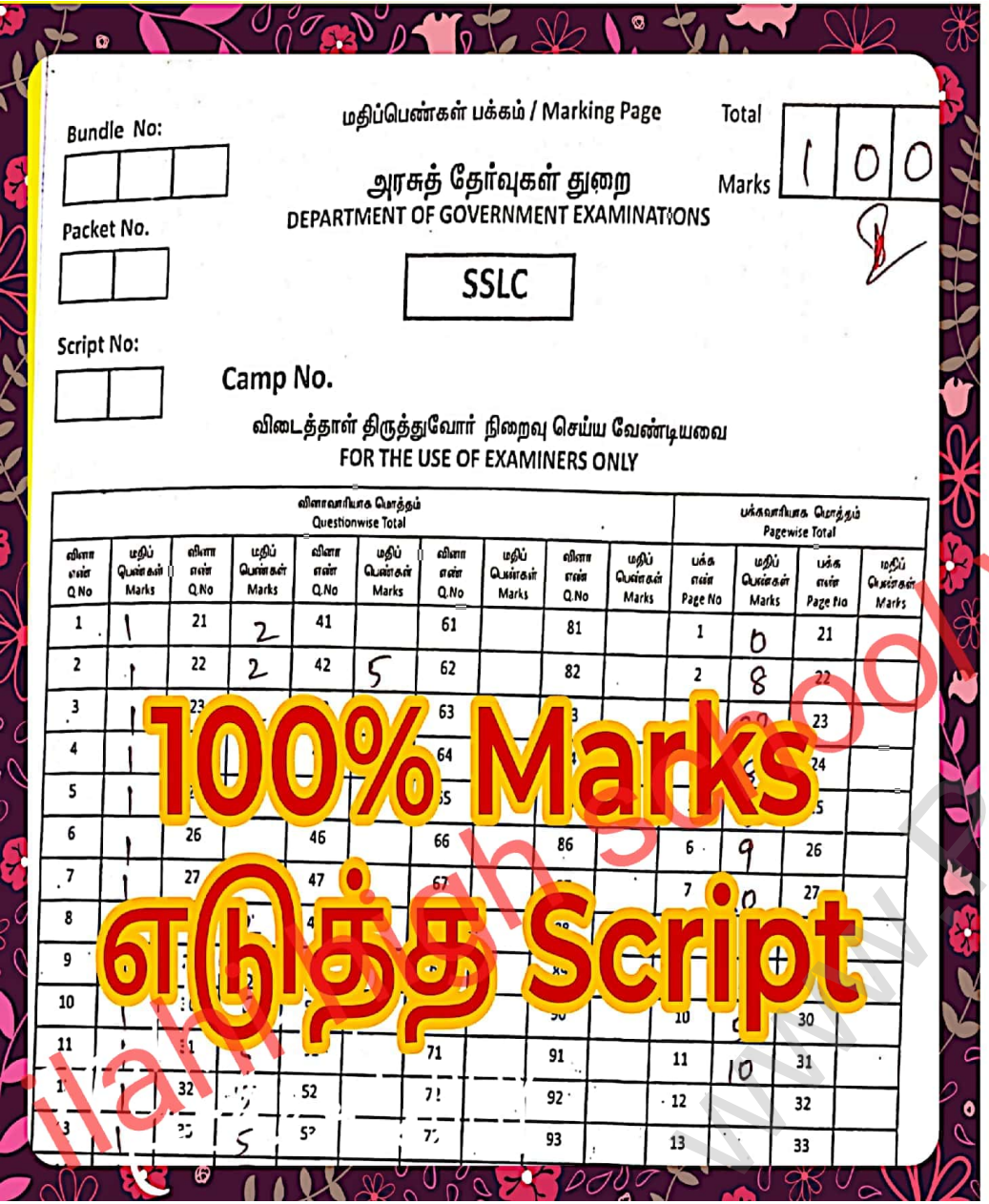


10th Maths

Public Exam

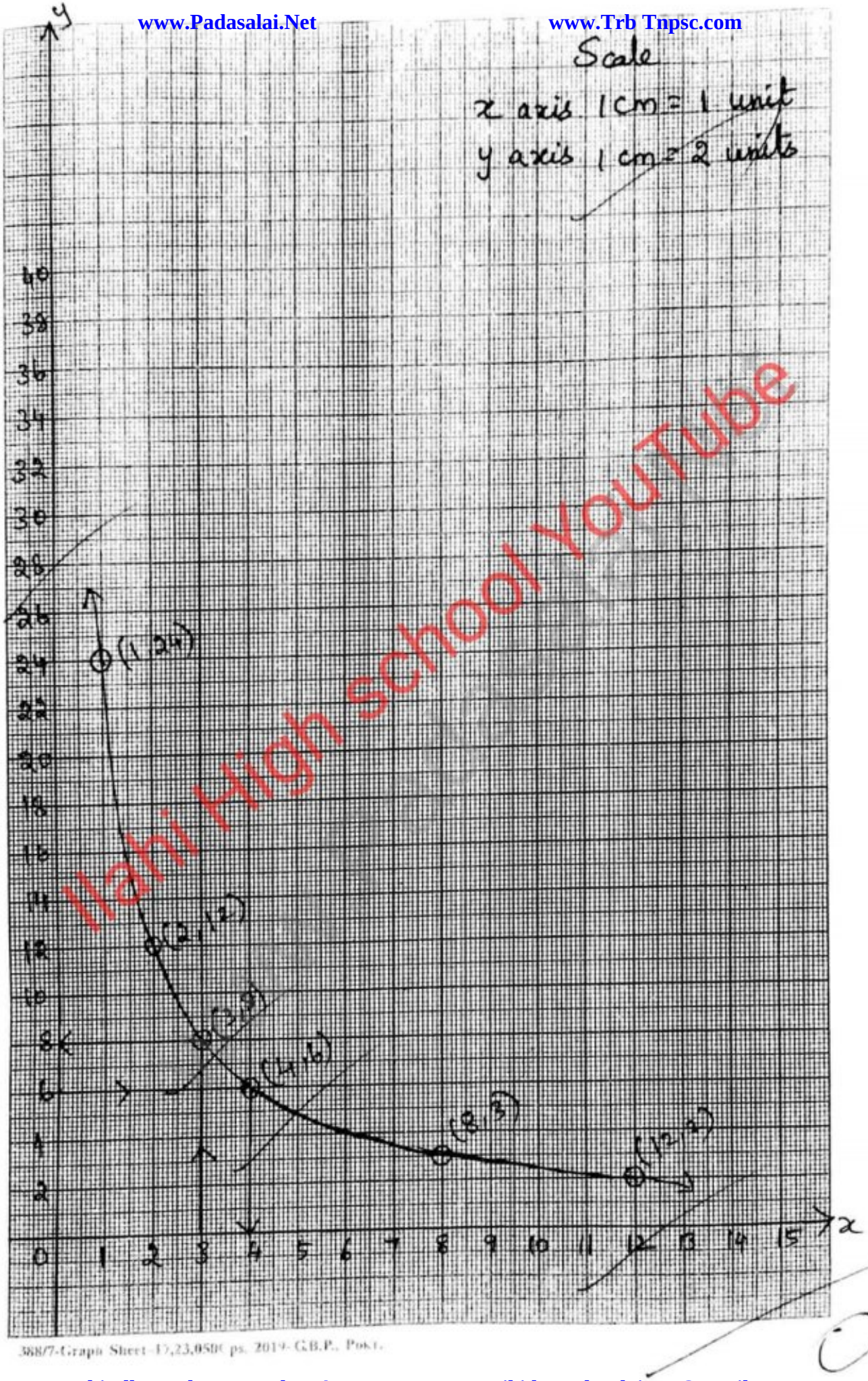
Centum Marks

Paper Presentation

Scale

x axis 1 cm = 1 unit

y axis 1 cm = 2 units



388/7-Graph Sheet-15,23,050(ps. 2019- G.B.P., Pvt.

Qn No

AA (a) $xy = 24$, $x, y > 0$

x	1	2	3	4	8	12
y	24	12	8	6	3	2

As x increases, y decreases.

∴ It is an Indirect variation.

Constant of variation $k = yx$

$k = 24$

From the graph,

(i) when $x = 3$; $y = 8$

(ii) when $y = 6$; $x = 4$

I

(1) a) 7

(2) c) 8

(3) c) 14280

(4) b) $16x^2$

Qn No.

