Shri Maruthi Matric Hr Sec School.
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(S.S.L.C) Quarterly Examination - 2017
Maths → Answer Key.

I. Part-A

1) a) $\{P, q\}$
2) c) 5
3) d) 0
4) a) a/b
5) a) k^2
6) a) has infinitely Many Solution
7) c) $x+1$
8) a) $(x-5)(x-3)$
9) d) $M=n$
10) b) 4×4
11) a) 4 : 3
12) b) 2 Sq. units
13) d) 40°
14) b) 4 : 9
15) a) $\cos\theta$

II 2 mark Part-B

16) $B \cup C = \{1,2,3,4,5,6\}$

$A \cap (B \cup C) = \{1,2,3,4,5,6,7,8,9\}$

17) 

18) $F_n = F_{n-1} + F_{n-2}$

$F_1 = F_2 = 1$

$F_3 = F_{3-1} + F_{3-2}$

$= F_2 + F_1$

$F_3 = 2$

$F_4 = F_3 + F_2 = 3 = F_4$

$F_5 = 6$

19) Given $a=1$ $r=2$

$t_n = 1024$

$t_n = ar^{n-1}$

$1 \times 2^{n-1} = 1024$

$2^{n-1} = 2^{10}$

$n-1 = 10$

$n = 11$

20) Let x be number of Pencil
Let y be number of erasers

$11x + 3y = 50$ — (1)

$8x + 3y = 30$ — (2)

Solv (1) & (2)

$x = 4$

Sub x in (1) equation

$y = 2$

$\therefore (4,2) = (x,y)$

21) $P(x) = x^3 + x^2 - 7x - 3$

Zero is divisor is 3.

3	1	1	-7	-3
	0	3	12	15
	1	4	5	12 – R

$P(x)$ is divided by $x-3$

Quotient x^2+4x+5

Remainder is 12.

22) $\frac{x^3+1}{x^2+2} + \frac{3x^3+2x^2+4}{x^2+2}$

$= \frac{4x^3+2x^2+3}{x^2+2}$

23) $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{bmatrix}$ $a = i/j$; $i = 1,2,3$; $j = 1,2$

$A = \begin{bmatrix} 1 & 1/2 \\ 2 & 1 \\ 3 & 3/2 \end{bmatrix}$

(24) $A = \begin{pmatrix} 2 & 3 \\ -9 & 5 \end{pmatrix} - \begin{pmatrix} 1 & 5 \\ 7 & -1 \end{pmatrix}$

$= \begin{pmatrix} 2-1 & 3-5 \\ -9-7 & 5+1 \end{pmatrix}$

$-A = \begin{pmatrix} 1 & -2 \\ -16 & 6 \end{pmatrix}$

(25) $\left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right)$

$\left(\frac{4+3+5}{3}, \frac{-6-2+2}{2}\right)$

$= (4, -2)$

(26) x- axis

$\therefore$ Slop of CD $\Rightarrow$

$\theta = 0$

$M = \tan\theta$

$= 0$

$\boxed{M = 0}$

(27) $M = \frac{2}{3}$

Point $(x_1, y_1) = (5, -4)$

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

$y + 4 = \frac{2}{3}(x - 5)$

$5y + 12 = 2x - 10$

$2x - 5y - 22 = 0$

(28) $\operatorname{cosec}^2(90-\theta) - \cot^2(90-\theta)$

$= \sec^2\theta - \tan^2\theta$

$= 1$

(29) $\frac{AB}{QR} = \frac{PB}{PR}$

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

$3 \times 6 = 2QR \Rightarrow \boxed{QR = 9\text{cm}}$

(30) (a) $f(x) = 1/x$

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

$f(-1) = -1$

$f(1) = 1$

$f(2) = 1/2$

$f(x) = \{-1/2, 1, -1, +1/2\}$

A to A is not function.

$-1/2, 1/2 \notin A$.

