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QUARTERLY EXAMINATION: 2022

STD: X ANSWER KEY MATHEMATICS

I Answer the following: 1m

1. 3 - (C)
2. 7 - (A)
3. Quadratic - (D)
4. 2520 - (D)
5. $\frac{1}{27}$ - (B)
6. 1 - (A)
7. $x=1, y=2, z=3$ - (A)
8. $\frac{16}{5}\left|\frac{xz^2}{y}\right|$ - (D)
9. 70° - (B)
10. 120° - (A)
11. Parallel to Y-axis - (B)
12. Two parallel and two non-parallel sides - (B)
13. $x+y=3, 3x+y=7$ - (B)
14. 1 - (B)

II Answer the following 2m

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

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

16. No, not a function — (1)
Reason- Vertical line test fails (1)

17. $fog = 2(x^2-2)+1$ (or)
$= 2x^2-3$ — (1)

$gof = (2x+1)^2-2$ (or)
$= 4x^2+4x-1$ — (1)

18. $7 \times 5 \times 3 \times 2 + 3$

$3 \times [7 \times 5 \times 2 + 1]$ — (1)

$3 \times 71 \rightarrow$ Yes, Composite no.

*A composite no. is a prod. of prime nos. — (1)

19. 8, 24, 72, 216, 648, 1944 (1) (1)

20. $1+2+\cdots+60$ — (1)

$= \frac{60 \times 61}{2} = 1830$ — (1)

21. $8x^4y^2, 48x^2y^4$

LCM $= 48x^4y^4$ (1) (1)

22. $\frac{4x^2y}{2x^2} \times \frac{6xz^3}{20y^4} = \frac{3xz^3}{5y^3}$ (1)

23. $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

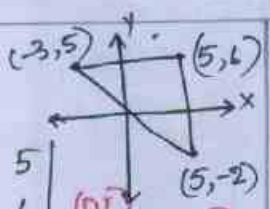
$\frac{3^2}{4^2} = \frac{54}{Ar(DEF)}$ — (1)

$Ar(\triangle DEF) = 96\ cm^2$ — (1)

24. $\frac{AE}{AC} = \frac{2}{11/2} = \frac{4}{11}$ — (1)

$\frac{AD}{AB} = \frac{3}{8}$ No, not Similar. — (1)

25. Area =



$\frac{1}{2}\begin{vmatrix} 5 & -3 & 5 & 5 \\ 6 & 5 & -2 & 6 \end{vmatrix}$ (or) (1)

$= \frac{1}{2}[(25+6+30)-(-18+25-10)]$ (1)

$= \frac{1}{2}[64] = 32$ sq-unit (1)

26. (-3,-4), (7,2) and (12,5).

Area $= \frac{1}{2}\begin{vmatrix} -3 & 7 & 12 & -3 \\ -4 & 2 & 5 & -4 \end{vmatrix}$ (or)

$= \frac{1}{2}[(-6+35-48)-(-28+24-15)]$ (1)

$= \frac{1}{2}[-19+19] = 0$

Area = 0 (or) collinear. (1)

27. LHS $\rightarrow \frac{\sin^2\theta}{\cos^2\theta} - \sin^2\theta$

$= \sin^2\theta\left[\frac{1-\cos^2\theta}{\cos^2\theta}\right]$ (1)

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

$= \tan^2\theta \cdot \sin^2\theta$ (1)

28. (2,3) and (-7,-1)

$\frac{y-3}{-1-3} = \frac{x-2}{-7-2}$ (1)

$9y-27 = 4x-8$

$4x-9y+19=0$ (1)

(OR)

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

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

$= \frac{1-\sin\theta}{\cos\theta} = \sec\theta - \tan\theta$.

Part - III 5m

III. Answer the following: (1)

29. $A=\{0,1\}$, $B=\{2,3,4\}$, $C=\{3,5\}$

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

$A \times (B \cup C) = \{(0,2),(0,3),(0,4),(0,5),(1,2),(1,3),(1,4),(1,5)\}$ LHS (1)

$A \times B = \{(0,2),(0,3),(0,4),(1,2),(1,3),(1,4)\}$ (or)

$A \times C = \{(0,3),(0,5),(1,3),(1,5)\}$ (1)

$(A \times B) \cup (A \times C)$

$= \{(0,2),(0,3),(0,4),(0,5),(1,2),(1,3),(1,4),(1,5)\}$ (1)

LHS = RHS

30. $f(x) = \frac{x}{2} - 1$

$f(2) = \frac{2}{2} - 1 = 0$, $f(4) = \frac{4}{2} - 1 = 1$, $f(6) = \frac{6}{2} - 1 = 2$