(5) b) 1

(6) b) point of contact

(7) b) 110°

(8) a) $x = 10$

(9) d) 2

(10) a) 20

(11) a) $3328\ \pi\ cm^3$

(12) b) 1 : 2

(13) c) 33.25

(14) c) $\frac{23}{26}$

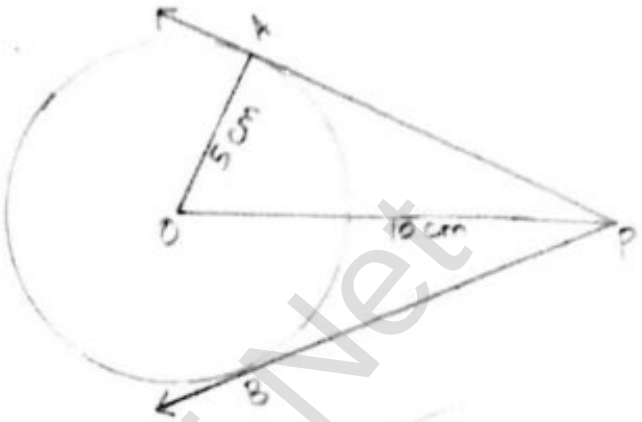
22

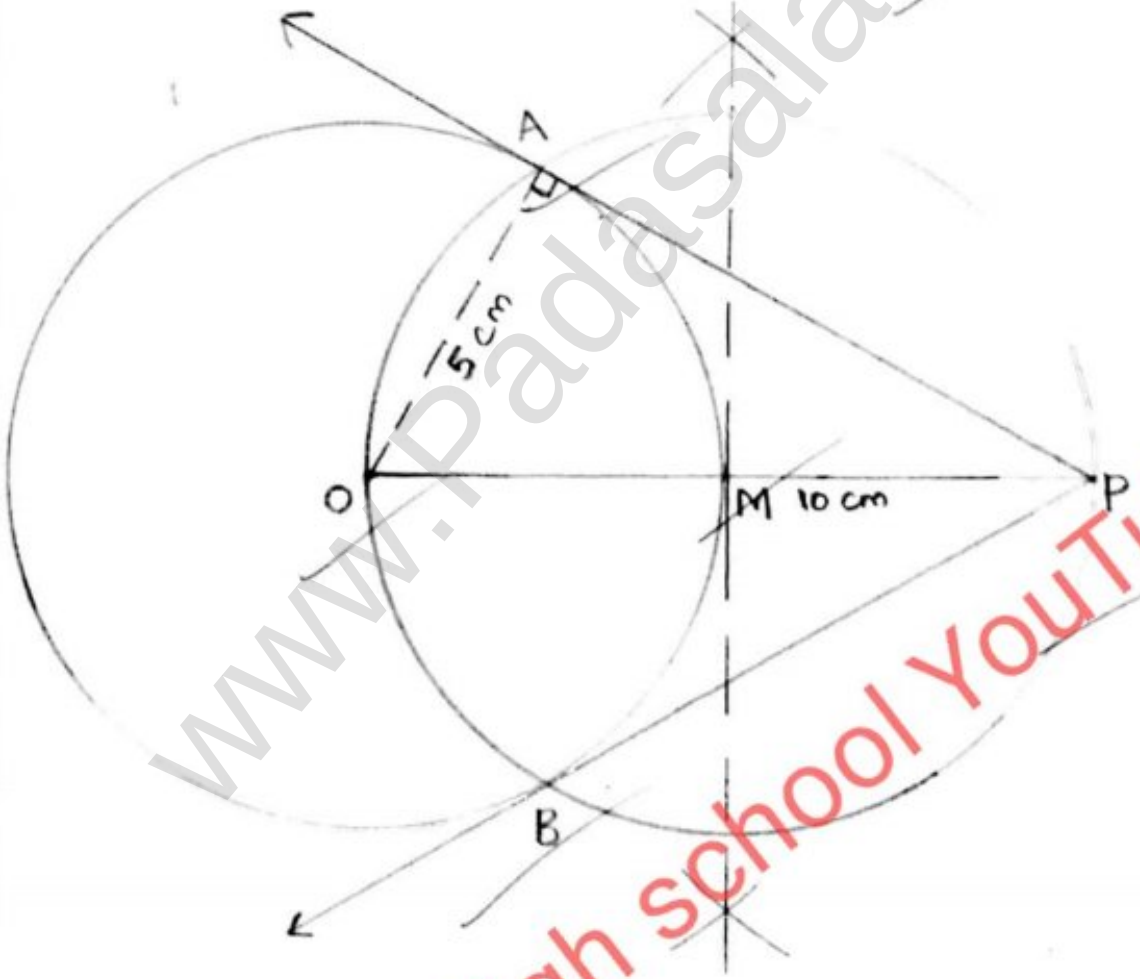
Qn No.

