GOVT. PUBLIC EXAMINATION
SSLC - APRIL 2024
ANSWER KEY

PART - I

1) c) 3 2) a) 7 3) d) 2520.
4) c) 31m 5) b) $16x^2$ 6) a) நேர்க்கோடு (straight line) 7) a) 1.4cm
8) b) two (இரண்டு) 9) b) 25 sq.units.
10) a) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ 11) a) 40π sq.units.
12) d) 3:1:2 13) c) 1.05 14) b) 1

PART II

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

16) $f \circ g = g \circ f$

$(3x-2) \circ (2x+k) = (2x+k) \circ (3x-2)$

$3(2x+k) - 2 = 2(3x-2) + k$

$6x + 3k - 2 = 6x - 4 + k$

$2k = -2$

$\boxed{k = -1}$

17) $a^b \times b^a = 800$

$5^2 \times 2^5 = 800$

$a = 5,\ b = 2$ (or) $a = 2,\ b = 5$

18) $\frac{\cancel{4}^{2} x^{\cancel{2}} y}{\cancel{2x^2}} \times \frac{{}^{3}\cancel{6} x z^3}{\cancel{20}_{\cancel{10}\,5}\, y^{\cancel{4}\,3}}$

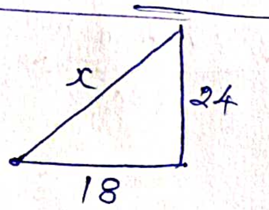
$= \frac{3xz^3}{y^3}$

19) $a = 1,\ b = 8,\ c = -65$

$SOR = \frac{-b}{a} = \frac{-8}{1} = -8$

$POR = \frac{c}{a} = \frac{-65}{1} = -65$

20)



$x^2 = 18^2 + 24^2$

$= 324 + 576$

$x^2 = 900$

$x = 30$ அடி

21) slope of AB = slope of AC
(ABன் சாய்வு) (ACன் சாய்வு)

$\frac{b-9}{a+3} = \frac{-5-9}{4+3}$

$\frac{b-9}{a+3} = \frac{-14}{7}$

$b - 9 = -2(a+3)$

$b - 9 = -2a - 6$

$\boxed{2a + b = 3} \rightarrow (1)$

$\boxed{a + b = 1} \rightarrow (2)$

$(1) - (2) \Rightarrow \boxed{a = 2}$

sub in (2) $\boxed{b = -1}$

22) $y - y_1 = m(x - x_1)$

$y - 2 = \frac{-5}{4}(x+1)$

$4(y-2) = -5(x+1)$

$4y - 8 = -5x - 5$

$5x + 4y - 3 = 0$

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

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

LHS

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

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

(24) $\pi r^2 = 1386$ sq.m.

$TSA = 3\pi r^2 = 3 \times 1386 = 4158$ sq.m

(25) $V = \pi r^2 h = 250 \times 2 = 500$ sq.m.

(26) Range (வீச்சு) $= L - S$

$= 67 - 18 = 49$

Co. of Range (வீச்சுக்கெழு) $= \frac{L-S}{L+S} = \frac{67-18}{67+18} = \frac{49}{85}$

$= 0.576.$

(27) 366 Days = 52 weeks + 2 days.

S = { SM, MT, TW, WT, TF, FS, SS}

$n(S) = 7$

A = 53 saturdays

A = {FS, SS}, $n(A) = 2$,

$P(A) = \frac{n(A)}{n(S)} = \frac{2}{7}$

(28) $23 = (1 \times 12) + 11$

$12 = (1 \times 11) + 1$

$11 = (11 \times 1) + 0$

∴ HCF = 1

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PART - III

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

LHS

$B \cup C = \{0, 1, 2\}$

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

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

RHS

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

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

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

From (1) & (2) LHS = RHS.

(30) $f: A \to B$, $f(x) = 2x + 1$

$f(0) = 0 + 1 = 1$

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

$f(2) = 4 + 1 = 5$

$f(3) = 6 + 1 = 7$

Arrow Diagram (அம்புக்குறி படம்)

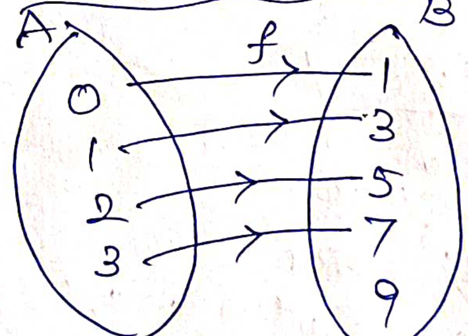

Table (அட்டவணை)

x	0	1	2	3
y	1	3	5	7

as a set of ordered pairs (வ.சோ.க)

