = 20%

Ans : 20%

66. Sol:

Printing cost of book = 20%

Royalty on book = 15% of c.p

Differently = (20% of c.p) - (15% of c.p) = 5% of c.p

Percentage difference= $\left(\frac{\text{differnce}}{\text{Printing cost}} \text{ x } 100\%\right)$

$$\frac{5\%\text{of c.p}}{\cancel{2}\cancel{0}_{1}} \times \cancel{10}^{5}\cancel{0} = 25\%$$

67. **Sol. :**

Total Number of students = 480

$$\text{Percentage} = \frac{\cancel{75}^{15}}{\cancel{10}\cancel{0}\cancel{0}_{\cancel{2}}} \times \cancel{48}^{28}\cancel{0} = 360$$

The no. of boys is x

70% of x + 85% (480-x) = 360

$$\frac{70 \text{ x } x}{100} + \frac{85(480-x)}{100} = 360$$

$$\frac{70x}{100} + \frac{40800-85x}{100} = 360$$

$$\frac{70-85x+40800}{100} = 360$$

$$-15x + 40800 = 36000$$

$$-15x = 36000 - 40800$$

$$+15x = +4800$$

$$x = \frac{\cancel{4800}^{\cancel{960}\,320}}{\cancel{15}_{\cancel{3}}} = 320$$

Ans : 320

68. Sol:

பொழுதுபோக்கு = 7%

$$= \frac{7}{1\cancel{00}} \text{ x } 280\cancel{00}$$

= 1960

69. Sol:

Let there be 100 students

$$\text{Number of boys} = \frac{3}{4}\text{x}100$$

= 60

$$\text{Number of Girls} = \frac{2}{5} \text{ x } 100$$

= 40

$$10\% \text{ of } 60 + 25\% \text{ of } 40 = \frac{1\cancel{0}}{1\cancel{0}\,\cancel{0}} \text{ x } 6\cancel{0} \text{ x } \frac{\cancel{25}^{5}}{\cancel{10}\,\cancel{0}_{\cancel{5}}} \text{ x } \cancel{4}^{2}\,\cancel{0}$$

= 6 + 10

= 16

Total = 100 - 16 = 84

Percentage $= \frac{84}{100} \times 100$

$= 84\%$

70. Sol:

40% of 1640 = 656

35% of 980 = 343

150% of 850 = 1275

$656 + x = 343 + 1275$

$x = 1618 - 656$

$x = 962$

AVERAGE

71. Sol:

Average : $\frac{\text{Total}}{\text{no. of items}}$

$60 = \frac{3x + 5x + 7x}{3}$

$60 = \frac{15x}{3}$

$15x = 180$

$x = \frac{\cancel{180}^{\cancel{60}\,12}}{\cancel{15}_{\cancel{5}}}$

$\boldsymbol{x = 12}$

($3x$ - மிகச்சிறிய எண், $5x$, $7x$ மிகப்பெரிய எண்)

Largest number = 7 x 12 = 84

72. Sol :

Total marks of 300 Students

= 300 x 45

= 13,500

Total marks of first 100 student

= 100 x 70

= 7000

Total marks of last 100

= 100 x 20

= 2000

Remaining 100 students marks

13,500 - (7000 + 2000)

= 13,500 - 9000

= 4,500

Average 100 remaining Students

$\frac{45\cancel{00}}{1\cancel{00}} = 45$

73. Sol:

The total of Their ages

= 30 x14

= 420

The age of teacher average

= 31 x 15

= 465

The age of teacher

= 465 - 420

= 45

Another Method

Model 1 :

ஆசிரியர் வயது ஒன்று கூடுகிறது என்றால், அனைத்தையும் கூட்டவும்

30 + 1 + 14 = 45

Model 2 :

சராசரி = 14

ஒரு ஆசிரியர் + 30 மாணவர்கள் = 31 x 1 = 31 (கூடிய சராசரியால் பெருக்கவும்)

$14 + 31 = 45$

74. Sol:

11 reading are denoted

$r_1, r_2, r_3, \ldots\ldots r_{11}$

First six reading → Average

$r_1 + r_2 + r_3 + r_4 + r_5 + r_6 = 6 \times 30$

$r_1 + r_2 + r_3 + r_4 + r_5 + r_6 = 180 \rightarrow (1)$

Last six reading - Average

$r_6 + r_7 + r_8 + r_9 + r_{10} + r_{11} = 6 \times 20$

$r_6 + r_7 + r_8 + r_9 + r_{10} + r_{11} = 120 \rightarrow (2)$

Overall Average

$r_1 + r_2 + r_3, \ldots\ldots r_{11} = 11 \times 26$

$r_1 + r_2 + r_3 + \ldots\ldots + r_{11} = 286 \rightarrow (3)$

Adding 1 & 2

$r_1 + r_2 + r_3 + \ldots\ldots + r_{11} + r_6 = 300$

from (Equation) (3)

$286 + r_6 = 300$

$r_6 = 300 - 286$

$r_6 = 14^o$

Another Method

முதல் 6 வெப்பஅளவுகளின் சராசரி = 6 x 30 = 180

கடைசி 6 வெப்பஅளவுகளின் சராசரி = 6 x 20 = 120

Total = 180 + 120 = 300

(Overall) மொத்த வெப்பஅளவுகளின் சராசரி = 11 x 26 = 286

300 - 286 = 14

Ans : 14°

75. Sol:

$$\frac{a + b + c + d}{4} = 20$$

$a + b + c + d = 80 \rightarrow (1)$

$$\frac{a + q + b + q + c + q + d + q}{4} = 22$$

$a + b + c + d + 4q = 88$

From → (1)

$80 + 4q = 88$

$4q = 88 - 80$

$4q = 8$

$q = 2$

Shortcut

4 மதிப்பின் சராசரி = 4 x 20 = 80

ஒரு எண் 4 மதிப்பிலும் கூட்டப்பட்டபின் சராசரி = 4 x 22 = 88

88 - 80 = 8

4 மதிப்பிலும் கூட்டப்பட வேண்டிய எண்

2 + 2 + 2 + 2 = 8

விடை : 2

76. Sol:

Then the corrected mean is

25 Observations - Average

= 25 x 78.4

Total = 1960

Now 69 was read as 96, so

correct value - wrong value = 96 - 69 = 27

correct mean = 1960 + 27 = 1987

$$\text{Average} = \frac{1987}{25} = 79.48$$

77. Sol:

4 எண்களின் சராசரி

$a + b + d + e = 4 \times 20$

$= 80 \rightarrow (1)$

C - யை கூட்டினால்

(ஒவ்வொரு எண்ணுடன்)

$$\frac{a+c+b+c+d+c+e+c}{4} = 22$$

$a + b + d + e + 4c = 88$

From (1)

$80 + 4c = 88$

4c = 88 - 80

c = 8/4

c = 2

78. Sol:

89 observations Average

Total = 89 x 32

= 2848

i. 2848 - 29 + 38

= 2819 + 38

= 2857

ii. 2857 - 37 + 28

= 2820 + 28

= 2848

Average = $\frac{2848}{89}$ = 32

79. Sol:

Average of 50 students maths

Total = 50 x 40 = 2000

2000 - 35 + 85 = 1965 + 85

= 2050

Average = $\frac{2050}{50}$

= 41

80. Sol:

5 எண்களின் சராசரி = 120

Total = 5 x 120 = 600

600 - 5 + 15 = 595 + 15 = 610

Average = $\frac{610}{5}$

= 122

81. Sol:

3 : 5 : 7

Average = 60

Smallest number ?

$$\frac{3x + 5x + 7x}{3} = 60$$

$$\frac{\cancel{15x}^{5}}{\cancel{3}} = 60$$

$$x = \cancel{60}/5$$

$x = 12$

The smallest number = 3 x 12 = 36

82. Sol:

$$\frac{15+75+33+67+76+54+39+12+78+11}{10}$$

$$\text{Mean} = \frac{46\cancel{0}}{1\cancel{0}} = 46$$

83. Sol:

$$\frac{\text{Total run scored-run scored in 1st 10 overs (10x3.2)}}{40}$$

$$= \frac{282 - 32}{40}$$

$$\boxed{\frac{1+1+...1}{10} = 3.2 \quad = 32}$$

$$= \frac{25\cancel{0}}{4\cancel{0}} = 6.25 \text{ run per over}$$

Ages

84. Sol:

(saran) Father = $4x$

(Rajesh) Son = $1x$

$$\frac{4x+4}{1x+4} = \frac{17}{5}$$

$$20x + 20 = 17x + 68$$

$$20x - 17x = 68 - 20$$

$$3x = 48$$

$$x = \frac{48}{3} = 16$$

$$Rajesh \text{ age} = 1x = 1(16) = 16$$

Another Method

S		R
4		1
17	:	5

$$\frac{4 \times \overset{4}{\cancel{12}}}{\cancel{3}} = 16$$

Rajesh Age = 16

85. Sol:

F + S = 60 →(1)

6 ஆண்டுகளுக்கு முன்

(F - 6) = 5 (S - 6)

F- 6 = 5S - 30

F - 5S = - 24 →(2)

Equation (2) - Equation (1)

- 6S = - 84

S = 14

6 ஆண்டுகளுக்கு பிறகு மகனின் வயது

= 14 + 6 = 20 years.

Another Method

F+S=60

6 வருடங்களுக்கு முன்பு

$60 - 12 = 48$

F	S
5	1

$$\frac{\cancel{48}}{\cancel{6}} = 8$$

$8 + 6 + 6 = 20$

86. Solution:

F + S = 50

6 years before

(F - 6) X ((S- 6) = 2 (F- 6)

÷ (F - 6) (Both sides)

$$\frac{(F-6)x(S-6)}{F-6} = \frac{2(F-6)}{(F-6)}$$

S - 6 = 2

S = 6 +2

S = 8

Son = 8 yrs.

Father = 42 yrs.

Another Method

F+S=50

40	10	34x4
41	9	35x3
38	12	32x6
42	8	36x4

6 வருடங்களுக்கு முன்பு

87. Solution:

Given that the Ratio 2:3

Consider P = $2x$, Q = $3x$

$3x - 2x = 8$

x = 8

'P' age → $2x$ = 2 x 8 = 16

'Q' age → $3x$ = 3 x 8 = 24

88. Solution:

4 (members) = 15 (Average)

Total ages = 4 x 15 = 60

after 20 years = 60 + 80 = 140

(4 members x 20 = 80)

20 year's after total age = 140

Average = $\frac{140}{4}$ = 35

Another Method

$4 \rightarrow 15$

$15 + 20 = 35$

89. Solution:

Rani Age = x, Mary age = y, Nancy age = z

(i) Rani + Mary = $x + y$

(ii) Mary + Nancy = y + z

$x + y = (y + z) + 14$

$x + y - y - z = 14$

$x - z = 14$

$x - 14 = z$

14 years younger than Rani

90. Solution:

Given	Sharma	Father
Present age	¼ x (or) $0.25x$	x
6 years before	¼ x - 6 (or) $0.25x$-6	x - 6

1:7

$$\frac{0.25x-6}{x-6}=\frac{1}{7}$$

$7(0.25x - 6) = x - 6$

$1.75x - 42 = x - 6$

$0.75x = 36$

$x = \cancel{36}^{12} \times \frac{4}{\cancel{3}}$

¾ $x = 36$

Answer

Present age of F = 48

Sharma = $\frac{\cancel{48}^{12}}{\cancel{4}}$ = 12

Another Method

A	B
7	1
4	1

$$\frac{6x\cancel{3}}{\cancel{3}}=6$$

$= 48, 12$

91. **Solution:**

Given	Son	Father
2015, 1:4	x	$4x$
2023, 3:8	$x + 8$	$4x + 8$
2010	x - 5	$4x$ - 5

$$\frac{x+8}{4x+8}=\frac{3}{8}$$

$8(x+8) = 3(4x + 8)$

$8x + 64 = 12x + 24$

$12x - 8x = 64 - 24$

$4x = 40$

$x = 10$

2015, Son age = 10, Father = 40

2010, Son age = 5, Father = 35

5 + 35 = 40

92. Solution:

The average age of 36 Students is = 14 years

Total age of 36 students = 36 x 14 = 504

Total age including teacher = 37 x 15 = 555

Total age of 36 students + age of teacher = Total age of including teacher

504 + age of teacher = 555

age of teacher = 555 - 504 = 51

Answer = 51

Another Method

$36 \rightarrow 14$

ஆசிரியர் $\rightarrow 1$

36+1=37+14=51

93. Solution

Total age of 3 boys = (25 x 3) = 75

3 : 5 : 7 = 15

Youngest = $\frac{\cancel{3}}{\cancel{15}^{\cancel{5}}} \times \cancel{75}^{15}$

Answer = 15 yrs.