43(b) Radius = 5 cm

Distance of OP = 10 cm

Rough diagram





length of the tangent = 8.7 cm

8

Qn No. 11

15) Given $R = \{(x,y)/y = x+3\}$ and $x \in \{0,1,2,3,4,5\}$

when $x=0$; $y = 0+3 = 3$

$x=1$; $y=4$

$x=2$; $y=5$

$x=3$; $y=6$

$x=4$; $y=7$

$x=5$; $y=8$

$\therefore R = \{(0,3); (1,4), (2,5), (3,6), (4,7), (5,8)\}$

Domain of $R = \{0,1,2,3,4,5\}$

Range of $R = \{3,4,5,6,7,8\}$

16) $X = \{3,4,6,8\}$

$R = \{(x, f(x))/x \in X, f(x) = x^2+1\}$

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

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

$f(4) = 4^2+1 = 17$

$f(6) = 6^2+1 = 37$

$f(8) = 8^2+1 = 65$

$R = \{(3,10)(4,17)(6,37)(8,65)\}$

மதிப்பீடு செய்தார். Qn.No.

Yes, R is a function from X to $\mathbb{N}$. Since all the elements of X are related to some elements of $\mathbb{N}$.

17) $f(x) = 3x-5$

(a,4) mean the image of a is 4

$f(a) = 4$

$3a-5 = 4$

$3a = 9$

$\boxed{a = 3}$

(1,b) means the image of 1 is b.

$f(1) = b$

$3(1)-5 = b$

$\boxed{b = -2}$

18) By Euclid's lemma $a = bq+r$, $0 \le r < b$

$a = 13q+9$

$b = 13q+7$

$c = 13q+10$

$a+b+c = 13q+9+13q+7+13q+10$

$= 39q+(9+7+10) = 39q+26$

$= 13(3q+2)$

which is divisible by 13.

$\therefore a+b+c$ is divisible by 13.

8

Qn.No.

19) $10^4 \equiv x \pmod{19}$

$100 \equiv 5 \pmod{19}$

$(100)^2 \equiv 5^2 \pmod{19}$

$10^4 \equiv 25 \pmod{19}$

$10^4 \equiv 6 \pmod{19}$

$\boxed{x = 6}$

20) $a = t_1 = 3$

$t_2 = 15$

$d = t_2 - t_1 = 15 - 3 = 12$

General term of an A.P. is given by,

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

$= 3 + (n-1)12$

$= 3 + 12n - 12$

$t_n = 12n - 9$

n^{th} term of the A.P. is $12n - 9$

Qn No.

21) $\frac{x^2}{x-y} + \frac{y^2}{y-x}$

$= \frac{x^2}{x-y} - \frac{y^2}{x-y}$

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

22) Given eqn. $7x^2+ax+2=0$

$(\div 7)$ $x^2 + \frac{a}{7}x + \frac{2}{7} = 0$

$\alpha+\beta = -\frac{a}{7}$

$\alpha\beta = \frac{2}{7}$

gn: $\beta-\alpha = \frac{-13}{7} \Rightarrow \alpha-\beta = \frac{13}{7}$

$(\alpha-\beta)^2 = \alpha^2+\beta^2-2\alpha\beta$

$= (\alpha+\beta)^2 - 2\alpha\beta - 2\alpha\beta$

$= (\alpha+\beta)^2 - 4\alpha\beta$

$\left(\frac{13}{7}\right)^2 = \left(\frac{-a}{7}\right)^2 - 4\left(\frac{2}{7}\right)$

$\frac{169}{49} = \frac{a^2}{49} - \frac{8}{7}$

$= \frac{a^2}{49} - \frac{56}{49}$

$(\alpha+\beta)^2 = \alpha^2+\beta^2+2\alpha\beta$

$\alpha^2+\beta^2 = (\alpha+\beta)^2 - 2\alpha\beta$

8

எடுத்தாள் எண்ணர். Qn.No.

$a^2 = 169 + 59 = 225$

$a = \pm 15$

The required value of a is -15 and 15

23) $\begin{pmatrix} d & 8 \\ 3b & a \end{pmatrix} + \begin{pmatrix} 3 & a \\ -2 & -4 \end{pmatrix} = \begin{pmatrix} 2 & 2a \\ b & 4c \end{pmatrix} + \begin{pmatrix} 0 & 1 \\ -5 & 0 \end{pmatrix}$

$d + 3 = 2$

$\boxed{d = -1}$

$8 + a = 2a + 1$

$8 - 1 = 2a - a$

$\boxed{a = 7}$

$3b - 2 = b - 5$

$3b - b = 2 - 5$

$2b = -3$

$\boxed{b = -3/2}$

$a - 4 = 4c$

$7 - 4 = 4c$

$4c = 3$

$\boxed{c = 3/4}$

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

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

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

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

Hence proved.