$f(10) = \frac{10}{2} - 1 = 4$, $f(12) = \frac{12}{2} - 1 = 5$ (1)

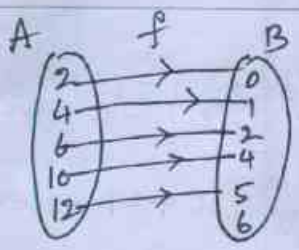
(i) $f = \{(2,0),(4,1),(6,3),(10,4),(12,5)\}$ (1)

(ii)

x	2	4	6	10	12
f(x)	0	1	2	4	5

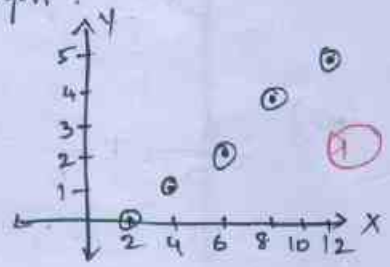
(1)

(iii)



(1)

(iv) graph :



(1)

31 $(fog)oh \rightarrow LHS$ — (1)

$fog = f(x^2) = x^2 - 4$ — (1)

$(fog)oh = (fog)(3x-5)$

$= (3x-5)^2 - 4$ — (1)

$RHS \rightarrow fo(goh)$

$goh = g(3x-5)$

$= (3x-5)^2$ — (1)

$fo(goh) = f(3x-5)^2$

$= (3x-5)^2 - 4$ — (1)

$LHS = RHS.$

32. 84, 90, 120

$90 = 84(1) + 6$ — (1)

$84 = 6(14) + 10$ — (1)

$HCF = 6.$ — (1)

& 120

$120 = 6(20) + 0$ — (1)

HCF of 84, 90, 120 = 6. — (1)

33 $a-d,\ a,\ a+d$ — (1)

$a-d+a+a+d = 27$

$3a = 27$

$\boxed{a=9}$ — (1)

$(a-d)(a)(a+d) = 288$ — (1)

$81 - d^2 = \frac{288}{9} = 32$

$d^2 = 49$

$d = \pm 7$ — (1)

A.P is 2, 9, 16 or 16, 9, 2 — (1)

34 $1+2+3+\dots+n = 666$

$\frac{n(n+1)}{2} = 666$ — (1)

$n^2+n = 1332$ — (1)

$n^2+n-1332 = 0$ — (1)

$(n+37)(n-36) = 0$ — (1)

$n = -37, 36$

$\therefore\ n = 36$ — (1).

35. $x+2y-z = 6$ — (1)

$-3x-2y+5z = -12$ — (2)

$x-2z = 3$ — (3)

Sol. eq (1) × (2) — (2)

$-x+2z = -3$ — (4)

Sol. eq (3) & (4)

$0 = 0$ — (2)

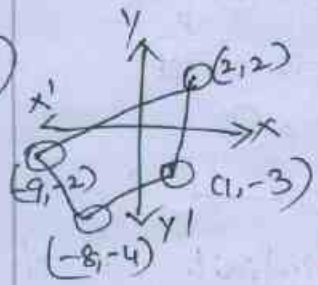
It has infinite no. of solutions — (1)

36)
$$2x^2 - 3x + 7$$
$$2x^2 \;|\; 4x^4 - 12x^3 + 37x^2 + bx + a$$
$4x^4$ — (1)
$$-12x^3 + 37x^2$$
$-12x^3 + 9x^2$ — (1)
$$28x^2 + bx + a$$
$28x^2 - 42x + 49$
$$0$$ — (1)
$4x^2 - 6x + 7$

$b = -42$ — (1)
$a = 49$ — (1)

37) Statement — (1) Without Dia no mark.
Given
To Prove } (1)
Construction, Dia.
Proof — (3)

38) Given DE || BC By BPT
$$\frac{AD}{AB} = \frac{AE}{AC}$$ — (1) (2)
CD || EF By BPT
$$\frac{AF}{AD} = \frac{AE}{AC}$$ — (2) (1)
from (1) & (2) $\frac{AD}{AB} = \frac{AF}{AD}$ (1)
$AD^2 = AB \times AF$ — (1)
Hence proved

39)


— (1)
Without graph no mark.