Another Method

சராசரி = 25 x 3

$= \frac{\cancel{75}^{5}}{\cancel{15}} = 5$

3 : 5 : 7 = 15

15 : 25 : 35

இளையவர் = 15

94. Solution:

Given P = 800

n = 1

Simple interest for one year = 840 - 800 = Rs.40

Formula:

$$SI = \frac{Pnr}{100}$$

$$r = \frac{SI \text{x} 100}{P \text{x } n}$$

$$= \frac{\cancel{40}^{5} \text{x} 1\cancel{00}}{\cancel{8}\,\cancel{00} \text{x} 1}$$

r = 5%

எளிய முறை

3 Yr → 800

4 Yr → 840

1Yr → 40 = SI (வித்தியாசம்)

$$R = \frac{40 \text{ x } 100}{800 \text{ x } 1} = 5\%$$

(∴ஒரு வருடம் வித்தியாசத்தில் உள்ளது SI = CI)

95. Solution:

r = 8%, n = 2, P = 1250, CI - SI = ?

Method I

1) 100 $\quad 125\cancel{0} \text{ x } \frac{8}{10\cancel{0}} = 100$

2) 100 + 8 $\quad 100 \text{ x } \frac{8}{100} = 8$

CI - SI = 8

(or)

Method II

$$P \text{ x } \frac{r}{100} \text{ x } \frac{r}{100} = \text{CI - SI}$$

$$1250 \text{ x } \frac{8}{100} \text{ x } \frac{8}{100} = CI - SI$$

CI - SI = 8

Method III

1 year :

$$CI_1 = \cancel{125\,0}^{25} \text{ x } \frac{\cancel{8}^{4}}{\cancel{10\,0}_{\cancel{2}}} = 100$$

2 years :

Amount = 1250 + 100 = 1350

$CI_2 = 1350 \times \frac{8}{100} = 108$

$CI = CI_2 - CI_1 = 108 - 100 = 8$

96. Solution:

P = 1000, r = 10%, Amt = Rs.1331, n = ?

$$A = P\left(1+\frac{r}{100}\right)^n$$

$$1331 = 1000\left(1+\frac{1\cancel{0}}{10\cancel{0}}\right)^n$$

$$\frac{1331}{1000} = \left(\frac{11}{10}\right)^n$$

$(1.1)^n = 1.331$

$(1.1)^n = (1.1)^3$

n = 3

(or)

1) 100 $\quad 10\cancel{00} \times \frac{10}{1\cancel{00}} = 100$

2) 100 + 10 $\quad \cancel{100} \times \frac{10}{\cancel{100}} = 10$

3) 100 + 21 $\quad 21\cancel{0} \times \frac{1\cancel{0}}{1\cancel{00}} = 21$

= 300 + 31

CI = 331

P = 1000

Amount = 1331

n = 3 years

97. Solution:

P = 5000, r = 12%, n = 2, CI - SI = ?

Step 1

1) 600 $\quad 50\cancel{00} \times \frac{12}{\cancel{100}} = 600$

Step 2

2) 600 + 72 $\quad 6\cancel{00} \times \frac{12}{\cancel{100}} = 72$

Answer: 72

98. Solution:

P = 2400, r = 5%, n = 2, CI - SI = ?

1) $120 \rightarrow 24\cancel{00} \times \frac{5}{\cancel{100}} = 120$

2) 120 + 6 → $\cancel{120}^{6}$ x $\frac{\cancel{5}}{\cancel{100}_{\cancel{20}}} = 6$

CI - SI = 6

99. Solution:

P = 1200, r= 10% → 5% (1/2 year),

CI - SI = ?

n = 1

P = Rs.1200

r = 5%

n = 2 half year

1) 60 → $12\cancel{00}$ x $\frac{5}{1\cancel{00}} = 60$

2) 60 + 3 → $\cancel{60}^{3}$ x $\frac{\cancel{5}}{\cancel{100}_{\cancel{20}}} = 3$

120 + 3

CI - SI = 3

100. Solution:

n = 2

r= 10%

CI - SI = 40

P = ?

I method

$$P \text{ x } \frac{r^2}{100^2} = CI - SI$$

$$P = \frac{40 \text{ x } \cancel{100}^{10} \text{ x } \cancel{100}^{10}}{\cancel{10} \text{ x } \cancel{10}}$$

P = 4000

II method

Take option (A)

P = 4000

1) 400 → $40\cancel{00}$ x $\frac{10}{\cancel{100}} = 400$

2) 400 + 40 → $4\cancel{00}$ x $\frac{10}{\cancel{100}} = 40$

40 → (CI - SI)

So answer is P = 4000

101. Solution:

years	Time
4	$2^1 = 2$
8	$2^2 = 4$

Answer: 8 years

102. **Solution:**

P = 640, n = 2, Amount = 774.40, r = ?

Take (a) option

1) 64 $\rightarrow$ $64\cancel{0} \times \frac{1\cancel{0}}{\cancel{100}} = 64$

2) 64 + 6.4 $\rightarrow$ $64 \times \frac{1\cancel{0}}{10\cancel{0}} = 6.4$

\+ 128 6.4

CI = 128 + 6.4 = 134.4

Amount = P + CI

= 640 + 134.4

CI = 774.0

so the answer is (a) option r = 10%

Another Method :

$$A = P\left(1+\frac{r}{100}\right)^n$$

$$774.40 = 640\left(1+\frac{r}{100}\right)^2$$

$$\frac{77440}{100 \times 640} = \left(1+\frac{r}{100}\right)^2$$

$$\frac{7744\cancel{0}}{100 \times 64\cancel{0}} = \left(1+\frac{r}{100}\right)^2 = \left(\frac{88}{80}\right)^2 = \left(\quad + \frac{}{100}\right)^2$$

$$1+\frac{r}{100} = \frac{88}{80}$$

$$\frac{r}{100} = \frac{88}{80} - 1$$

$$= \frac{88-80}{80} = \frac{8}{80}$$

$$\frac{r}{100} = \frac{1}{10}$$

$$r = \frac{10\cancel{0}}{1\cancel{0}}$$

r = 10%

103. Solution:

Half yearly of interest

P = 24000,

r = 10% = 5% (half year),

n = 1 ½(3 half years),

CI = ?

1) $1200 \rightarrow 240\cancel{00} \times \frac{5}{\cancel{100}} = 1200$

2) $1200 + 60 \rightarrow 12\cancel{00} \times \frac{5}{\cancel{100}} = 60$

3) $1200 + 123 \rightarrow \overset{123}{\cancel{246\,0}} \times \frac{\cancel{5}}{\underset{\cancel{2}}{\cancel{10\,0}}} = 123$

$+ \quad 3600 \quad 183$

CI = 3783

எளியமுறை

$R = \frac{10}{2} = 5\%$

$1\frac{1}{2} = 3\frac{1}{2}$ ஆண்டுகள்

$2400\cancel{00} \times \frac{5}{1\cancel{00}} = 1200 \times 3 = 3600$

$12\cancel{00} \times \frac{5}{1\cancel{00}} = 60 \times 3 = 180$

$60 \times \frac{5}{100} = 3 \times 1 = 3$

CI = 3783

104. Sol:

$800 \rightarrow 882$

$\frac{A}{P} = \left(1 + \frac{R}{100}\right)^N$

$\frac{882}{800} = \left(1 + \frac{5}{100}\right)^N$

$\frac{\overset{441}{\cancel{882}}}{\underset{400}{\cancel{800}}} = \left(\frac{\overset{21}{\cancel{105}}}{\underset{20}{\cancel{100}}}\right)^N$

$\frac{441}{400} = \left(\frac{21}{20}\right)^N \quad \left| \begin{array}{l} 21^2 = 441 \\ 20^2 = 400 \end{array} \right.$

N = 2 ஆண்டுகள்

105. **Sol. :**

$r = 10\%$

$n = 2$

$CI - SI = 631$

$P = ?$

$$P \text{ x} \left(\frac{r}{100}\right)^2 = CI - SI$$

$$P \text{ x} \frac{10^2}{100^2} = 631$$

$$P \text{ x} \frac{631 \text{ x } 100 \text{ x } 1\cancel{0}0}{1\cancel{0} \text{ x } 1\cancel{0}} = 63100$$

Ans Rs. 63100

106. **<u>Sol. :</u>**

$P = 5000$

$r = 8\%$

$n = 2$

$$P \text{ x} \left(\frac{r}{100}\right)^2 = CI - SI$$

$$500 \text{ x} \left(\frac{8}{100}\right)^2 = CI - SI$$

$$5\cancel{0}\cancel{0}\cancel{0} \text{ x } \frac{8 \text{ x } 8}{1\cancel{0}\cancel{0} \text{ x } 1\cancel{0}\cancel{0}} = CI - SI$$

$$\frac{320}{10} = CI - SI$$

$$CI - SI = 32$$

Ans. = Rs. 32

SIMPLE INTEREST

107. Sol:

$S.I_2 - S.I_1 = 412.50$

$S.I_1 = ?$ $\quad r = 11\%$ $\quad n = \frac{7}{2}$ $\quad P = x$

$$S.I_1 = x \text{ x } \frac{7}{2} \text{ x} \frac{11}{100}$$

$$= \frac{77x}{200}$$

$S.I_2 = ?$ $\quad r = 11\%$ $\quad n = \frac{9}{2}$ $\quad P = x$

$$S.I_2 = x \text{ x } \frac{9}{2} \text{x} \frac{11}{100}$$

$$= \frac{99x}{200}$$

$$= \frac{99x}{200} - \frac{77x}{200} = 412.50$$

$$22x = 412.50 \text{ x } 200$$

$$22x = 82500$$

$$x = \frac{82500}{22}$$

$$x = 3750$$

108. Sol:

$S.I_1$ - $S.I_2$ = 2.5 P = 500 n = 2 years

$$\left(\cancel{500}^{5} \text{ x } 2 \text{ x } \frac{r_1}{1\cancel{00}}\right) - \left(\cancel{500}^{5} \text{ x } 2 \text{ x } \frac{r_2}{1\cancel{00}}\right) = 2.5$$

$$10r_1 - 10r_2 = 2.5$$

$$10(r_1 - r_2) = 2.5$$

$$r_1 - r_2 = \frac{2.5}{10} = 0.25$$

109. Sol:

P = 2500 A = 6 months $= \frac{6}{12} = \frac{1}{2}$ S.I = 100

$$= \frac{\cancel{100}^{4} \text{ x } 1\cancel{00} \text{ x } 2}{\cancel{25\ 00}}$$

R = 8%

New P = 3200 N = $\frac{9}{12} = \frac{3}{4}$ years

R = 8%

$= \overset{8}{\cancel{32\ 00}} \times \frac{3}{\cancel{4}} \times \frac{8}{\cancel{100}}$

= 64 x 3

S.I = 192

NUMBER SYSTEM

110. Sol :

$(2^1-1, 2^2-1, 2^3-1, 2^4-1, 2^5-1, 2^6-1)$

$= 2^n-1 = 2^7-1$

= 128 - 1

Ans = 127

111. Sol :

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

n = 40

$1^2 - 2^2 + 3^2 - 4^2 + ... + n^2 = \pm\left[\frac{n(n+1)}{2}\right]$

$= \pm\left[\frac{40(40+1)}{2}\right]$

$= \pm\left[\frac{40(41)}{2}\right]$

Ans = - 820

112. Sol :

$= 2^2(1^1+2^2+3^2+ .... +10^2)$

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

$= 2^2 \left(\frac{10(11)(21)}{6}\right)$

$= 2^2 \frac{2310}{6}$

Ans = 1540

113. Sol :

Since k=3

Then the value of

3+1, (3)3, 4(3)+2

4, 9, 14

The three numbers difference between 5

114. Sol :

42 - 12 = 30

30 - 10 = 20

20 - 8 = 12

12 - 6 = 6

TIME AND WORK

115. Solution:

$$A + B + C = \frac{1}{4}$$

$A = \frac{1}{12}$

$B = \frac{1}{18}$

C = ?

C அவ்வேலையை செய்ய ஆகும் நாட்கள்

A + B + C = A + B + C

$$\frac{1}{4} = \frac{1}{12} + \frac{1}{18} + \frac{1}{x}$$

$$\frac{1}{4} = \frac{3+2}{36} + \frac{1}{x}$$

$$\frac{1}{4} = \frac{5}{36} + \frac{1}{x}$$

$$\frac{1}{x} = \frac{1}{4} - \frac{5}{36}$$

$$\frac{9-5}{36} = \frac{\cancel{4}}{\cancel{36}_{9}}$$

$$\frac{1}{x} = \frac{1}{9}$$

$x = 9$ days

116. Solution:

$A + B = \frac{1}{6}$, $B = \frac{1}{15}$ A = ?