III

29) Given $A = \{1, 2, 3\}$ $B = \{2, 3, 5\}$

$C = \{3, 4\}$ $D = \{1, 3, 5\}$

$A \cap C = \{1, 2, 3\} \cap \{3, 4\} = \{3\}$

$B \cap D = \{2, 3, 5\} \cap \{1, 3, 5\} = \{3, 5\}$

$(A \cap C) \times (B \cap D) = \{3\} \times \{3, 5\}$

$= \{(3, 3), (3, 5)\}$ ——— (1)

வினா எண். Qn.No.

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

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

$C \times D = \{3,4\} \times \{1,3,5\}$

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

$(A \times B) \cap (C \times D) = \{(3,3),(3,5)\}$ ——— (2)

From (1) and (2)
we have,
$(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$
is true.

30. Area can be decorated $= 10^2 + 11^2 + \ldots + 24^2$

$= (1^2 + 2^2 + \ldots + 24^2) - (1^2 + 2^2 + \ldots + 9^2)$

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

Qn.No

$$= \frac{24 \times 25 \times 49}{1} - \frac{9 \times 10 \times 19}{2}$$

$$= 4900 - 285$$

$$= 4615$$

∴ she can decorate 4615 cm^2 area with these colour papers.

31) $f(x) = 2x^3 - 5x^2 + 5x - 3$ and $g(x) = x^3 + x^2 - x + 2$

$$\begin{array}{r|l} & 2 \\ x^3+x^2-x+2 & 2x^3-5x^2+5x-3 \\ & 2x^3+2x^2-2x+4 \\ & (-)\ (-)\ (+)\ (-) \\ \hline & -7x^2+7x-7 \end{array}$$

$$= -7(x^2 - x + 1)$$

$$\begin{array}{r|l} & x+2 \\ x^2-x+1 & x^3+x^2-x+2 \\ & x^3-x^2+x \\ & (-)\ (+)\ (-) \\ \hline & 2x^2-2x+2 \\ & 2x^2-2x+2 \\ \hline & 0 \end{array}$$

∴ GCD of $(x^3+x^2-x+2,\ 2x^3-5x^2+5x-3)$

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

Rough : $\frac{19}{15}\times$ → 95, 19, 285

4900 (−) 285 → 4615

10

Qn.No.

32)

$$3x^2 + 2x + 4$$

$$3x^2 \;\big)\; 9x^4 + 12x^3 + 28x^2 + ax + b$$

$$9x^4$$

$$12x^3 + 28x^2$$

$$6x^2 + 2x$$

$$12x^3 + 4x^2$$

$$6x^2 + 4x + 4$$

$$24x^2 + ax + b$$

$$24x^2 + 16x + 16$$

$$0$$

$\therefore a = 16, \; b = 16$

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

To prove: $(AB)^T = B^T A^T$

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

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

$$= \begin{pmatrix} 52 & 30 \\ 43 & 3 \end{pmatrix}$$

Qn No.

$$(AB)^T = \begin{pmatrix} 52 & 43 \\ 30 & 3 \end{pmatrix} \quad \text{——— (1)}$$

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

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

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

$$= \begin{pmatrix} 52 & 43 \\ 30 & 3 \end{pmatrix} \quad \text{——— (2)}$$

From (1) and (2) we know,

$$(AB)^T = B^T A^T = \begin{pmatrix} 52 & 43 \\ 30 & 3 \end{pmatrix}$$

Hence verified.

10

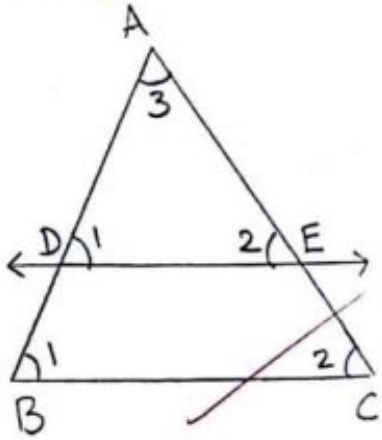
Question Qn No.

34) **Statement:**

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

Proof:

Given: In ΔABC, D is a point on AB and E is a point on AC.



To prove: $\frac{AD}{DB} = \frac{AE}{EC}$

Construction: Draw a line DE || BC

Statement	Reason
1. $\angle ABC = \angle ADE = \angle 1$	Corresponding angles are equal. $\because$ DE || BC
2. $\angle ACB = \angle AED = \angle 2$	Corresponding angles are equal. $\because$ DE || BC
3. $\angle DAE = \angle BAC = \angle 3$	Both triangles have a common angle.