Area of Quad. $= \frac{1}{2}\begin{bmatrix} -9 & -8 & 1 & 2 & -9 \\ -2 & -4 & -3 & 2 & -2 \end{bmatrix}$ — (1)
$= \frac{1}{2}[(36 + 24 + 2 - 4) - (16 - 4 - 6 - 18)]$ — (1)
$= \frac{1}{2}[58 + 12] = \frac{1}{2} \times 70 = 35\ cm^2$
(1) (1)

40) $\frac{x}{a} + \frac{y}{b} = 1$
$a + b = 7 \Rightarrow b = 7 - a$ — (1)
$\frac{-3}{a} + \frac{8}{7-a} = 1$ — (1)
$-3(7-a) + 8(a) = 7a - a^2$
$a^2 + 4a - 21 = 0$
$(a-3)(a+7) = 0$ — (1)
$\therefore a = 3, -7$ not possible
$b = 4$, — (1)
$\frac{x}{3} + \frac{y}{4} = 1$
$4x + 3y - 12 = 0$ — (1)

41) LHS
$\sin^2 A \cos^2 B + \cos^2 A \cos^2 B + \cos^2 A \sin^2 B + \sin^2 A \sin^2 B$ (1)
$= \cos^2 B(\sin^2 A + \cos^2 A) + \sin^2 B(\cos^2 A + \sin^2 A)$ (1)
$= \cos^2 B(1) + \sin^2 B(1)$ — (1)
$= \sin^2 B + \cos^2 B$ — (1)
$= 1$ — (1)
$= RHS$
$LHS = RHS$.

42) $3x^2 + 7x - 2 = 0$
$a = 3 ; b = 7 ; c = -2$.

$\alpha+\beta=\frac{-7}{3}$
$\alpha\beta=-\frac{2}{3}$ } (1)

i) $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}=\frac{\alpha^2+\beta^2}{\alpha\beta}$

$=\frac{(\alpha+\beta)^2-2\alpha\beta}{\alpha\beta}$ — (1)

$=\frac{\frac{49}{9}+\frac{4}{3}}{-\frac{2}{3}}=-\frac{61}{6}$ — (1)

ii) $\frac{\alpha^2}{\beta}+\frac{\beta^2}{\alpha}=\frac{\alpha^3+\beta^3}{\alpha\beta}$

$=\frac{(\alpha+\beta)^3-3\alpha\beta(\alpha+\beta)}{\alpha\beta}$

$=\frac{\left(\frac{-7}{3}\right)^3-3\left(\frac{-2}{3}\right)\left(\frac{-7}{3}\right)}{-\frac{2}{3}}$ — (1)

$=\frac{469}{18}$ — (1)

(or)

42) $a:b=2:5$

$a=2k,\ b=5k$ — (1)

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

$\frac{1}{a}+\frac{-4}{b}=1$

$\frac{1}{2k}-\frac{4}{5k}=1$

$\frac{5-8}{10k}=1$

$-3=10k$ (or)

$k=\frac{-3}{10}$ (1)

$a=-\frac{\cancel{6}3}{\cancel{10}5}$ $a=-\frac{3}{5}$ — (1)

any method carries mark

$b=5\times\frac{-3}{\cancel{10}_2}=-\frac{3}{2}$

$b=-\frac{3}{2}$ — (1)

$\frac{x}{-3/5}+\frac{y}{-3/2}=1$

$\frac{5x}{-3}+\frac{2y}{-3}=1$

$\boxed{5x+2y+3=0}$ — (1)

43) R.D — (1)
triangle — (1)
acute angle, 7 arcs — (1)
Joining Q_4 with R — (1)
Parallel line $-Q_7$ — (2)
Drawing Prallel line — (1)
Steps — (1)
(or)
R.D — (1)
PQ = 4.5 — (1)
35°, 90°, 1 bisector — (2)
circle — (1)
median — (1)
triangle — (1)
steps — (1)

44)

Time (x)	60	120	180	240
Distance (y)	50	100	150	200

— (2)

as x increases, y also increases. — (1)
So it is D.V
It is St. Line graph
$k=\frac{5}{6}$ — scale, axis (1)
i) (90, 75) — (1) plotting — (1)
ii) (360, 300) — (1) St. line — (1)

(or)

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

— (2)

Indirect variation — (1)

$k = xy$

$k = 24$.

i) When $x = 3$, $y = 8$ — (1)

ii) When $y = 6$, $x = 4$. — (1)

Scale, axis — (1)

Plotting points — (1)

rectangular hyperbola — (1)

Handling teachers

1. S. Bd 28/09/22
2. P. Vasu dharDevi 28/9/22
3. 28/9/22
4. N.L. Leaf 28/9.
5. 28/9
6. R. Prec 28/9.
7.

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28/9/22