A = A + B - B

$$A = \frac{1}{6} - \frac{1}{15}$$

$$= \frac{5-2}{30}$$

$$= \frac{\cancel{3}}{\cancel{30}_{10}}$$

= 10 days

A = 10 days

117. Solution:

$$\frac{2}{3} = 10 \text{ days}$$

A $\frac{1}{3}$ பகுதியை செய்து முடிக்க ஆகும் நாட்களின் எண்ணிக்கை x என்க

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

$$\frac{\frac{2}{3}}{10} = \frac{\frac{1}{3}}{x}$$

Cross multiple

$$\frac{2}{3}x = \frac{10}{3}$$

$$x = \frac{{}^{5}\cancel{10}}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{2}} = 5$$

x = 5 days

118. Solution:

Case of inverse variation

Men : days

56 ↔ 42

x ↔ 14

$$x = \frac{{}^{\cancel{28}\,4}\cancel{56} \times 42}{\cancel{14}_{\cancel{7}}}$$

x = 4 x 42= 168

119. Solution:

$A + B = \frac{1}{8}$ $B + C = \frac{1}{12}$ $C + A = \frac{1}{24}$

$A + B + B + C + C + A = \frac{1}{8} + \frac{1}{12} + \frac{1}{24}$

$2A + 2B + 2C = \frac{3+2+1}{24}$

$A + B + C = \frac{1}{2} \times \frac{3+2+1}{24} = \frac{1}{2} \times \frac{\cancel{6}}{\cancel{24}_{4}} = \frac{1}{8}$

$= \frac{1}{8}$

வேலையை முடிக்கத் தேவைப்படும் நாட்கள் = 8

120. Solution:

10 women → 7 days

10 Children → 14 days

5 W + 10 C = ?

$\frac{{}^{1}\cancel{5}}{\cancel{70}_{14}} + \frac{1\cancel{0}}{14\cancel{0}} = \frac{1}{14} + \frac{1}{14} = \frac{\cancel{2}}{\cancel{14}_{7}} = \frac{1}{7}$

7 நாட்களில் செய்து முடிப்பர்

121. Solution:

Consider

M→ ஆண்கள், b → சிறுவர்கள்

$6M + 8b = \frac{1}{10}$ .....(1)

$26M + 48b = \frac{1}{2}$ .....(2)

$15M + 20b = ?$ .....(3)

eqn 1 x 6 → $36M + 48b = \frac{6}{10}$

eqn (2) → $26M + 48b = \frac{1}{2}$

(-) (-)

$10M = \frac{6}{10} - \frac{1}{2}$

$10M = \frac{12-10}{20}$

$M = \frac{2}{20} \times \frac{1}{10}$

$M = \frac{1}{100}$

M is sub in eqn (1)

$$6M + 8b = \frac{1}{10}$$

$$^{3}\cancel{6} \times \frac{1}{\cancel{100}_{50}} + 8b = \frac{1}{10}$$

$$8b = \frac{1}{10} - \frac{3}{50}$$

$$8b = \frac{5-3}{50}$$

$$b = \frac{\cancel{2}}{50} \times \frac{1}{\cancel{8}_{4}}$$

$$b = \frac{1}{200}$$

eqn (3) → $15\,M + 20\,b = 15 \times \frac{1}{100} + 20 \times \frac{1}{200}$

$$= {}^{3}\cancel{15} \times \frac{1}{\cancel{100}_{20}} + \cancel{20} \times \frac{1}{\cancel{200}_{10}}$$

$$\frac{3}{20} + \frac{1}{10} = \frac{3+2}{20} = \frac{\cancel{5}}{\cancel{20}_{4}} = \frac{1}{4}$$

= 4 days

122. Solution:

$A = \frac{1}{4}$, $B = \frac{1}{12}$

$$A + B = \frac{1}{4} + \frac{1}{12}$$

$$= \frac{3+1}{12} = \frac{\cancel{4}}{\cancel{12}_{3}} = \frac{1}{3}$$

= 3 days

123. Solution:

$A = \frac{1}{20}$, $B = \frac{1}{25}$

A மற்றும் B ஈட்டும் தொகை = 3600

$$A+B=\frac{1}{20}+\frac{1}{25}$$

$$=\frac{25+20}{500}=\frac{45}{500}$$

மொத்த பங்கு = 45

மொத்த பங்கு = $=\frac{\cancel{3600}^{\cancel{400}\,80}}{\cancel{45}_{\cancel{5}}}=80$

A - யின் பங்கு = 25 x 80 = 2000

124. Solution:

$$A=\frac{1}{60}, B=\frac{1}{20}$$

$$A+B=\frac{1}{60}+\frac{1}{20}$$

$$=\frac{20+60}{1200}=\frac{\cancel{80}}{\cancel{1200}_{15}}=\frac{1}{15}$$

= 15 days

125. Solution:

$$A\rightarrow\frac{1}{12}$$

B's One day Work $=\frac{1.6}{12}=\frac{\cancel{16}^{2}}{\cancel{120}_{15}}=\frac{2}{15}$

$$=7\frac{1}{2}\text{ days}$$

Another method:

Ratio of time taken by A and B

160 : 100 = 8 : 5

8 : 5 = 12 : x

$$\frac{8}{5}=\frac{12}{x}$$

$$x=\frac{\cancel{12}^{3}\text{x }5}{\cancel{8}_{2}}=\frac{3\text{x}5}{2}=\frac{15}{2}=7\frac{1}{2}\text{ days}$$

126. Solution:

$$A+B=\frac{1}{7}$$

A என்பவர் B யை $1\frac{3}{4}$ விட மடங்கு விரைவாக முடிப்பார்

$1\frac{3}{4}=\frac{7}{4}$

$7x+4x=\frac{1}{7}$

$11x=\frac{1}{7}$

$x=\frac{1}{77}$

$=\frac{1}{\cancel{77}_{11}}\text{x}\cancel{7}=11$

11 days

127. Solution:

$4M+6W=\frac{1}{8}\rightarrow(i)$

$3M+7W=\frac{1}{10}\rightarrow(ii)$

$(\text{i})\text{x}3\Rightarrow\cancel{12M}+18W=\frac{3}{8}$

$(ii)\text{x}4\Rightarrow\cancel{12M}+28W=\frac{\cancel{4}^{2}}{\cancel{10}_{5}}$

(i) - (ii)

$-10W=\frac{3}{8}-\frac{2}{5}$

$-10W=\frac{15-16}{40}$

$-10W=\frac{-1}{40}$

$10W=\frac{1}{40}$

40 நாட்களில் செய்து முடிப்பர்

128. Solution:

ஆண்கள்	பையன்கள்	நாட்கள்
4	6	20
6	11	?

$$\frac{6x}{20x4}+\frac{11x}{6x20}=1$$

$$\frac{36x+44x}{20x4x6}=1$$

$$\frac{\overset{4}{\cancel{80}}x}{\cancel{20}x\cancel{4}x6}=1$$

$x=6$ days

129. Solution:

$A \rightarrow \frac{1}{25}$ $\qquad$ $B=\frac{1}{20}$

$$A:B=\frac{1}{\underset{5}{\cancel{25}}}:\frac{1}{\underset{4}{\cancel{20}}}$$

$=4:5$

A = 10 x 4 =40

Total = 100 - 40 = 60 $=\frac{\overset{20}{\cancel{60}}}{\underset{3}{\cancel{9}}}=\frac{20}{3}$

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

130. Solution:

$A+B=\frac{1}{12}$ $\qquad$ $B+C=\frac{1}{15}$ $\qquad$ $C+A=\frac{1}{20}$

$$2(A+B+C)=\frac{1}{12}+\frac{1}{15}+\frac{1}{20}$$

$$=\frac{5+4+3}{60}$$

$$=\frac{\cancel{12}}{\underset{5}{\cancel{60}}}x\frac{1}{2}=\frac{1}{10}$$

10 days

SQUARE AND RECTANGLE

131. Sol:

Perimeter of a square(சதுரத்தின் சுற்றளவு) = 4a

4a = 24

a = $\frac{24}{4}$

a = 6 செ.மீ

Area of a square(சதுரத்தின் பரப்பளவு) = a^2

= 6x6

= 36 ச.செ.மீ

132. Sol:

செவ்வகத்தின் சுற்றளவு = 2 (l + b)

தேவையான கம்பியின் நீளம் = 3x2 (l + b)

= 3x2 (120 + 68)

= 6x188

= 1128மீ

l = 120மீ, b = 68மீ

133. Sol:

சதுரத்தின் பரப்பளவு = $\frac{1}{2}$ ச.மீ

செவ்வகத்தின் பரப்பளவு (தரை) = l x b

தேவையான ஓடுகளின் எண்ணிக்கை } = $\frac{\text{செவ்வகத்தின் பரப்பளவு}}{\text{சதுரத்தின் பரப்பளவு}}$

$= \frac{5x4}{\frac{1}{2}}$

$= \frac{20}{\frac{1}{2}}$

= 40

134. Solution:

Terrace size,

l = 15.17m = 1517 cm

b = 9.02 m = 902 cm

Area = (15.17 x 9.02) x 100

= 1368334 cm^2

HCF, 1517 & 902 = 41

2|902	37|1515
11|451	41|41
41|41	1
1	

Area of the marbles = 41 x 41 = 1681

Minimum no. of square tiles = $\frac{1368334}{1681}$

= 814

Answer = 814

135. Solution:

Circle (Area) = πr^2

$= \pi\ (4)^2$

$= 16\ \pi$

Square (Area) = ½ d^2

= ½ x $(8)^2$

$= \frac{1}{2} \times 64$

= 32

Answer: 16 π - 32 cm^2

136. solution:

x = ?

equal square Area = 6.25 cm^2

$a^2 = 6.25$

$a = \sqrt{6.25}$

a = 2.5 cm

64 equal squares = 8 x 8 grid

= 8 x 2.5 = 20

Answer = 24 cm

The length of the side of the chess board = 24 cm

137. **Solution**

New side = (a + 4)

New area = (a + 4) (a + 4)

$(a + 4)^2 = a^2 + 60$

$a^2 + 8a + 16 = a^2 + 60$

8a = 60 - 16

$a = \frac{44}{8}$

$\mathbf{a = \frac{11}{2}}$

Answer: a = 5.5 cm

138. Solution:

Area = ½ d^2

882 = ½ d^2

d^2 = 2 x 882

d^2 = 1764

d = 42

Answer = 42 cm

139. Solution:

l increased by 10%

$$1\cancel{0} \times \frac{11\cancel{0}}{1\cancel{0}\,\cancel{0}} = 11$$

b decreased by 10%

$$1\cancel{0} \times \frac{9\cancel{0}}{1\cancel{0}\,\cancel{0}} = 9$$

$l \times b = l \times b$

$10 \times 10 = 11 \times 9$

$100 = 99$

1% decreased

140. Solution:

$l = 8$ m ; $b = 10$ m ; $h = 4$ m

Door area $= l \times b$

$= 3\text{m} \times 1.5\text{m}$

$= 4.5\ \text{m}^2$

C.S area of the cuboid $= 2\,(l + b) \times h$

$= 2\,(8 + 10) \times 4$

$= 2\,(18) \times 4 = 144\ \text{m}^2$

$= 144 - 4.5$

$= 139.5\ \text{m}^2$

Cost of painiting per square meter = Rs. 200

= 139.5 x 200

= Rs. 27900

Note :

$1\text{m}^2 = 200$

$139.5\text{m} = x$

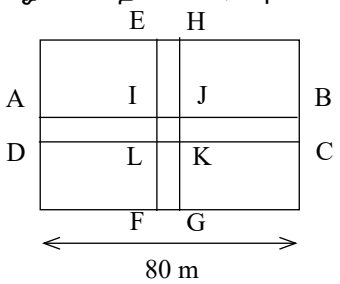
141. Solution:

$l = 80$ m

b= 60 m

Area of rectangle = 80 x 60 = 4800

வழிப்பாதையின் பரப்பு = 675



Area = Area of ABCD + Area of EFGH - Area of IJKL

$675 = 80 \times x + 60 \times x - x^2$

$x^2 - 140x + 675 = 0$

$x = 135$ or $x = 5$

Ans: 5 m

Note :

675 = 80 x 5 + 60 x 5 - 5^2

= 400+300-25

= 700-25

= 675

142. Solution:

$(l + 3)(b - 3) = lb - 18$

$lb - 3l + 3b - 9 = lb - 18$

$lb - 3l + 3b - lb = -18 + 9$

$-3l + 3b = -9 \quad \rightarrow \quad (1)$

$(l - 1)(b + 2) = lb + 14$

$lb + 2l - b - 2 = lb + 14$

$lb + 2l - b - lb = 14 + 2$

$2l - b = 16$ (mutiply by 3)

$6l - 3b = 48 \quad \rightarrow \quad (2)$

(2) + (1)

$6l - 3b = 48$

$-3l + 3b = -9$

$l = \frac{39}{13} = 13$

$l = 13$, substitute in eqn (2)

$2(13) - b = 16$

$26 - b = 16$

$26 - 16 = b$

$b = 10$

$l = 13$; $b = 10$

Another Method

Take option (a) $l = 13$ cm ; $b = 10$ cm

l	b	lb	l	b	lb
13	10	130	16	7	112
13	10	130	12	12	144

143. Solution:

$l = 3.78$m = 378 cm

$b = 5.25$m = 525 cm

$$\begin{array}{r|l} 21 & 378, 525 \\ \hline & 18, 25 \end{array}$$

HCF = 21

ஓட்டின் மிகப்பெரிய அளவு = 21 cm

(largest size of the tiles)

144. Solution:

Volume of rectangular tank = l x b x h

செவ்வக வடிவ தொட்டியின் கனஅளவு = 2340 m^3

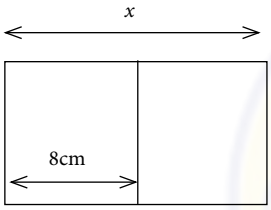
l = 15m b = 13m h=?