Statement	Reason
$\Delta ABC \sim \Delta ADE$	By AAA similarity
$\frac{AB}{AD} = \frac{AC}{AE}$	corresponding sides are proportional.
$\frac{AD+DB}{AD} = \frac{AE+EC}{AE}$	Split AB and AC using the points D and E.
4. $1 + \frac{DB}{AD} = 1 + \frac{EC}{AE}$	On simplification
$\frac{DB}{AD} = \frac{EC}{AE}$	Cancelling 1 on both sides
$\frac{AD}{DB} = \frac{AE}{EC}$	Taking reciprocals.

Hence proved

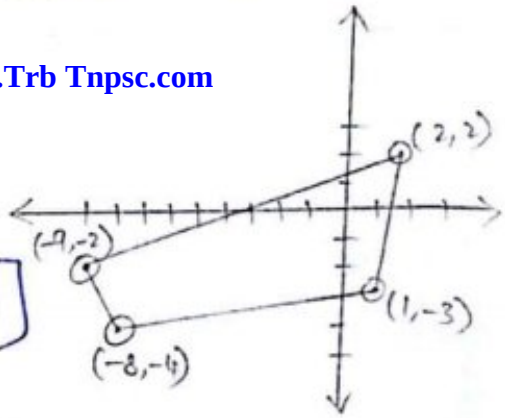
35) Area of quadrilateral $= \frac{1}{2}\begin{bmatrix} x_1 & x_2 & x_3 & x_4 & x_1 \\ y_1 & y_2 & y_3 & y_4 & y_1 \end{bmatrix}$

$= \frac{1}{2}\begin{bmatrix} -9 & -8 & 1 & 2 & -9 \\ -2 & -4 & -3 & 2 & -2 \end{bmatrix}$

$= \frac{1}{2}[(36+24+2-4)-(16-4-6-18)]$

$= \frac{1}{2}[58-(-12)]$

10



Qn.No.

$$= \frac{1}{2}[58+12]$$

$$= \frac{1}{2}(70)$$

Area of quadrilateral 35 sq. units.

---

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

Taking reciprocal on both sides we get,

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

Squaring on both sides,

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

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

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

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

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

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

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

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

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

From (1) and (2)

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

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

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

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

Hence proved.

Qn.No

39) Height of the frustum $h = 45$ cm

Radii of ends $R = 28$ cm

$r = 7$ cm

Volume of frustum $= \frac{1}{3}\pi h\left[R^2 + Rr + r^2\right]$ cu. units

$= \frac{1}{3} \times \frac{22}{7} \times 45\left[28^2 + (28 \times 7) + 7^2\right]$

$= \frac{1}{\cancel{3}} \times \frac{22}{\cancel{7}} \times \overset{15}{\cancel{45}} \times \overset{147}{\cancel{1029}}$

$= 48510$

$\therefore$ Volume of the frustum of a cone $= 48510$ cm^3.

---

42) inner diameter of the sphere = 14 cm

inner radius $r = 7$ cm

thickness = 1 mm

Outer radius = 7 cm + 0.1 cm

$R = 7.1$ cm

Volume of the hollow sphere $= \frac{4}{3}\pi\left(R^3 - r^3\right)$

வினா எண். Qn No.

$$= \frac{4}{3} \times \frac{22}{7} (7.1^3 - 7^3)$$

$$= \frac{4}{3} \times \frac{22}{7} (357.911 - 343)$$

$$= \frac{4}{3} \times \frac{22}{7} \times 14.911$$

$$= 62.48 \text{ cm}^3$$

Density of the sphere = 17.3 g/cm³

weight of the hollow sphere

= Density × Volume

= 17.3 × 62.48

= 1080.9 g.

Rough work:

71 × 71 = 5041

497 × 71 = 35287

5041 × 71 = 357911

343 · 14.911 × 88 = 119288

357.911 − 119288 = 131.2168

1312.168 / 21 = 62.48

10

மதிப்பெண்கள் பக்கம் / Marking Page

Bundle No:

Packet No.

Script No:

அரசுத் தேர்வுகள் துறை
DEPARTMENT OF GOVERNMENT EXAMINATIONS

SSLC

Camp No.