(b)

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

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

$= \tan\theta\left(\frac{\cos^2\theta-\sin^2\theta}{\cos^2\theta-\sin^2\theta}\right)$

$= \tan\theta.$

Part-C 5 mark

(31) L.H.S $A \setminus (B \cap C)$

$B \cap C = \{15, 20\}$

$A \setminus (B \cap C) = \{10, 25, 30, 35, 40, 45, 50\}$

R.H.S

$(A \setminus B) = \{25, 35, 40, 45, 50\}$

$(A \setminus C) = \{10, 25, 30, 40, 50\}$

$(A \setminus B) \cup (A \setminus C) = \{10, 25, 30, 40, 45, 50\}$

L.H.S = R.H.S

(32) $n(A) = 65$

$n(B) = 45$

$n(C) = 42$

$n(A \cap B) = 20$

$n(B \cap C) = 25$

$n(A \cap C) = 15$

$n(A \cap B \cap C) = 8$

$n(A \cup B \cup C) = 65 + 45 + 42 - 20 - 25 - 15 + 8$

$= 100$

Number of students in group = 100.

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

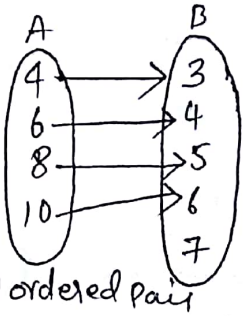
$f(4) = \frac{4}{2} + 1 = 3$

$f(6) = \frac{6}{2} + 1 = 4$

$f(8) = \frac{8}{2} + 1 = 5$

$f(10) = \frac{10}{2} + 1 = 6$

(i) An arrow diagram :-



(ii) ordered pair

$f = \{(4,3), (6,4), (8,5), (10,6)\}$

(iii)

x	4	6	8	10
f(x)	3	4	5	6

(34) 308, 319, ... 495

$a = 308 \quad l = 495$

$d = 11$

Also; $l = a + (n-1)d$

$n = \frac{l-a}{d} + 1$

$= \frac{495-308}{11} + 1$

$\boxed{n = 18}$

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

$S_{18} = \frac{18}{2}[308+495]$

$= 9[803]$

$\boxed{S_{18} = 7227}$

(35)

$S_n = 4 + 44 + 444 + \dots$

$= 4(1 + 11 + 111 + \dots)$

$= \frac{4}{9}(9 + 99 + 999 + \dots)$

$= \frac{4}{9}((10-1) + (100-1) + \dots)$

$= \frac{4}{9}[10 + 10^2 + \dots - n]$

$= \frac{4}{9}\left[\frac{10(10^n-1)}{9} - n\right]$

$= \frac{40}{81}(10^n - 1) - \frac{4n}{9}$

(36) $2x^3 - 3x^2 - 3x + 2 = P(x)$

-1	2	-3	-3	2
	0	-2	5	-2
	2	-5	2	0

$(x+1)$ is a factor $P(x)$

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

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

$\therefore (x+1)(x-2)(2x-1)$.

(37)

$x^3 + x^2 - 5x + 3$) $x^4 + 3x^3 - x - 3$ ($x + 2$

$x^4 + x^3 - 5x + 3x$

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

$2x^3 + 2x^2 - 10x + 6$

$3x^2 + 6x - 9$

$\div 3 \quad x^2 + 2x - 3$

$x^2 + 2x - 3$) $x^3 + x^2 - 5x + 3$ ($x - 1$

$x^3 + 2x^2 - 3x$

$-x^2 - 2x + 3$

$-x^2 - 2x + 3$

0

G.C.D is $x^2 + 2x - 3$ //

(38)

Man = x boy = y

1 man $\Rightarrow 1/x$

1 boy = $1/y$

$\frac{8}{x} + \frac{12}{y} = \frac{1}{10}$

$\frac{6}{x} + \frac{8}{y} = \frac{1}{14}$

$8a + 12b = \frac{1}{10}$

$6a + 8b = \frac{1}{14}$

$a = \frac{1}{140} \quad b = \frac{1}{280}$

$\boxed{x = 140}$ $\boxed{y = 280}$

(39)

$B + C = \begin{pmatrix} -2 & 5 \\ 6 & 7 \end{pmatrix} + \begin{pmatrix} 1 & 1 \\ -5 & 3 \end{pmatrix}$

$= \begin{pmatrix} -1 & 6 \\ 1 & 10 \end{pmatrix}$

$A(B+C) = \begin{pmatrix} 3 & 2 \\ -1 & 4 \end{pmatrix}\begin{pmatrix} -1 & 6 \\ 1 & 10 \end{pmatrix}$