2340 = 15 x 13 x h

$$= \frac{2340}{15 \times 13}$$

= 12 m

145. Solution:



A = l x b = 240 m^2

The area of the rectangular land is = 240 m^2

செவ்வகத்தின் பரப்பளவு = 240 m^2

b = x - 8

l = x

$x(x - 8) = 248$

$x^2 - x = 240$

$x^2 - x - 240 = 0$

$(x - 20)(x + 12) = 0$

$x = 20$, $x = -12$

Another method:

Take C option

l x b = lb

20 x 12 = 240

(l - 8 cm)

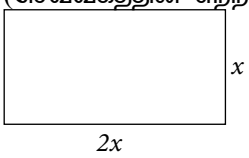
12 x 12 ⇒ Square

l = 20m ; b = 20 - 12 = 12m

146. Solution:

Perimeter of a rectangle = 60m

(செவ்வகத்தின் சுற்றளவு)



சுற்றளவு = 2 ($l + b$)

$$60m = 2(2x + x)$$

$$6x = 60$$

$$x = \frac{60}{6}$$

$$x = 10 \text{ breadth}$$

$$2x = 20 \text{ length}$$

Area of the Rectangle = l x b

= 10 x 20

= 200 m^2

TRIANGLE AND CONE

147. a = 13, b = 14, c = 15

$$S = \frac{a+b+c}{2} = \frac{13+14+15}{2} = \frac{42}{2} = 21$$

பரப்பு = $\sqrt{S(S-a)\,(S-b)\,(S-c)}$

$= \sqrt{21(21-13)\,(21-14)\,(21-15)}$

$= \sqrt{21(8)\,(7)\,(6)}$

$= \sqrt{7x3x4x2x7x2x3}$

= 7x3x4

= 21x4

A = 84செ.மீ^{2}

148. Solution:

½ bh : ½ bh

a x a : 2a x 2a

10 x 10 = 20 x 20

100 = 400

300% ↑ (increase)

149. Solution:

The side of a right angled triangle are x - 1, x, x + 1

= x + 1 is the longest side Pythagoras theorem

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

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

$x^2 - 4x = 0$

$x\,(x - 4) = 0$

$x = 0, x = 4$

$x = 0$ can not be side of a triangle one side is $x = 4$, $x - 1 = 3$, $x + 1 = 5$

a = 3, b = 4, c = 5 $\qquad A = \sqrt{s(s-a)(s-b)(s-c)}$

$s = \frac{3+4+5}{2}$ $\qquad$ $A = \sqrt{6(6-3)(6-4)(6-5)}$

$s = \frac{\cancel{12}^{6}}{\cancel{2}}$ $\qquad$ $A = \sqrt{6(3)(2)(1)}$

$s = 6$ $\qquad$ $A = \sqrt{6 \text{ x } 6} = \sqrt{36} = 6 \text{ cm}^2$

Answer = 6

150. Solution:

The angles of a triangle are in the ratio 3 : 4 : 5

$3x + 4x + 5x = 180$

$12x = 180$

$x = 15$

The angles are: 45°, 60°, 75°

151. Solution:

Area of triangle = ½ bh

Consider , h = x, b = $x + 4$

$48 = ½ (x) (x+4)$

$x^2 + 4x = 96$

$x^2 + 4x - 96 = 0$

$x = 8$, Altitude = 8

$h = x = 8$ cm

$b = x + 4 = 8 + 4 = 12$cm

Answer: 12 cm $\qquad$ $x = 8$, $x = -12$ (Base can not be negative)

152. Solution:

a = 15 cm, b = 20 cm, c = 25 cm

$S = \frac{a+b+c}{2} = \frac{15+20+25}{2} = \frac{60}{2} = 30$ cm

Answer : S = 30 cm (Semi perimeter)

153. Solution:

h = 5 cm

$\pi r^2 =$ 48 sq. cm

$r^2 = 48\text{x}\frac{7}{22} = 15.27$

r = 3.9 cm

$V = \frac{1}{3}\pi r^2 h$

$\frac{1}{3}$ x $\frac{22}{7}$ x $(3.9)^2$ x 5 ≈ 79.89

$= 80$

Answer = 80 cm^3

154. Solution:

$$V = \frac{1}{3}\pi r^2 h$$

$$l^2 = h^2 + r^2 \quad = h^2 = l^2 - r^2$$

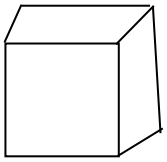
$$h = \sqrt{l^2 - r^2}$$

$$V = \frac{1}{3}\pi r^2 \sqrt{l^2 - r^2}$$

155. Solution:

a = 14 cm, d = 14 cm, h = 14 cm

r = 7 cm



$$V = \frac{1}{3}\pi r^2 h$$

$$= \frac{1}{3} \text{ x } \frac{22}{\cancel{7}} \text{ x } \cancel{7} \text{ x } 7 \text{ x } 14$$

$$= \frac{2156}{3}$$

$= 718.67$ cm^3

Answer : 718.67 cm^3

156. Solution:

The ratio of the slant height $l_1 : l_2$

4 : 3

Curved surface are $\pi r l_1 : \pi r l_2$

4 : 3

157. Solution:

V = 216 π cu.cm

r = 9 cm

h = ?

$$\frac{1}{3}\pi r^2 h = 216\ \pi$$

$$h = \frac{216 \text{ x } 3}{r^2}$$

$$= \frac{216 \text{ x } \cancel{3}}{\cancel{9}_{3} \text{ x } 9}$$

$$= \frac{216}{27}$$

h = 8 cm

Answer: 8 cm

158. **Solution:**

r = 9 cm

$\theta = 140°$

$$A = \frac{\pi r^2}{360°} \text{x} \theta$$

$$= \frac{\cancel{22}^{11}}{\cancel{7}} \text{ x } \frac{9 \text{ x } \cancel{9}}{\cancel{360°}_{\cancel{40}_{\cancel{2}}}} \text{ x } \cancel{140°}^{20}$$

= 11 x 9 = 99

Answer: A = 99sq. cm

CUBE AND CUBOID

159. Sol:

1000 லிட்டர் = 1மீ^{3}

தொட்டியின் கனஅளவு = 64,000லி

$$= \frac{64,000}{1,000}$$

V = 64மீ^{3}

a^3 = 64மீ^{3}

a = $\sqrt[3]{64}$

a = 4மீ

160. Sol:

கனச்சதுரத்தின் மொத்தப்பரப்பு $6a^2$ = 2400

a^2 = 400

a = 20 செ.மீ

பக்கப்பரப்பு = $4a^2$

= $4x20^2 = 4 \text{ x } 400$

= 1600 செ.மீ^{2}

161. Sol:

கனச்சதுரத்தின் ஒரு பக்கத்தின் சுற்றளவு (Perimeter of one face of a cube)

= 20 cm

4a = 20

$a = \frac{\cancel{20}^{5}}{\cancel{4}}$

= 5

கனச்சதுரத்தின் கனஅளவு (Volume of cube)

= a^3

= $(5)^3$

= 125 cm^3

162. Solution:

Volume of A = x^3

Volume of B = $\frac{4}{3}\pi x^3$

Ratio of Volume A to Volume B = $\frac{\cancel{x^3}}{\frac{4}{3}\pi \cancel{x^3}} = \frac{3}{4\pi}$

Answer: 3 : 4 π

163. Sol:

கனச்செவ்வகதின் கனஅளவு

= l x b x h

= 16m x 14m x 7m

Volume = 1568 m^3

பரப்பு = 2($lb + bh + hl$)

= 2(16 x 14 + 14 x 7 + 7 x 16)

= 2(224 + 98 + 112)

= 2(434)

Area = 868 m^2

164. Sol:

Room is the shape of cuboid

LSA of Cuboid = 2 $(l + b)\ h$

$^{44}\cancel{88} = \cancel{2}\ (5 + 3)\ h$

$h = \frac{^{5.5}\cancel{44}}{\cancel{8}}$

$h = 5.5\ cm$

165. Sol:

(Volume of a cuboid)

கனசெவ்வகத்தின் கனஅளவு = $l \times b \times h\ m^3$

$= 3 \times 2 \times 1$

$= 6\ m^3$

1 m = 1000 litres

6 m = 6000 litres

CYLINDER AND SPHERE

166. Sol:

Volume of Sphere (கோளத்தின் கனஅளவு) $= \frac{4}{3}\pi r^3$

Surface area of sphere (கோளத்தின் வளைபரப்பு) $= 4\pi r^2$

$\frac{4}{3}\pi r^3 = 4\pi r^2$

$\frac{r}{3} = 1$

r = 3 units

167. Sol:

Volume of sphere = Volume of surface area

$\frac{4}{3}\pi r^3 = 4\pi r^2$

$\frac{r}{3} = 1$

r = 3

Ans : 3

168. Sol:

Diameter r = 2 cm

ஆரம் = 1 cm

Total surface area

$= 3\pi r^2$

$= 3 \times \pi \times 1^2$

$= 3\pi$ sq.cm

169. Sol:

CSA of Sphere : TSA of hemisphere : CSA of hemisphere

$4\pi \cancel{r^2} : 3\pi \cancel{r^2} : 2\pi \cancel{r^2}$

Ans : 4 : 3: 2

170. **Sol:**

அரைக்கோளத்தின் வளைபரப்பு : கூம்பின் வளைபரப்பு

$2\cancel{\pi} r^2 : \cancel{\pi} r\sqrt{r^2+h^2}$

$h^2 = r^2$

$2r^2 : r\sqrt{r^2+r^2}$

$2r^2 : r\sqrt{2r^2}$

2r2 : r x $\sqrt{2}$ x r

$2\cancel{r^2} : \sqrt{2}\cancel{r^2}$

$\cancel{\sqrt{2}}.\sqrt{2} : \cancel{\sqrt{2}}$

Ratio = $\sqrt{2} : 1$

171. Sol:

அரைக்கோளத்தின் மொத்த புறப்பரப்பு

$= 3\pi r^2$

$3\pi r^2 = 675\pi$ sq.cm

$r^2 = 225$

$r^2 = \frac{\overset{225}{\cancel{675}}\cancel{\pi}}{\cancel{3}\cancel{\pi}}$

வளைப்பரப்பு

$= 2\pi r^2$

$= 2\pi$ x 225

450π sq.cm

172. Sol:

கோளத்தின் கனஅளவு

$= \frac{4}{3}\pi r^3$

$\frac{4}{3}\cancel{\pi} r^3 = \frac{9}{16}\cancel{\pi}$

$r^3 = \frac{9}{16} \text{ x } \frac{3}{4}$

$r^3 = \frac{27}{64}$

$r = \frac{3}{4}$ cm

173. Sol:

Volume of hollow Sphere

$$= \frac{4}{3}\pi\left(R^3 - r^3\right)$$

$$\frac{\overset{516}{\cancel{1032}}}{\cancel{7}} = \frac{4}{3} \times \frac{\overset{1}{\cancel{2}}\cancel{22}}{\cancel{7}}\left(8^3 - r^3\right)$$

$$516 = \frac{4}{3}\left(512 - r^3\right)$$

$$\overset{129}{\cancel{516}} \times \frac{3}{\underset{1}{\cancel{4}}} = 512 - r^3$$

$$387 - 512 = -r^3$$

$$\cancel{-}125 = \cancel{-}r^3$$

r = 5 cm

174. Sol:

r = 5 cm

Thickness = 0.25 cm

R = 5 cm + 0.25 cm = 5.25 cm

Curved Surface area $= 2\pi R^2$

$$= \cancel{2} \times \frac{\overset{11}{\cancel{22}}}{7} \times \frac{\overset{105}{\cancel{525}}}{\underset{10}{\cancel{100}}} \times \frac{\overset{105}{\cancel{525}}}{\underset{10}{\cancel{100}}}$$

$$= 173.25 \text{ cm}^2$$

175. Sol:

Diameter of the tank = 28 cm

(உருளை வடிவத் தொட்டியின் விட்டம்)

Radius of the tank = 14 cm

(உருளை வடிவத் தொட்டியின் ஆரம்)