Total Marks: 100

விடைத்தாள் திருத்துவோர் நிறைவு செய்ய வேண்டியவை
FOR THE USE OF EXAMINERS ONLY

வினாவாரியாக மொத்தம் Questionwise Total										பக்கவாரியாக மொத்தம் Pagewise Total			
வினா எண் Q.No	மதிப் பெண்கள் Marks	வினா எண் Q.No	மதிப் பெண்கள் Marks	வினா எண் Q.No	மதிப் பெண்கள் Marks	வினா எண் Q.No	மதிப் பெண்கள் Marks	வினா எண் Q.No	மதிப் பெண்கள் Marks	பக்க எண் Page No	மதிப் பெண்கள் Marks	பக்க எண் Page No	மதிப் பெண்கள் Marks
1	1	21	2	41		61		81		1	0	21	
2	1	22	2	42	5	62		82		2	8	22	
3	1	23	2	43	8	63		83		3	22	23	
4	1	24		44	8	64		84		4	8	24	
5	1	25		45		65		85		5	8	25	
6	1	26		46		66		86		6	9	26	
7	1	27		47		67		87		7	10	27	
8	1	28	2	48		68		88		8	10	28	
9	1	29	5	49		69		89		9	10	29	
10	1	30	5	50		70		90		10	5	30	
11	1	31	5	51		71		91		11	10	31	
12	1	32	5	52		72		92		12		32	
13	1	33	5	53		73		93		13		33	
14	1	34	5	54		74		94		14		34	
15	2	35	5	55		75		95		15		35	
16	2	36		56		76		96		16		36	
17	2	37	5	57		77		97		17		37	
18	2	38		58		78		98		18		38	
19	2	39	5	59		79		99		19		39	
20	2	40		60		80		100		20		40	
மொத்தம் TOTAL	26	மொத்தம் TOTAL	53	மொத்தம் TOTAL	21	மொத்தம் TOTAL		மொத்தம் TOTAL		மொத்தம் TOTAL	100	மொத்தம் TOTAL	

வினாவாரியாக ஒட்டு மொத்தம்
Question-wise Grand Total: 100

பக்கவாரியாக் ஒட்டு மொத்தம்
Page-wise Grand Total: 100

AE: SO: CE:

388/1 - 15,50,000 Cps.-GBP., Vdm. - 2018.

COMMON FIRST REVISION TEST - 2023

T

Standard X

Reg.No. | | | | | | |

MATHEMATICS

Time : 3.00 hrs *Marks : 100*

Part - I

I. Choose the correct answer: 14 x 1 = 14

1. If f : A → B is a bijective function and if n(B)=7, then n(A) is equal to
   a) 7 b) 49 c) 1 d) 14
2. In an A.P, the first term is 1 and the common difference is 4. How many terms of the A.P. must be taken for their sum to be equal to 120?
   a) 6 b) 7 c) 8 d) 9
3. The value of $(1^3 + 2^3 + 3^3 + ... + 15^3) - (1 + 2 + 3 + ... + 15)$ is
   a) 14400 b) 14200 c) 14280 d) 14520
4. Which of the following should be added to make $x^4 + 64$ a perfect square
   a) $4x^2$ b) $16x^2$ c) $8x^2$ d) $-8x^2$
5. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis is
   a) 0 b) 1 c) 0 or 1 d) 2
6. A tangent is perpendicular to the radius at the
   a) centre b) point of contact c) infinity d) chord
7. The two tangents from an external points P to a circle with centre at O are PA and PB. If ∠APB = 70°, then the value of ∠AOB is
   a) 100° b) 110° c) 120° d) 130°
8. A man walks near a wall, such that the distance between him and the wall is 10 units. Consider the wall to be the Y axis. The path travelled by the man is
   a) x = 10 b) y = 10 c) x = 0 d) y = 0
9. The slope of the line joining (12, 3), (4, a) is $\frac{1}{8}$. The value of 'a' is
   a) 1 b) 4 c) –5 d) 2
10. If sinθ + cosθ = a and secθ + cosecθ = b, then the value of $b(a^2 - 1)$ is equal to
    a) 2a b) 3a c) 0 d) 2ab
11. A frustum of a right circular cone is of height 16 cm with radii of its ends as 8 cm and 20 cm. Then, the volume of the frustum is
    a) 3328π cm^3 b) 3228π cm^3 c) 3240π cm^3 d) 3340π cm^3
12. The height and radius of the cone of which the frustum is a part are h_1 units and r_1 units respectively. Height of the frustum is h_2 units and radius of the smaller base is r_2 units. If $h_2 : h_1 = 1 : 2$, then $r_2 : r_1$ is
    a) 1 : 3 b) 1 : 2 c) 2 : 1 d) 3 : 1
13. Variance of first 20 natural numbers is
    a) 32.25 b) 44.25 c) 33.25 d) 30
14. If a letter is chosen at random from the English alphabets {a,b,...., z} then the probability that the letter chosen precedes z
    a) $\frac{12}{13}$ b) $\frac{1}{13}$ c) $\frac{23}{26}$ d) $\frac{3}{26}$