$= \begin{pmatrix} -1 & 38 \\ 5 & 34 \end{pmatrix} - (1)$

Now,

$AB + AC = \begin{pmatrix} 6 & 29 \\ 26 & 23 \end{pmatrix} + \begin{pmatrix} -7 & 9 \\ -21 & 11 \end{pmatrix}$

$= \begin{pmatrix} -1 & 38 \\ 5 & 34 \end{pmatrix}$

$A(B+C) = AB + AC$

(40)

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

$4A = \begin{pmatrix} 4 & -4 \\ 8 & +12 \end{pmatrix}$

$5I_2 = \begin{pmatrix} 5 & 0 \\ 0 & 5 \end{pmatrix}$

$A^2 - 4A + 5I_2 = 0$ //

(3)

(41)

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

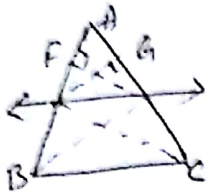
$$= \frac{1}{2}\begin{Bmatrix} -5 & 4 & 1 & -3 & -5 \\ -6 & -1 & 2 & 4 & -6 \end{Bmatrix}$$

$$= \frac{1}{2}\{35 + 51\}$$

$$= \frac{1}{2}(86)$$

$$= 43 \text{ sq units.}$$

(42)



ΔABC, $l \parallel BC$

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

Join BE, CD

draw $EF \perp AB$ &

$DG \perp CA$

$\text{Area}(\Delta ADE) = \frac{1}{2} AD \times EF$

$\text{Area}(\Delta DBE) = \frac{1}{2} BD \times EF$

$\therefore \frac{\text{area}(\Delta ADE)}{\text{area}(\Delta DBE)} = \frac{AD}{DB} \rightarrow (1)$

$\therefore \frac{\text{area } \Delta ADE}{\text{area } \Delta DCE} = \frac{AE}{EC}$.

$\therefore \text{area}(\Delta DBE) = \text{area}(\Delta DCE)$

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

Hence the theorem.

(43)

$M = \tan\theta + \sin\theta$

$N = \tan\theta - \sin\theta$

$M^2 - N^2 = 4 \sin\theta \tan\theta \rightarrow (1)$

$4\sqrt{mn} = 4\sqrt{\sin^2\theta \tan^2\theta}$

$= 4 \sin\theta \tan\theta \rightarrow (2)$

From (1) & (2)

$M^2 - N^2 = 4\sqrt{mn}$.

(45)

(a) $a = a$, $b = ar$, $c = ar^2$

$d = ar^3$

Now,

$= (ar - ar^2)^2 + (ar^2 - a)^2 + (ar^3 - ar)^2$

$= a^2[r^6 - 2r^3 + 1]$

$= a^2[r^3 - 1]^2$

$= (ar^3 - a)^2$

$= (a - ar^3)^2$

$= (a - d)^2$.

(b)

$P = \frac{x}{x+y}$ $Q = \frac{y}{x+y}$

$\frac{1}{P-Q} - \frac{2Q}{P^2 - Q^2}$

$= \frac{1}{P-Q} - \frac{2Q}{(P-Q)(P+Q)}$

$= \frac{P+Q-2Q}{(P-Q)(P+Q)}$

$= \frac{P-Q}{(P+Q)(P-Q)} = \frac{1}{P+Q}$

$= \frac{1}{\frac{x+y}{x+y}} = 1$

(46)

(a) Rough diagram - 2 cm

Fair diagram - 7 cm

Verification - 1 cm

$\therefore PA = \sqrt{OP^2 - OA^2}$

$= \sqrt{7^2 - 1^2}$

$= \sqrt{49 - 1}$

$= \sqrt{48}$

$PA = 6.4$ cm

(47)

(b)

x	100	200	300	400
y	10	20	30	40

Direct Variation

$y \propto x$

$y = kx$

$k = y/x$

$k = \frac{10}{100} = \frac{20}{200} \ldots$

$k = 1/10$

$y = \frac{x}{10}$

$\therefore x = 650 \Rightarrow y = 65$

$y = 45 \Rightarrow x = 450$

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