Volume of Cylinder $= \pi r^2 h$

(உருளையின் கனஅளவு)

$$V = 11 \text{ litres} = 11 \times 10^3 \text{ cm}^3$$

$$V = \pi r^2 h$$

r = 14 cm

$$11 \times 10^3 = \frac{22}{7} \times (14)^2 \times h$$

$$h = \cancel{11} \times 10^3 \times \frac{\cancel{7}}{\underset{2}{\cancel{22}}} \times \frac{1}{\underset{2}{\cancel{14}} \times 14}$$

$$h = \frac{10^3}{56} = \frac{1000}{56}$$

$$= \frac{125}{7} = 17\frac{6}{7} \text{ cm}$$

176. Sol:

Volume of the cylinder

(உருளையின் கனஅளவு) $V = \pi r^2 h = 81$

Volume of the cone $= \frac{1}{3}\pi r^2 h$

(கூம்பின் கனஅளவு)

$$= \frac{1}{\cancel{3}} \times \overset{27}{\cancel{81}}$$

$$= 27\text{cm}^3$$

177. Sol:

Ratio of the heights = 2: 3 $h_1 = 2, h_2 = 3$

(உயரங்களின் விகிதம்)

Volumes are equal

(கன அளவுகள் சமம்)

Volume of the cylinder= $\pi r^2 h$

(உருளையின் கனஅளவு)

$$\pi r_1^2 h_1 : \pi r_2^2 h_2$$

$$\cancel{\pi} \times r_1^2 \times (2) = \cancel{\pi} \times r_2^2 \times (3)$$

$$\frac{r_1^2}{r_2^2} = \frac{3}{2}$$

$$\frac{r_1}{r_2} = \frac{\sqrt{3}}{\sqrt{2}}$$

$$\sqrt{3} : \sqrt{2}$$

178. Sol:

Radius (ஆரம்) r = 7 m

Height (உயரம்) h = 20 m

Total surface area of cylinder = $= 2\pi r(r+h)$

(உருளையின் மொத்த பரப்பளவு)

$$= 2 \times \frac{22}{\cancel{7}} \times \cancel{7} \times (7+20)$$

$$= 2 \times 22 \times 27$$

$$= 1188 \text{ cm}^2$$

Curved surface area $= = 2\pi rh$

(வளைபரப்பு)

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

$= 2 \times 22 \times 20$

$= 880\ cm^2$

Total surface area $= 1188\ cm^2$

Curved Surface area $= 880\ cm^2$

CIRCLE, PARALLELOGRAM, QUDRILATERAL, RHOMBUS, TRAPEZIUM

179. Sol :

வட்டத்தின் ஆரம் (radius) r = 10 cm என்க

$A_1 = \pi r^2$

$r^2 = 10 \times 10 = 100$

Note: $\cancel{10}^5 \times \frac{\cancel{50}}{\cancel{100}_2} = 5$

வட்டத்தின் ஆரத்தில் 50% குறைந்தால்

$r^2 = 5 \times 5 = 25$

வித்தியாசம் = 100 - 25 = 75

வித்தியாசம் % = 75%

180. Sol:

Area of a circle (வட்டத்தின் பரப்பளவு) $= \pi r^2$

$220 = \frac{22}{7} r^2$

$\frac{220}{22} = \frac{r^2}{7}$

$10 = \frac{r^2}{7}$

$r^2 = 70$

$r = \sqrt{70}$

சதுரத்தின் மூலைவிட்டம் = 2r

Diagonal of the Square $= = 2\sqrt{70}$

Side of a square (சதுரத்தின் பக்கம்) $= \frac{\text{Diagonal (மூலைவிட்டம்)}}{\sqrt{2}}$

$$= \frac{2\sqrt{\cancel{70}^{35}}}{\sqrt{\cancel{2}}} = 2\sqrt{35}$$

Area of a square (சதுரத்தின் பரப்பளவு) $= a^2$

$$= \left(2\sqrt{35}\right)^2$$

$$= 4 \text{ x } 35$$

$$= 140cm^2$$

181. Sol:

r = 7

அரை வட்டத்தின் பரப்பளவு (Area of a semicircle)

$$= \frac{\pi r^2}{2}$$

$$= \frac{\cancel{22}^{11}}{\cancel{7}} \text{ x } \frac{\cancel{7} \text{ x } 7}{\cancel{2}} = 77cm^2$$

182. Sol:

வட்டத்தின் சுற்றளவு = 264 m

$$\cancel{2}\pi r = \cancel{264}_{132}$$

$$\frac{22}{7} \text{ x r} = 132$$

$$r = \cancel{132}^{\cancel{12}^{6}} \text{ x } \frac{7}{\cancel{22}_{\cancel{2}_{1}}}$$

r = 42

வட்டத்தின் பரப்பளவு

$$= \pi r^2$$

$$= \frac{22}{\cancel{7}} \text{ x } \cancel{42}^{6} \text{ x } 42$$

$$= 5544 \text{ cm}^2$$

183. Sol:

Distance = சுற்றுகளின் எண்ணிக்கை x சுற்றளவு

$$\text{Circuference} = \frac{\text{Distance}}{\text{சுற்றுகளின் எண்ணிக்கை}}$$

$$2\pi r = \frac{\overset{176}{\cancel{8800}}}{\cancel{50}} \text{ (Convert to cm)}$$

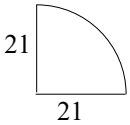
$$\cancel{2} \times \frac{\overset{\cancel{2}}{\cancel{22}}}{7} \times r = \overset{\substack{4\\ \cancel{8}\\ \cancel{16}}}{\cancel{176}}$$

$$\frac{r}{7} = 4$$

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

சக்கரத்தின் ஆரம் = 28 cm

184. Sol:

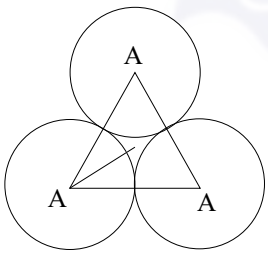


Perimeter of a Quadrant $= \left(\frac{\pi}{2}+2\right)r$

$$= \left(\frac{\overset{11}{\cancel{22}}}{7 \times \cancel{2}}+2\right) \times 21$$

$$= \left(\frac{11+14}{\cancel{7}}\right) \times \overset{3}{\cancel{21}} = = 25 \times 3 = 75$$

185. Sol:



= Area of equilateral triangle ABC - 3 times area of the sector

$$= \frac{\sqrt{3}}{4}a^2 - 3\frac{\theta}{360^o} \times \pi r^2$$

$$= \frac{\sqrt{3}}{\underset{\cancel{2}}{\cancel{4}}} \times \overset{3}{\cancel{6}} \times \overset{3}{\cancel{6}} - \cancel{3} \times \frac{\cancel{60}}{\underset{\substack{\cancel{6}\\ \cancel{2}}}{\cancel{360}}} \times \frac{\overset{11}{\cancel{22}}}{7} \times 3 \times 3$$

$$= 9\sqrt{3} - \frac{99}{7}$$

$$= 15359 - 14.14$$

$$= 1.45 \text{ cm}^2$$

186. Sol:

அரைவட்டத்தின் சுற்றளவு $= P = (\pi+2)r$

$$= \left(\frac{22}{7} + 2\right) \times 14$$

$$= \frac{36}{7} \times 14 = 72 \text{ cm}$$

$$P = 72 \text{ cm}$$

அரைவட்டத்தின் பரப்பளவு $= \frac{\pi r^2}{2}$

$$= \frac{\frac{\overset{11}{\cancel{22}}}{\cancel{7}} \times \overset{2}{\cancel{14}} \times 14}{\cancel{2}}$$

$$= 22 \times 14$$

$$= 308 \text{ cm}^2$$

187. Sol:

அரைவட்டத்தின் சுற்றளவு $P = (\pi+2)r$

$$= \left(\frac{22}{7} + 2\right) \times 28$$

$$= \left(\frac{22+14}{\cancel{7}}\right) \times \overset{4}{\cancel{28}}$$

$$= 36 \times 4 = 144 \text{ cm}$$

188. Sol:

$a = 1$

Percentage increase in area $= \left(2a + \frac{a^2}{100}\right)\%$

$$= \left(2 \times 1 + \frac{1^2}{100}\right)$$

$$= (2 + 0.01)$$

$$= 2.01\%$$

189. Sol:

வட்டத்தின் பரப்பளவு $\pi r^2 = 154$

$$\frac{\overset{2}{\cancel{22}}}{7} \times r^2 = \overset{7}{\cancel{14}}\cancel{154}$$

$$r^2 = 7 \times 7$$

$$r = 7$$

சுற்றளவு $= 2\pi r$

$= 2 \times \frac{22}{\cancel{7}} \times \cancel{7}$

$= 44$ cm

190. Sol:

வட்டத்தின் சுற்றளவு $= 2\pi r$

$= 2 \times \frac{22}{\cancel{7}} \times \cancel{35}^{5}$

$= 220$ cm

சுழற்சிகளின் எண்ணிக்கை $= \frac{154m}{220}$ (convert into cm)

$= \frac{\cancel{1540\ 0}^{\cancel{140}\ 70}}{\cancel{22\ 0}_{2}}$

$= 70$

191. Sol:

சுற்றளவு $= 2\pi r$

$= \cancel{2} \times \frac{22}{\cancel{7}} \times \frac{\cancel{63}^{9}}{\cancel{2}}$

$= 198$

தொலைவு = சுற்றளவு x சுற்றுகளின் எண்ணிக்கை

$= 198 \times 20$

$= 3960$ cm

$= 39$m 60cm

192. Sol:

Given,

Perimeter of a circle = $2\pi r$

It area = πr^2 radius = r

area of a square = a^2

$a^2 = \pi r^2$

$a = \sqrt{\pi r}$

Perimeter of square = 4 a

$4\sqrt{\pi r}$

$4\sqrt{\pi r}$

193. Sol:

வட்ட கோணப்பகுதியின் நீளம்

$$= \frac{\theta}{360^o} \times 2\pi r$$

$$26 = \frac{\theta}{\cancel{360}_{\cancel{90}_{18}}} \times \cancel{2} \times \frac{\cancel{22}^{11}}{7} \times \cancel{15}^{3}$$

$\theta = 99.3630$

வட்ட கோணப்பகுதியின் பரப்பு $= \frac{\theta}{360^o} \times \pi r^2$

$$= \frac{99.3630}{\cancel{360}_{\cancel{180}_{\cancel{36}_{\cancel{12}_{4}}}}} \times \frac{\cancel{22}^{11}}{7} \times \cancel{15}^{\cancel{3}^{1}} \times \cancel{15}^{5}$$

$$= 195 \text{ cm}^2$$

194. Sol:

The area of the circle = πr^2

area of semi circle = $\frac{1}{2}\pi r^2$

The ratio of the area of a circle to the area of semicircle

$$\frac{\cancel{\pi r^2}}{\frac{1}{2}\cancel{\pi r^2}} = \frac{2}{1}$$

2 : 1

195. Sol:

$d_1 = 18\text{m}, \quad d_2 = 25\text{m}$

Area of Rhombus $= \frac{d_1 \times d_2}{2}$

$$= \frac{\cancel{18}^{9} \times 25}{\cancel{2}}$$

$$= 225 \text{ m}^2$$

196. Sol:

$d_1 = 20 \text{ cm}, \quad d_2 = 12 \text{ cm}$

Area of Rhombus $= \frac{d_1 \times d_2}{2}$

$$= \frac{\cancel{20}^{10} \times 12}{\cancel{2}}$$

$$= 120 \text{ cm}^2$$

197. Sol:

Area of Quadrilateral $= \frac{1}{2}\ d\ (h_1 + h_1)$

$= \frac{1}{2}$ x 100 (50 + 50)

= 50 x 100

= 5000 m^2

198. **Sol:**

Area of the quadrilateral $= \frac{1}{2}\ d\ (h_1 + h_1)$

$= \frac{1}{2}$ x 20 (7+10)

= 10 x 17

= 170 cm^2

199. Sol:

$a - b = 4 \rightarrow (i)$

Area of Trapezium = ½ x (a + b) h

475 = ½ x (a + b) x 19

950 = (a +b) x 19

50 = a + b ..... (ii)

Add (i) and (ii)

$a \cancel{-b} = 4$

$a \cancel{+b} = 50$

$2a = 54$

$a = 27$

$(i) \Rightarrow$

$27 - b = 4$

$27 - 4 = b$

$23 = b$

Parallel sides 27cm and 23cm

200. Sol:

Area of Trapezium $= \frac{1}{2}(a+b)$ x h

$960 = \frac{1}{2}(40+60)$ x h

$960 = \frac{1}{\cancel{2}}$ x $\overset{50}{\cancel{100}}$ x h

$$\frac{\overset{19.2}{\cancel{960}}}{\cancel{50}} = h$$

$$h = 19.2cm$$

201. **Sol:**

$x + y = 180^\circ$ (Condition)

$x = 2y - 30^\circ$ (Given)

$2y - 30 + y = 180$

$3y - 30 = 180$

$3y = 180 + 30$

$$y = \frac{\overset{70}{\cancel{210}}}{\cancel{3}}$$

$y = 70^\circ$

$x = 2y - 30$

$x = 2 \text{ x } 70 - 30$

$x = 140 - 30$

$x = 110^\circ$

$70^\circ, 110^\circ$

TIME AND DISTANCE

202. Sol:

20 mins. = 5 km

50 mins. = ?