$f = \{(0,1), (1,3), (2,5), (3,7)\}$

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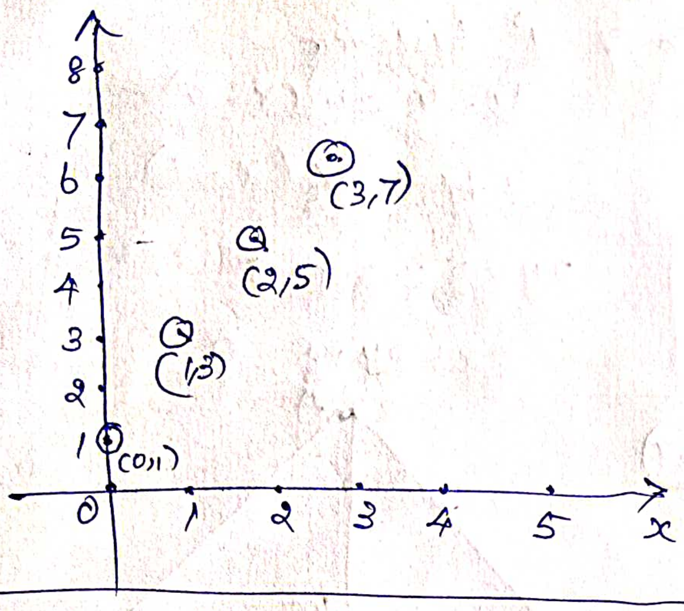
Graph (வரைபடம்)



(31) $9^3+10^3+\cdots+21^3$

$=(1^3+2^3+\cdots+8^3+9^3+\cdots+21^3)$

$\quad-(1^3+2^3+\cdots+8^3)$

$=\left(\frac{21\times22}{2}\right)^2-\left(\frac{8\times9}{2}\right)^2$

$=(21\times11)^2-(4\times9)^2$

$=(231)^2-(36)^2=53361-1296$

$=52065$

(32)

		8	-1	1		
8		64	-16	+17	-2	+1
		64				
		(-)				
16	-1		-16	+17		
			-16	+1		
			+	-		
16	-2	1		16	-2	+1
				16	-2	+1
				-	+	-
					0	

$\sqrt{64x^4-16x^3+17x^2-2x+1}=|8x^2-x+1|$

(33) $A^2=\begin{pmatrix}3&1\\-1&2\end{pmatrix}\begin{pmatrix}3&1\\-1&2\end{pmatrix}$

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

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

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

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

$+\begin{pmatrix}7&0\\0&7\end{pmatrix}=\begin{pmatrix}0&0\\0&0\end{pmatrix}$

$=0$

(34) Statement:-

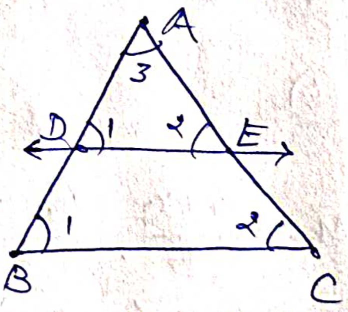
A straight line drawn parallel to a side of triangle intersecting the other two sides, divides the sides in the same ratio.

Proof: Given:

In $\triangle ABC$, D, E are the points on AB and AC respectively.

To prove:

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



Construction:- Draw a line DE∥BC.

$\angle ABC=\angle ADE=\angle 1$ (corresponding angles)

$\angle ACB=\angle AED=\angle 2$ (")

$\angle BAC=\angle DAE=\angle 3$ (common)

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$\Delta ABC \sim \Delta ADE$

$$\frac{AB}{AD} = \frac{AC}{AE}$$

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

$$1 + \frac{DB}{AD} = 1 + \frac{EC}{AE}$$

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

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

(35) $A(-9,-2), B(-8,-4), C(1,-3), D(2,2)$

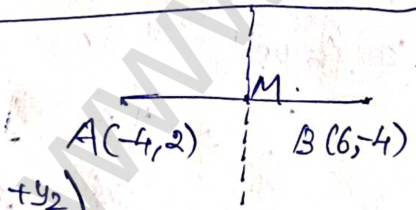
$$A = \frac{1}{2}\left[(x_1-x_3)(y_2-y_4) - (x_2-x_4)(y_1-y_3)\right]$$

$$= \frac{1}{2}\left[(-9-1)(-4-2) - (-8-2)(-2+3)\right]$$

$$= \frac{1}{2}\left[(-10)(-6) - (-10)1\right]$$

$$= \frac{1}{2}\left[60+10\right] = \frac{1}{2} \times 70 = 35 \text{ sq. units.}$$

(36)



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

$$= \left(\frac{-4+6}{2}, \frac{2-4}{2}\right) \Rightarrow M = (1,-1)$$

$$\text{slope of } AB = \frac{y_2-y_1}{x_2-x_1} = \frac{-4-2}{6+4} = \frac{-6}{10}$$

$$m_1 = \frac{-3}{5}$$

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slope of $\perp$ bisector $m = \frac{5}{3}$.