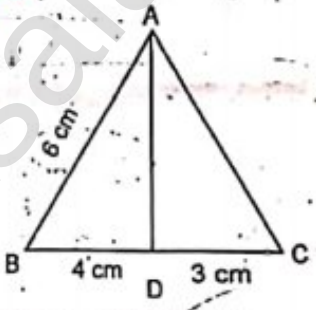
Part - II

II. Answer any 10 questions: (Q.No.28 is compulsory) **10 x 2 = 20**

15. A Relation R is given by the set $\{(x,y) / y = x + 3 / x \in \{0,1,2,3,4,5\}\}$. Determine its domain and range.
16. Let X= {3, 4, 6, 8}. Determine whether the relation $R = \{(x, f(x) \setminus x \in X, f(x) = x^2 + 1\}$ is a function from X to N?
17. Let f be a function from R to R defined by $f(x) = 3x - 5$. Find the values of a and b given that (a, 4) and (1, b) belong to f.
18. When the positive integers a, b and c are divided by 13, the respective remainders are 9,7 and 10. Show that a + b + c is divisible by 13.
19. Compute x, such that $10^4 \equiv x \pmod{19}$
20. Find the n^{th} term (general term) of an A.P. given by 3, 15, 27, 39, ...
21. Simplify : $\frac{x^2}{x-y} + \frac{y^2}{y-x}$
22. If α, β are the roots of $7x^2 + ax + 2 = 0$ and $\beta - \alpha = \frac{-13}{7}$. Find the values of a.
23. Find the value of a, b, c, d, x, y from the following matrix equation.

$$\begin{pmatrix} d & 8 \\ 3b & a \end{pmatrix} + \begin{pmatrix} 3 & a \\ -2 & -4 \end{pmatrix} = \begin{pmatrix} 2 & 2a \\ b & 4c \end{pmatrix} + \begin{pmatrix} 0 & 1 \\ -5 & 0 \end{pmatrix}$$

24. AD is the bisector of $\angle A$. If BD = 4cm, DC =3cm and AB = 6 cm, find AC.



25. Calculate the slope and y intercept of the straight line $8x - 7y + 6 = 0$
26. The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value.
27. The mean of a data is 25.6 and its coefficient of variation is 18.75, Find the standard deviation.
28. Prove that $\frac{\sec\theta}{\sin\theta} - \frac{\sin\theta}{\cos\theta} = \cot\theta$

(OR)

The radius of a sphere increases by 25%. Find the percentage increase in its surface area.

Part - III

III. Answer any 10 questions: (Q.No.42 is compulsory) **10 x 5 = 50**

29. Given A = {1,2,3}, B = {2,3,5}, C = {3,4} and D = {1,3,5}, check if $(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$ is true?
30. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm,..., 24 cm. How much area can be decorated with these colour papers?
31. Find the GCD of the polynomials $x^3 + x^2 - x + 2$ and $2x^3 - 5x^2 + 5x - 3$

32. If $9x^4 - 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of a and b.

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

34. State and Prove Basic proportionality theorem or Thales theorem

35. Find the area of the quadrilateral whose vertices are(–9, –2), (–8, –4), (2, 2) and (1, –3)

36. A(–3,0) B(10,–2) and C(12,3) are the vertices of ΔABC. Find the equation of the altitude through A and B.

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

38. From a point on the ground, the angles of elevation of the bottom and top of a tower fixed at the top of a 30 m high building are 45° and 60° respectively. Find the height of the tower. ($\sqrt{3}$ = 1.732)

39. If the radii of the circular ends of a frustum which is 45 cm high are 28 cm and 7 cm, find the volume of the frustum.

40. The marks scored by 10 students in a class test are 25, 29, 30, 33, 35, 37, 38, 40, 44, 48. Find the standard deviation.

41. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that
    i) The student opted for NCC but not NSS.
    ii) The student opted for NSS but not NCC.
    iii) The student opted for exactly one of them.

42. From a window (h metres high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are @ and 6, respectively. Show that the height of the opposite house is

$$h\left(1+\frac{\cot\theta_2}{\cot\theta_1}\right)$$ *(OR)*

Calculate the weight of a hollow brass sphere if the inner diameter is 14 cm and thickness is 1 mm, and whose density is 17.3 g/cm^3

Part - IV

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

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3}$). *(OR)*

    b) Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 5 cm. Also, measure the lengths of the tangents.

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

    b) Graph the $x^2 - 9x + 20 = 0$ quadratic equation and state the nature of solution.

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