$$1 \min = \frac{5}{20} km$$

$$50 \text{ mins} = \frac{5}{2\cancel{0}} \text{ x } 5\cancel{0} = \frac{25}{2}$$

$$= 12.5 \ km$$

203. Sol:

Lets distace between the A and B x km, then,

$$\frac{x}{10} - \frac{x}{15} = \frac{30}{60}$$

$$\frac{15x - 10x}{150} = \frac{\cancel{30}}{\cancel{60}_2}$$

$$\frac{5x}{150} = \frac{1}{2}$$

$$x = \frac{\cancel{150}^{\cancel{75}\,15}}{\cancel{2}\text{x}\cancel{5}}$$

x = 15 km

204. Sol:

Time Taken to travel = $\frac{90}{x}$ hr

New Speed = (x + 15) km/hr

$$\frac{90}{x} = \frac{90}{x+15} + \frac{1}{2}$$

$$\frac{90}{x} - \frac{90}{x+15} = \frac{1}{2}$$

$$90\left(\frac{1}{x} - \frac{1}{x+15}\right) = \frac{1}{2}$$

$$\frac{x+15-x}{x+15} = \frac{1}{180}$$

$$\frac{\cancel{x}+15-\cancel{x}}{x(x+15)} = \frac{1}{180}$$

$$2700 = x^2 + 15x$$

$$x^2 + 15x - 2700 = 0$$

$$(x+60)(x-45) = 0$$

$$x = -60 \qquad x = 45$$

negative not possible

x = 45 km/ hr

205. Sol:

ratio of time taken

$$= \frac{y}{5x} : \frac{y}{4x} : \frac{y}{6x}$$

$$= \frac{1}{5} : \frac{1}{4} : \frac{1}{6}$$

$$=\frac{12:15:10}{60}$$

$$=12:15:10$$

206. Sol:

$$\text{Speed}=\frac{\text{Distance}}{\text{Time}}$$

Distance = 360 km
Time = 4 hours

$$=\frac{\overset{90}{\cancel{360}}}{\cancel{4}}=90 \text{ km}$$

6 மணி 30 நிமிடங்கள் = $\frac{13}{2}$

Distance = Speed x Time

$$=\overset{45}{\cancel{90}}\text{x}\frac{13}{\cancel{2}}=585 \text{ km}$$

207. Sol:

Speed = 5kmph
Time = 3 hrs 48 mins
= 3 x60 +48
= 228 min
distance = speed x time
= 5 x 228
= 1140
Speed = 28.5 km find time =?

$$\text{Time}=\frac{\text{Distance}}{\text{Speed}}$$

$$=\frac{1140}{28.5}$$

= 40 mins

208. Sol:

Distance travelled by the car = 60 x 4
= 240 km

$$\text{Time}=\frac{\text{Distance}}{\text{Speed}}$$

$$=\frac{240}{60+20}$$

$$=\frac{\overset{3}{\cancel{240}}}{\cancel{80}}=3 \quad = 3 \text{ hours}$$

209. Sol:

2004 ம் ஆண்டு இலாபத்தின் உயர்வு = 30

(Increased Profit)

2005 ம் ஆண்டு இலாபத்தின் உயர்வு = 50

$$\frac{50-30}{30} x100$$

$$\frac{20}{30} x100 = 66\frac{2}{3}\%$$

210. Sol:

$$x = 414 \ x \frac{100}{100+15}$$

$$= 414 \ x \frac{100}{115}$$

= 360

Answer: Rs.360

211. Sol:

2005&‹ Ý‡´ Þô£ðˆF¡ ñ£Ÿø‹ = 60

2006&‹ Ý‡´ Þô£ðˆF¡ ñ£Ÿø‹ = 50

$$\text{Profit \%} = \frac{50-60}{60} x100$$

$$= \frac{-10}{60} x100 = \frac{-50}{3}$$

$$= -16\frac{2}{3}\% \qquad \text{(Negative)}$$

Profit decreased by $16\frac{2}{3}\%$

212. Sol:

Let the original cost Price(பொருளின் விலை) = Rs.100

profit (இலாபம்) = 3% discount = 3%

$$= 100 \ x \frac{3}{100} \ x \ \frac{3}{100} = \frac{9}{100}$$

= 0.09%

Same amount of increases and decreases is always loss

Ans: loss of 0.09%

213. Sol:

Horse(குதிரை) = x

Cow(மாடு) = y

$\cancel{x} + 2y = 680$

$\cancel{x} - y = 80$

$3y = 600$

$y = \frac{\overset{200}{\cancel{600}}}{\cancel{3}} = 200$

$y = 200$

$x - 200 = 80$

$x = 280$

$x : y = \underset{7}{\cancel{280}} : \underset{5}{\cancel{200}}$

$x : y = 7 : 5$

214. Sol:

Let, Market price of the set is x

$\left(x \text{ x } \frac{90}{100}\right) \text{x } \frac{80}{100} = 14400$

$\frac{9x}{10} \text{ x } \frac{8}{10} = 14400$

$72x = 14400 \text{ x } 100$

$x = 20000$

215. Sol:

cost price of 21 pens = 21

(அடக்க விலை)

cost price of 20 pens = 20

S.P of 20 pens = C.P of 21 pens

Profit % (இலாபம்) $= \frac{\text{S.P-C.P}}{\text{C.P}} \text{ x } 100$

$\frac{21-20}{\cancel{20}} \text{ x } \cancel{100}^{5}$

= 1 x 5 = 5%

216. Sol:

Pencil(பென்சில்) = x

Eraser(அழிப்பான்) = y

$3x+5y=34 \rightarrow (i)$

$2x+7y=30 \rightarrow (ii)$

(i) x 2 $\Rightarrow$ $6x + 10y = 68$

(ii) x 3 $\Rightarrow$ $6x + 21y = 90$

Sub eqn (i) & (ii)

$\cancel{-}11y = \cancel{-}22$

$y = \frac{\overset{2}{\cancel{22}}}{\cancel{11}} = 2$

$y = 2$

$3x+10=34$

$3x=34-10$

$x = \frac{\overset{8}{\cancel{24}}}{\cancel{3}} = 8$

$x = 8$

Pencil = 8

217. Sol:

$4x+3y=750$

$y=2x$

$4x+3 \text{ x } 2x=750$

$4x+6x=750$

$10x=750$

$x=75$, $y = 2(75) = 150$

Total Cost (மொத்த விலை) = 75+150

= 225

218. Sol:

C.P = 27,75,000+2,25,000

= 30,00,000

S.P = (1% + Profit %) x C.P

$= \left(1+\frac{40}{100}\right)3,00,000$

$= \left(1+\frac{40}{100}\right)3,00,000$

$= \frac{140}{1\cancel{00}} \text{x}30000\cancel{00}$

= 140 x 30,000

S.P = 42,00,000

Another Method:

C.P = 27,75,000 + 2,25,00 = 30,00,000

Profit amount $= \frac{40}{1\cancel{00}} \text{x} 30000\cancel{00}$

= 12,00,000

S.P = C.P + Profit = 30,00,000 + 12,00,000

= 42,00,000

219. Sol:

Let the cost Price = x

Loss = 20%

$= \frac{\cancel{20}}{\underset{5}{\cancel{100}}} \text{x } x = \frac{x}{5}$

S.P = C.P - Loss

$= x - \frac{x}{5} = \frac{4x}{5}$

New S.P $= \frac{4x}{5} + 100$

Profit = 5% of C.P

$= \frac{5}{100} \text{ x } x$

$= \frac{x}{20}$

Profit = S.P - C.P

$= \frac{x}{20} = \frac{4x}{5} + 100 - x$

$\frac{20x - 16x + x}{20} = 100$

$5x = 2000$

$x = 400$

220. Sol:

$5x + 4y = 13 \rightarrow (i)$

$9x + 5y = 19 \rightarrow (ii)$

$(i)\text{x}5 \Rightarrow 25x + \cancel{20y} = 65$

$(ii)\text{x}4 \Rightarrow_{(-)} 36x \underset{(-)}{+} \cancel{20y} =_{(-)} 76$

$-11x = -11$

$x = 1$

$5\text{x}1 + 4y = 13$

$4y = 13 - 5$

$y = 2$

6 pencil and 3 erasers = 6 x 1 + 3 x 2
= 6+6 = 12

CHAIN RULE

221. Sol:

9 girls prepared = 135 garlands
(பெண்கள்) (மாலைகள்)

= 3 h

1 hour = 9 x 3
= 27 girls

135 garlands in 1 hour
(மாலைகள் ஒரு மணி நேரத்தில்)

$= \frac{27}{135}$ girls

270 garlands in 1 hour
(மாலைகள் ஒரு மணி நேரத்தில்)

$= \frac{27}{135} \text{x} 270$

$= \frac{7290}{135} = 54$ girls (பெண்கள்)

222. Sol:

7 men can finish in = 52 days
(7 ஆட்கள் வேலையை செய்து முடிக்கும் நாள்)
1 men can finish in = 7 x 52 days

13 men can finish in $= \frac{7 \text{ x } \overset{4}{\cancel{52}}}{\cancel{13}} = 28$

28 days

223. Sol:

60 machines 5 hours 4850 mobiles

60 machines 5 hours $= \frac{\overset{970}{\cancel{4850}}}{\cancel{5}} = 970$

1 machine $= \frac{97\cancel{0}}{6\cancel{0}}$ mobiles

1 machine 6 hours $= \frac{97}{\cancel{6}} \times \cancel{6}$

$= 97$

25 machines = 97 x25

$= 2425$

224. Sol:

for cube there are 12 edges

(கனச்சதுரத்தில் 12 முனைகள் உள்ளன)

2 smaller cubes painted on two surfaces

(2 சிறிய கனச்சதுரத்தின் 2 பக்கங்கள் வண்ணம் பூசப்பட்டுள்ளது)

No. of smaller cubes with two surfaces painted red are 12 x 12 = 24

(மொத்த எண்ணிக்கை)

225. Sol:

$M_1 = 12$ $M_2 = 8$

$D_1 = 90$ $D_2 = ?$

$T_1 = 8$ $T_2 = 12$

$M_1D_1T_1 = M_2D_2T_2$

$D_2 = \frac{\cancel{12} \times 90 \times \cancel{8}}{\cancel{8} \times \cancel{12}} = 90$

90 days

226. Sol:

men	days	hours	women
	15	21	8
			6 21

given,

$3W = 2M \Rightarrow W = \frac{2M}{3}$

15 M x 21 x 8 = 6 x 21W x x

$$15\text{ M} \times 21 \times 8 = 6 \times \cancel{21}^{7} \times \frac{2M}{\cancel{3}} \times x$$

$$x = \frac{15M \times 21 \times 8}{6 \times 7 \times 2M}$$

$$x = \frac{15\cancel{M} \times \cancel{21}^{3} \times \cancel{8}^{\frac{2}{4}}}{\cancel{6}_{2} \times \cancel{14}_{2}\cancel{M}} = 30$$

30 days

227. Sol:

men (ஆட்கள்)	days (நாட்கள்)
7	52
26	?

Indirect

7 x 52 = 26 x x

$$x = \frac{7 \times \cancel{52}^{2}}{\cancel{26}} = 14$$

14 days

228. Sol:

cows (பசுக்கள்)	buffaloes (எருமைகள்)
21	15
?	35

Indirect

21 x 35 = 15 x x

$$x = \frac{\cancel{21}^{7} \times \cancel{35}^{7}}{\cancel{15}_{3}} = 49$$

49 cows

229. Sol:

persons (ஆட்கள்)	boxes (பெட்டிகள்)	days (நாட்கள்)
15	35	7
?	65	5

direct

$$x = \frac{\cancel{15}^{3} \times \cancel{65}^{13} \times \cancel{7}}{\cancel{35}_{5} \times \cancel{5}} = 39$$

39 mens

230. Sol:

men (ஆட்கள்)	days (நாட்கள்)

5 52

13 ?