Eqn of $\perp^r$ bisector

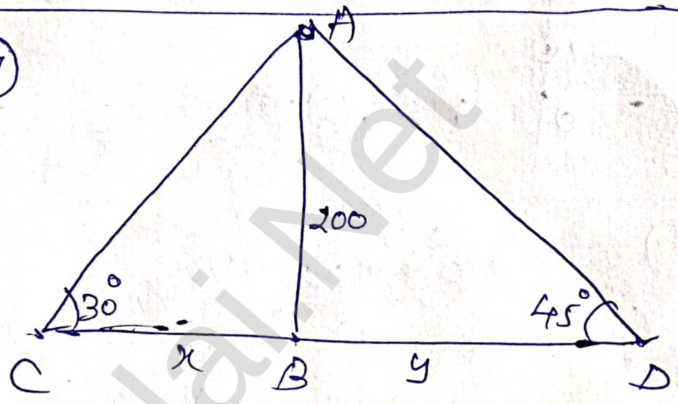
$$y - y_1 = m(x - x_1)$$

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

$$3y + 3 = 5x - 5$$

$$5x - 3y - 8 = 0$$

(37)



In ΔABC,

$$\frac{200}{x} = \tan 30^\circ$$

$$\frac{200}{x} = \frac{1}{\sqrt{3}}$$

$$\boxed{x = 200\sqrt{3}\text{ m}}$$

In ΔABD,

$$\frac{200}{y} = \tan 45^\circ$$

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

$$\boxed{y = 200\text{ m}}$$

Reqd distance $= x + y = 200\sqrt{3} + 200$

$$= 200(1+\sqrt{3}) = 200 \times 2.732$$

$$= 546.4\text{ m}$$

(38) $V = \frac{\pi h}{3}(R^2 + r^2 + Rr)$

$$= \frac{22 \times \cancel{45}^{15}}{7 \times \cancel{3}} \times (28^2 + 7^2 + 28\times 7)$$

$$= \frac{22 \times 15}{7} \times 1029 = 22 \times 15 \times 147$$

$$= 48510\text{ cm}^3$$

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$V_1 = n V_2$

$\pi r_1^2 h_1 = n\left[\frac{1}{3}\pi r_2^2 h_2 + \frac{2}{3}\pi r_2^3\right]$

$\cancel{\pi}\times 6\times 6\times 15 = \cancel{\pi} n\left[\frac{\cancel{3}\times 3\times 9}{\cancel{3}} + \frac{2\times\cancel{3}\times 3\times 3}{\cancel{3}}\right]$

$6\times 6\times 15 = n(27+18)$

$6\times 6\times 15 = 45n$

$\frac{2\cancel{6}\times 6\times \cancel{15}^{1}}{\cancel{45}\ \cancel{3}} = n$

$\boxed{n=12}$

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

$= \frac{180}{6} = 30$

x_i	$d_i = x_i - 30$	d_i^2
24	-6	36
26	-4	16
29	-1	1
31	1	1
33	3	9
37	7	49
	0	112

$\sigma = \sqrt{\frac{\Sigma d^2}{n}} = \sqrt{\frac{112}{6}} = \sqrt{18.67}$

$\sigma = 4.32$

$CV = \frac{\sigma}{\bar{x}} \times 100\%$

$= \frac{4.32}{3\cancel{0}} \times 10\cancel{0}$

$= 1.44 \times 10 = 14.4\%$

(41) $S = \{(1,1)\ldots(6,6)\}$

$n(S) = 36$

A = even number on the first die

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

$n(A) = 18,\ P(A) = \frac{18}{36}$.

B = total of face sum is 8

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

$n(B) = 5,\ P(B) = 5/36$

$A\cap B = \{(2,6),(4,4),(6,2)\}$

$n(A\cap B) = 3,\ P(A\cap B) = 3/36$

$P(A\cup B) = P(A) + P(B) - P(A\cap B)$

$= \frac{18}{36} + \frac{5}{36} - \frac{3}{36} = \frac{20}{36} = \frac{5}{9}$

(42) $7+77+777+\ldots$ upto n terms

$= 7(1+11+111+\ldots$ upto n terms$)$

$= \frac{7}{9}(9+99+999+\ldots$ upto n terms$)$

$= \frac{7}{9}[(10-1)+(100-1)+(1000-1)+\ldots]$

$= \frac{7}{9}\left[\frac{10(10^n-1)}{9} - n\right]$

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PART - IV

43 (a) Draw a triangle.

(or)

(b) Draw two tangents.

Tangent length = 7.4 cm.

44 (a) $2x^2 - 3x - 5$

Vertex $= \frac{-b}{2a} = \frac{-(-3)}{2\times2} = \frac{3}{4}$

$= 0.75$.

When $x=1$, $y = 2(1)^2 - 3(1) - 5$

$= 2 - 3 - 5$

$= -6$.

x	-2	-1	0	1	2	3	4
y	9	0	-5	-6	-3	4	15

9 5 1 3 7 11

$y = 2x^2 - 3x - 5$

$0 = 2x^2 - 4x - 6$

$- \quad + \quad +$

$y = \quad x + 1$

x	-2	-1	0	1	2
y	-1	0	1	2	3

1 1 1 1

subtract add

Solution : $x = -1, x = 3$.

Scale x-axis 1 cm = 1 unit.

y-axis 1 cm = 1 unit.

(b) $xy = 24$, $x, y > 0$

x	2	3	4	6	8	12
y	12	8	6	4	3	2

Indirect variation.

Scale

x-axis 1 cm = 1 unit

y-axis 1 cm = 1 unit.

When $x = 3$, $y = 8$

When $y = 6$, $x = 4$.

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