Indirect

$$x = \frac{5 \text{ x } \overset{4}{\cancel{52}}}{\cancel{13}} = 20$$

20 days

STATISTICS

231. Sol:

Range = Max - Min

(வீச்சு)

= 92 - 17 = 75

Ans: 75

232. Sol:

First 7 natural numbers = 1, 2, 3, 4, 5, 6, 7

(முதல் 7 இயல் எண்கள்)

$$\text{Mean } \frac{\sum x}{n} = \frac{1+2+3+4+5+6+7}{7}$$

$$= \frac{\overset{4}{\cancel{28}}}{\cancel{7}} = 4$$

$$\bar{x} = 4$$

x	x^2
1	1
2	4
3	9
4	16
5	25
6	36
7	49

$$\sum x^2 = 140$$

$$\sigma = \sqrt{\frac{\sum x^2}{n} - (\bar{x})^2}$$

$$= \sqrt{\frac{\overset{20}{\cancel{140}}}{\cancel{7}} - (4)^2}$$

$= \sqrt{20-16}$

$= \sqrt{4} = 2$

$\sigma = 2$

233. Sol:

First order it = 248, 252, 256, 265, 267, 276, 284, 482, 526, 625, 672, 726 arrange in ascending order

(முதலில் வரிசைபடுத்தவும்)

n = 12 even

Median

$$M = \frac{\left(\frac{n}{2}\right)^{th} \text{term} + \left(\frac{n}{2}+1\right)^{th} \text{term}}{2}$$

$$M = \frac{6^{th} \text{ term} + 7^{th} \text{term}}{2}$$

$$= \frac{276+284}{2}$$

$$= \frac{\overset{280}{\cancel{560}}}{\cancel{2}} = 280$$

Median = 280

234. Sol:

Range = Max - Min

(வீச்சு)

= 98 - 23 =75

Ans : 75

235. Sol:

Data have no , repeated values

(விவரங்கள்)

Mid value 21 for 7th size

Mode(முகடு) = 7

PROBABILITY

236. Sol:

5 Mens = $M_1 : M_2 : M_3 : M_4 : M_5$

5 Womens = $W_1 : W_2 : W_3 : W_4 : W_5$

$$S = \left\{ \begin{matrix} (M_1, W_1)(M_1, W_2)(M_1, W_3)(M_1, W_4)(M_1, W_5) \\ (M_2, W_1)(M_2, W_2)(M_2, W_3)(M_2, W_4)(M_2, W_5) \\ (M_3, W_1)(M_3, W_2)(M_3, W_3)(M_3, W_4)(M_3, W_5) \\ (M_4, W_1)(M_4, W_2)(M_4, W_3)(M_4, W_4)(M_4, W_5) \\ (M_5, W_1)(M_5, W_2)(M_5, W_3)(M_5, W_4)(M_5, W_5) \\ (M_1, M_2)(M_1, M_3)(M_1, M_4)(M_1, M_5)(M_2, M_3) \\ (M_2, M_4)(M_2, M_5)(M_3, M_4)(M_3, M_5)(M_4, M_5) \\ (W_1, W_2)(W_1, W_3)(W_1, W_4)(W_1, W_5)(W_2, W_3) \\ (W_2, W_4)(W_2, W_5)(W_3, W_4)(W_3, W_5)(W_4, W_5) \end{matrix} \right\}$$

n(S) = 45

Let Event A be getting one of them man and the other women

$$A = \left\{ \begin{matrix} (M_1, W_1)(M_1, W_2)(M_1, W_3)(M_1, W_4)(M_1, W_5) \\ (M_2, W_1)(M_2, W_2)(M_2, W_3)(M_2, W_4)(M_2, W_5) \\ (M_3, W_1)(M_3, W_2)(M_3, W_3)(M_3, W_4)(M_3, W_5) \\ (M_4, W_1)(M_4, W_2)(M_4, W_3)(M_4, W_4)(M_4, W_5) \\ (M_5, W_1)(M_5, W_2)(M_5, W_3)(M_5, W_4)(M_5, W_5) \end{matrix} \right\}$$

n(A) = 25

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

$$= \frac{\overset{5}{\cancel{25}}}{\underset{9}{\cancel{45}}} = \frac{5}{9}$$

237. Sol:

red = 4 blue = 5 green = 6

Total balls = 15

Two balls are drawn at random $15C_2 = \frac{15 \text{ x } 14}{1 \text{ x } 2}$

one blue and other is green = 6 x 5

$$= \frac{6 \text{ x } 5}{\frac{15 \text{ x } 14}{1 \text{ x } 2}}$$

$$= \frac{6 \text{ x } 5 \text{ x } 2}{15 \text{ x } 14}$$

238. Sol:

Die is thrown twice

No. of possiblities $=(6)^2 = 36$

n(S) = 36

No. of chances having sum of 9

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

n (A) = 4

$$P(A)=\frac{n(A)}{n(S)}=\frac{\overset{1}{\cancel{4}}}{\underset{9}{\cancel{36}}}=\frac{1}{9}$$

239. Sol:

In a leap yer there are 366 days

Sun - Mon

Mon - Tue

Tue - Wed

Wed - Thur

Thur - Fri

Fri - Sat

Sat - Sun

$$P(53\ Fri)=\frac{2}{7}$$

$$P(53\ Sat)=\frac{2}{7}$$

$$P(53\ Fri\ \&\ 53\ Sat)=\frac{1}{7}$$

$$=\frac{2}{7}+\frac{2}{7}-\frac{1}{2}$$

$$=\frac{4}{7}-\frac{1}{7}$$

$$=\frac{4-1}{7}$$

$$=\frac{3}{7}$$

[Note:

$P(A\cup B) = P(A) + P(B) - P(A\cap B)$]

240. Sol:

20 is 7 times repeated, so

Frequency = 7

CODING

241. **Sol:**

சோப்பு = Ink

Ink is used for washing

Ink துணி துவைக்க பயன்படும்

242. **Sol:**

H	Y	D	R	O	G	E	N
+	+	+	+	+	+	+	+
2	4	6	8	10	12	14	16
J	C	J	R	O	G	E	N

A	N	T	I	M	O	N	Y
1	14	20	9	13	15	14	25
+	+	+	+	+	+	+	+
2	4	6	8	10	12	14	16
3	18	26	17	23	27	28	41
C	R	Z	Q	W	A	B	O

243. **Sol:**

C A L D

3 + 1 + 12 + 12 = 28

C E L L

3 + 5 + 12 + 12 = 32

Ans : 32

244. **Sol:**

D	E	L	H	I		C	A	L	C	U	T	T	A
↓	↓	↓	↓	↓		↓	↓	↓	↓	↓	↓	↓	↓
7	3	5	4	1				8	2	5	8	9	6	6	2

C	A	L	I	C	U	T
8	2	5	1	8	9	6

245. **Sol:**

A C E G

1+ 3+ 5+ 7 = 16

H I K M
8+ 9+ 11+ 13 = 41

SIMPLIFICATION

246. Sol:

Value of

$$\sqrt{58+\sqrt{31+\sqrt{21+\sqrt{11+\sqrt{25}}}}}$$

$$\sqrt{58+\sqrt{31+\sqrt{21+\sqrt{11+5}}}}$$

$$\sqrt{58+\sqrt{31+\sqrt{21+\sqrt{16}}}}$$

$$\sqrt{58+\sqrt{31+\sqrt{21+4}}}$$

$$\sqrt{58+\sqrt{31+\sqrt{25}}}$$

$$\sqrt{58+\sqrt{31+5}}$$

$$\sqrt{58+\sqrt{36}}$$

$$\sqrt{58+6}$$

$$\sqrt{64}$$

$$=8$$

247. Sol:

$$\sqrt{77-\sqrt{150+\sqrt{366-\sqrt{25}}}}$$

$$\sqrt{77-\sqrt{150+\sqrt{366-5}}}$$

$$\sqrt{77-\sqrt{150+\sqrt{361}}}$$

$$\sqrt{77-\sqrt{150+19}}$$

$$\sqrt{77-\sqrt{169}}$$

$$\sqrt{77-13}=\sqrt{64}=8$$

248. Sol:

$$\sqrt{1+\sqrt{1+\sqrt{5+\sqrt{14+\sqrt{1+\sqrt{9}}}}}}$$

$$\sqrt{1+\sqrt{1+\sqrt{5+\sqrt{14+\sqrt{1+3}}}}}$$

$$\sqrt{1+\sqrt{1+\sqrt{5+\sqrt{14+\sqrt{4}}}}}$$

$$\sqrt{1+\sqrt{1+\sqrt{5+\sqrt{14+2}}}}$$

$$\sqrt{1+\sqrt{1+\sqrt{5+\sqrt{14+2}}}}$$

$$\sqrt{1+\sqrt{1+\sqrt{5+\sqrt{16}}}}$$

$$\sqrt{1+\sqrt{1+\sqrt{5+4}}}$$

$$\sqrt{1+\sqrt{1+\sqrt{9}}}$$

$$\sqrt{1+\sqrt{1+3}}$$

$$\sqrt{1+\sqrt{4}}$$

$$\sqrt{1+2}=\sqrt{3}$$

249. Sol:

$$x^2=3\sqrt{3\sqrt{3\sqrt{3}x}}$$

$$x^2=3x$$

$$x^2-3x=0$$

$$x(x-3)=0$$

$$x=0, \qquad x=3$$

not possible

Ans: $x=3$

250. Sol:

Using Bodmas method

$$25-5\left[2+3\{2-2(5-3)+5\}-10\right]\div 4$$

$$=25-5\left[2+3\{2-2(2)+5\}-10\right]\div 4$$

$$=25-5\left[2+3\{7-4\}-10\right]\div 4$$

$$=25-5\left[2+3(3)-10\right]\div 4$$

$$=25-5\left[2+9-10\right]\div 4$$

$$= 25 - 5[1] \div 4$$

$$= 25 - \frac{5}{4}$$

$$= 25. - 1.25$$

$$= 23.75$$

251. Sol:

Numerator

$$= 2 + \frac{1}{\frac{19}{5}}$$

$$= \frac{2}{1} + \frac{5}{19}$$

$$= \frac{43}{19}$$

Dinominator

$$= 2 + \frac{1}{3 + \frac{1}{1 + \frac{1}{4}}}$$

$$= 2 + \frac{1}{3 + \frac{4}{5}}$$

$$= 2 + \frac{1}{\frac{19}{5}} = 2 + \frac{5}{19}$$

$$= \frac{38 + 5}{19} = \frac{43}{19}$$

$$\frac{N}{D} = \frac{43}{19} \text{ x } \frac{19}{43} = 1$$

252. sol:

$$= \left(\frac{\cancel{7}}{\underset{2}{\cancel{4}}} \text{ x } \frac{\overset{11}{\cancel{22}}}{\cancel{7}} \right) - \left(\frac{35}{8} \div \frac{28}{5} \right)$$

$$= \frac{11}{2} - \left(\frac{35}{8} \text{ x } \frac{5}{28} \right)$$

$$=\frac{11}{2}-\left(\frac{\overset{25}{\cancel{175}}}{\underset{32}{\cancel{224}}}\right)=\frac{11}{2}-\frac{25}{32}$$

(LCM = 32)

$$=\frac{11}{2}\text{ x }\frac{16}{16}-\left(\frac{25}{32}\right)$$

$$=\frac{176-25}{32}$$

$$=\frac{151}{32}$$

$$=4\frac{23}{32}$$

253. Sol:

$$\frac{41}{2}+\frac{91}{3}-\frac{91}{6}$$

$$\frac{123+182}{6}-\frac{91}{6}$$

$$\frac{123+182-91}{6}=\frac{\overset{107}{\cancel{214}}}{\underset{3}{\cancel{6}}}=35\frac{2}{3}$$

254. Sol:

$a = 4, b = 3$

$$\frac{6(4)+4(3)}{6(4)-5(3)}$$

$$=\frac{24+12}{24-15}$$

$$=\frac{36}{9}=4$$

255. **Sol:**

$x=5,\qquad y=8$

$x+5:y+8$

$5+5:8+8$

$10:16$

$5:8$

256. Sol:

$x = 6k$ $\qquad$ $y = \frac{7k}{2}$

$$\frac{x-y}{x+y} + \frac{14}{9}$$

$$\frac{6k - \frac{7k}{2}}{6k + \frac{7k}{2}} + \frac{14}{19}$$

$$\frac{\frac{12k - 7k}{\cancel{2}}}{\frac{12k + 7k}{\cancel{2}}} + \frac{14}{19}$$

$$\frac{5\cancel{k}}{19\cancel{k}} + \frac{14}{19}$$

$$\frac{5+14}{19} = \frac{\cancel{19}}{\cancel{19}} = 1$$

257. Sol:

$a + \cancel{b} = 7$

$a - \cancel{b} = 4$

$2a = 11$

$a = \frac{11}{2}$

$\frac{11}{2} + b = 7$

$b = 7 - \frac{11}{2}$

$b = \frac{14-11}{2} = \frac{3}{2}$

$ab = \frac{11}{2} \text{x} \frac{3}{2} = \frac{33}{4}$

258. Sol:

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

$= \left(\frac{1}{2}\right)^{4}$

$= \frac{1}{16}$

259. Sol:

$$= \sqrt[4]{3^4} + \sqrt[3]{6^3} + \sqrt[5]{2^5}$$
$$= 3 + 6 + 2$$
$$= 11$$

260. Sol:

$$\frac{3^{-6} \text{ x } 2^{-6}}{2^{-8} \text{ x } 3^{-4} \text{ x } 4^{-2}}$$

$$3^{-6} \text{ x } 3^{4} \text{ x } 2^{-6} \text{ x } 2^{8} \text{ x } 4^{2}$$

$$3^{-2} \text{ x } 2^{2} \text{ x } 4^{2} = \frac{2^2 \text{ x } 4^2}{3^2}$$

$$= \frac{4 \text{ x } 16}{9}$$

$$= \frac{64}{9}$$

$$= 7\frac{1}{9}$$

261. Sol:

$$\frac{17.28 \div x}{3.6\text{x}0.2} = 2$$

$$17.28 \div x = 2\text{x}0.72$$

$$x = \frac{17.28}{1.44} = 12$$

262. Sol:

$$x = 1.6666.... \rightarrow (i)$$

$$10x = 16.6666.... \rightarrow (ii)$$

(ii) - (i)

$$9x = 15$$

$$x = \frac{\overset{5}{\cancel{15}}}{\underset{3}{\cancel{9}}} = \frac{5}{3}$$

Shortcut Method

$$1 + \frac{6}{9} = \frac{9+6}{9}$$

$$= \frac{\overset{5}{\cancel{15}}}{\underset{3}{\cancel{9}}} = \frac{5}{3}$$

263. Sol:

$$\frac{1}{6} + \frac{1}{24} + \frac{1}{60} + \frac{1}{120}$$

$$= \frac{20+5+2+1}{120}$$

$$= \frac{\overset{7}{\cancel{14}}}{\underset{\underset{30}{\cancel{60}}}{\cancel{120}}} = \frac{7}{30}$$

264. Sol:

$$\left(\frac{3-1}{3}\right)\left(\frac{4-1}{4}\right)\left(\frac{5-1}{5}\right)\ldots\left(\frac{99}{100}\right)$$

$$\frac{2}{3} \text{ x } \frac{3}{4} \text{ x } \frac{4}{5} \ldots\ldots \frac{99}{100}$$

$$= \frac{\cancel{2}}{\underset{50}{\cancel{100}}} = \frac{1}{50}$$

265. Sol:

(Take (D) option

-47+16 = -31

Another Method :

16+ x = -31

x = -31 - 16

x = -47

266. Sol:

Using Bodmas

$$\left(4.59 \text{ x } 1.8 \div 3.6 + 5.4 + 0.6 - 0.2\right)$$

$$= \overset{2.295}{\cancel{4.59}} \text{ x } \frac{1}{\cancel{2}} + 0.6 - 0.2$$

= 2.895 - 0.200

$= 2.695$

267. Sol:

$3x = 21$

$$x = \frac{21}{3}$$

$$x = 7$$

$$2y = 22$$

$$y = \frac{22}{2}$$

$$y - x = 11 - 7$$

$$y - x = 4$$

268. Sol:

$$\left(\frac{30+12}{12}\right) - \left(\frac{4}{2}\right) + 2$$

$$\left(\frac{\overset{21}{\cancel{42}}}{\underset{6}{\cancel{12}}}\right) - \cancel{2} + \cancel{2}$$

$$= \frac{21}{6}$$

269. Sol:

$(a + b)^3 = a^3 + 3\,a^2b + 3ab^2 + b^3$

$$(0.98 + 0.02)^3$$

$$(1) \quad 1$$

270. Sol:

$4 + 8 = 12 \qquad 12^2 = 144$

$6 + 9 = 15 \qquad 15^2 = 225$

$7 + 10 = 17 \qquad 17^2 = 289$

271. Sol:

Ans

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

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

Ans : $\frac{1}{x^2 - 1}$

272. Sol:

$x = y^a \qquad y = z^b \qquad z = x^c$

$x = \left(z^b\right)^a$

$x = z^{ba}$

$x = \left(x^c\right)^{ba}$

$x = x^{abc}$

$abc = 1$

273. Sol:

$x = \sqrt{2} - \sqrt{3} \rightarrow (i)$

$-x = \sqrt{3} - \sqrt{2}$

$\frac{-1}{x} = \frac{1}{\sqrt{3} - \sqrt{2}}$

$\Rightarrow \frac{-1}{x} = \frac{1}{\sqrt{3} - \sqrt{2}} \text{x} \frac{(\sqrt{3} + \sqrt{2})}{(\sqrt{3} + \sqrt{2})} = \frac{\sqrt{3} + \sqrt{2}}{3 - 2} = \sqrt{3} + \sqrt{2}$

$\frac{-1}{x} = \sqrt{3} + \sqrt{2} \rightarrow (ii)$

$x = \sqrt{2} - \cancel{\sqrt{3}} \rightarrow (i)$

$\frac{-1}{x} = \cancel{\sqrt{3}} + \sqrt{2} \rightarrow (ii)$

(1) + (2)

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

÷2 both the sides

$\frac{1}{}\left(\quad - \frac{1}{}\right) = \frac{1}{\cancel{2}} \text{ x } \cancel{2}\sqrt{\ }$

$\sqrt{2} = \frac{1}{2}\left(x - \frac{1}{x}\right)$

274. Sol:

$\frac{ab}{a+b} = \frac{3^*(3^*(-1))}{3^* + (3^*(-1))}$

$= \frac{3(-3)}{3 + (-3)}$

$= -3$

275. Sol:

$$\frac{\cancel{(a+b)}\left(a^2-ab+b^2\right)}{\cancel{(a+b)}^{2}} \times \frac{\cancel{(a+b)}\cancel{(a-b)}}{\cancel{(a-b)}}$$

$$= a^2 - ab + b^2$$

276. Sol:

$$x+\frac{1}{x} = 2+\sqrt{3}+\frac{1}{2+\sqrt{3}}$$

$$= 2+\sqrt{3}+\frac{1}{2+\sqrt{3}}\left(\frac{2-\sqrt{3}}{2-\sqrt{3}}\right)$$

$$= 2+\sqrt{3}+\frac{2-\sqrt{3}}{4-3}$$

$$= 2\cancel{+\sqrt{3}}+2\cancel{-\sqrt{3}}$$

$$= 4$$

277. Solution:

Take (D) option

$$\frac{x^2-1}{x}+\frac{1}{x}$$

$$\Rightarrow \frac{x^2-1+1}{x}$$

$$\Rightarrow \frac{x^2}{x}$$

$$\Rightarrow x$$

Answer: $\frac{x^2-1}{x}$

278. Sol:

$$= \frac{x^2}{\left(x^2\right)^2-\left(y^2\right)^2} - \frac{y^2}{\left(x^2\right)^2-\left(x^2\right)^2}$$

$$= \frac{x^2}{\left(x^2-y^2\right)\left(x^2+y^2\right)} - \frac{y^2}{\left(x^2-y^2\right)\left(x^2+y^2\right)}$$

$$= \frac{\cancel{x^2-y^2}}{\cancel{\left(x^2-y^2\right)}\left(x^2+y^2\right)}$$

$$=\frac{1}{\left(x^2+y^2\right)}$$

279. Sol:

$$a+b+c=0$$

$$a^3+b^3+c^3=3abc$$

$$a=x-y, \qquad b=y-z, \qquad c=z-x$$

$$a^3+b^3+c^3=3abc$$

$$\frac{(x-y)^3+(y-z)^3+(z-x)^3}{9(x-y)(y-z)(z-x)}=\frac{\cancel{3}\,\cancel{abc}}{\cancel{9}_{3}\,\cancel{abc}}$$

$$\frac{(x-y)^3+(y-z)^3+(z-x)^3}{9(x-y)(y-z)(z-x)}=\frac{1}{3}$$

280. Sol:

P = 9 எனில் $\sqrt[3]{\left(P(P^2+3P+3\right)+1}=?$

P =9

$$\sqrt[3]{\left(P(P^2+3P+3\right)+1}$$

$$=\sqrt[3]{\left(9(81+27+3\right)+1}$$

$$=\sqrt[3]{\left(9(111)\right)+1}$$

$$=\sqrt[3]{999+1}$$

$$=\sqrt[3]{1000}$$

$$=\sqrt[3]{10\text{x}10\text{x}10}$$

$$=10$$

281. Sol:

$$\frac{a^3}{a-b}+\frac{b^3}{b-a}$$

$$=\frac{1}{a-b}\left(a^3-b^3\right)$$

$$=\frac{1}{\cancel{a-b}}\cancel{(a-b)}\left(a^2+ab+b^2\right)$$

$$=a^2+ab+b^2$$

282 Sol:

$$\left(X^2\right)^2-\left(Y+Z\right)^2.$$

$x^4 - (y + z)^2 = (x^2)^2 - (y+z)^2$

$$a^2-b^2=\left(a+b\right)\left(a-b\right)$$

$$\left(X^2+Y+Z\right)\left(X^2-Y-Z\right)$$

283. Sol:

$$\frac{x^3}{x-2}-\frac{2^3}{x-2}$$

$a^3 - b^3 = (a^2 + ab + b^2)(a - b)$

$$\frac{x^3-2^3}{x-2}=\frac{\cancel{\left(x-2\right)}\left(x^2+2x+4\right)}{\cancel{x-2}}$$

$$=x^2+2x+4$$

284. Sol:

$$\frac{\cancel{x^2}\left(x^2-y^2\right)}{\cancel{y^2}\left(y^2-x^2\right)}\text{x}\frac{\cancel{y^2}}{\cancel{x^2}}$$

$$\frac{\left(x^2-y^2\right)}{-\left(x^2-y^2\right)}=-1$$

285. Sol:

$$\frac{1}{x}=\frac{1}{3+2\sqrt{2}}\text{x}\frac{3-2\sqrt{2}}{3-2\sqrt{2}}$$

$$=\frac{3-2\sqrt{2}}{3^2-\left(2\sqrt{2}\right)^2}$$

$$=\frac{3-2\sqrt{2}}{9-4\text{x}2}=\frac{3-2\sqrt{2}}{9-8}=3-2\sqrt{2}$$

$$x+\frac{1}{x}=3+\cancel{2\sqrt{2}}+3-\cancel{2\sqrt{2}}=6$$

$$x+\frac{1}{x}-2=4$$

$$\left(\sqrt{x}-\frac{1}{\sqrt{x}}\right)^2=4$$

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

286. Sol:

5	9	6	84
7	3	7	70
8	6	4	56
5	x	3	36

$5 + 9 * 6 = 84$
$7 + 3 * 7 = 70$
$8 + 6 * 4 = 56$
$5 + x * 3 = 36$

$$x = \frac{\overset{12}{\cancel{36}}}{\cancel{3}} - 5$$

$x = 12 - 5 = 7$
$x = 7$

287. Sol:

$1^2 + 2^2 = 5$
$2^2 + 3^2 = 13$
$3^2 + 4^2 = 25$
$4^2 + 5^2 = 16 + 25 = 41$

288. Sol:
$(3 \text{ x } 2) + (5 \text{ x } 4) = 6 + 20 = 26$
$(5 \text{ x } 2) + (4 \text{ x } 8) = 10 + 32 = 42$
$(8 \text{ x } 1) + (3 \text{ x } x) = 44$
$8 + 3x = 44$
$3x = 44 - 8$
$3x = 36$
$x = 12$

289. Sol:
$11 + 8 = 19$
$9 + 4 + 6 = 19$
$3 + 6 + 2 + 8 = 19$
$x = 19$

290. Sol:

Kamesh	Raj			
Somesh	Kamesh	Raj		
Subash	Rajeev	Somesh		
Subash	Rajeev	**Somesh**	Kamesh	Raj

Ans : Somesh

291. Sol:

Second line rotate clock wise 90° opposite

Note:

Number Series

+1, +2, +3, +4.....

-1, -2, -3, -4.....

x1, x2, x3, x4.....

$+1^2, +2^2, +3^2, +4^2$.....

$+1^3, +2^3, +3^3, +4^3$.....

+1, -1, +2, -2, +3, -3.....

292. Sol:

7, 11, 9, 11, 17, 14, 15, 23, 19

7 + 4 = 11; 11 + 4 = 15; 15 + 4 = 19

11 + 6 = 17; 17 + 6 = 23; 23 + 6 = 29

9 + 5 = 14; 14 + 5 = 19; 19 + 5 = 24

Ans: 19, 29, 24

293 Sol:

3 + 11 ⇒ 14 + 5 = 19

5 + 13 ⇒ 18 + 5 = 23

7 + 17 ⇒ 24 + 5 = 29

Ans = 23

394. Sol:

Next next alphabet

DE^2 HI^4 NO^6 VW

295. Sol:

5 + 10 x 2 ⇒ 30

3 + 9 x 2 ⇒ 24

(7 + x) x 2 ⇒ 20

7 + x ⇒ 20 /2 ⇒ 10

x = 10 - 7 = 3

Ans: 3

296. Sol:

Odd numbers 5, 7, 9, 11, 13, ...

1 + 5 = 6

6 + 7 = 13

13 + 9 = 22

22 + 11 = 33

33 + 13 = 46

Ans: 46

297. Sol:

18 + 7 = 25

22 + 13 = 35

x + 8 = 45

x = 45 - 8 = 37

Ans: 37

298. Sol:

$2^3 + 3^3 = 35$

8 + 27 = 35

$3^3 + 4^3 = 91$

$2^3 + 1^3 = 9$

$5^3 + 4^3 = 125 + 64 = 189$

Ans: 189

299. Sol:

1 x 2 = 2 - 1 = 1

2 x 3 = 6 - 1 = 5

3 x 4 = 12 - 1 = 11

4 x 5 = 20 - 1 = 19

Ans: 19

300. Sol:

W - 23,	T-20	Diff--->3
S-19,	D-4	Diff--->15
J-10,	T-20	Diff ---->10
G-7,	P-16	Diff ---->9

Ans : 9