OSDAV Public School, Kaithal
PT2 Exam (July,2024)
Class : X
Subject : Mathematics

SET-B

Time: 1 hr 20 min. **M.M. : 30**

General Instructions:- All questions are compulsory.

QNo	Questions	Marks
1	**The probability of selecting a vowel from the letter of the word QUADRILATERAL is** (a) 4/11 (b) 5/11 (c) 6/11 (d) None of these	**1**
2.	**Write a quadratic polynomial if sum of zeroes is 1/4 and product of zeroes is -1** (a) ¼(4x² - x - 4) (b) x² - 1/4 x +1 (c) x² - 4 x + 1 (d) 4x² - x + 1	**1**
3.	**The value of k for which the system of equations kx +2y = 3 and 2x -3y = 1 has unique solution is** (a)-4/3 (b) 3/4 (c) 4/3 (d) none of these	**1**
4.	**If HCF(x,18) = 2 and LCM(x,18) = 36 Then x is** (a) 2 (b) 3 (c) 4 (d) 5	**1**
5.	**Assertion - The quadratic equation $3x^2 - 6x + 3 = 0$ has repeated roots** **Reason – The quadratic equation $ax^2 + bx + c = 0$ have repeated roots if discriminant $D > 0$** (a.) Both Assertion and Reason are correct, and Reason is the correct explanation for Assertion (b.) Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion. (c.) Assertion is true but reason is false. (d.) Assertion is false but reason is true .	**1**
6.	Find the zeroes of the quadratic polynomial $x^2 - 4x + 3$ and verify the relationship between the zeroes and its coefficients.	**2**
7.	Solve $5x^2 - 3x - 2 = 0$	**2**
8.	Prove that $\sqrt{3}$ is irrational number.	**2**
9.	A card is drawn from a well shuffled pack of cards. Find the probability of card to be (i) a king of Spade (ii) a black card	**2**
10.	Find x and y by substitution method $3x - y = 3$, and $7x + 2y = 20$	**2**
11.	If α and β are zeroes of quadratic polynomial $f(x) = x^2 - (k+6)x + 2(2k-1)$, then find the value of k if $\alpha + \beta = \frac{1}{2}\alpha\beta$	**3**
12.	Determine the nature of roots of quadratic equation $2y^2 + 5y - 3 = 0$. Also find the roots if exist.	**3**
13.	If 1 is added to both numerator and denominator of a fraction, it becomes7/8 and If 1 is subtracted from both numerator and denominator the fraction becomes 6/7. Find the fraction.	**3**
14.	Determine graphically whether the system of equations $2x - y = 2$ and $4x - y = 8$ is consistent or inconsistent?	**3**
15.	Find HCF and LCM of numbers 135 and 225. Also verify that product of numbers = HCF x LCM	**3**

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SET-A

Time: 1 hr 20 min. **M.M. : 30**

General Instructions:- All questions are compulsory.

Q.No.	Questions	Marks
1	**If HCF(x,8) = 4 and LCM(x,8) = 24 Then x is** (a) 8 (b) 10 (c) 12 (d) 14	1
2	**The probability of selecting a consonant from the letter of the word TRIANGLE is** (a) 2/7 (b) 3/8 (c)5/8 (d) 1/8	1
3	**If α and β are zeroes of the polynomial p(x) = $4x^2$+ 3x +7 then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to** (a) 7/3 (b) -7/3 (c) 3/7 (d) -3/7	1
4	**The value of k for which the system of equation kx – y = 2 and x -2y = 3 has unique solution is** (a)3 (b) not equal to 3 (c) not equal to zero (d) 0	1
5	**Assertion -** The quadratic equation $4x^2 + 6x +3 = 0$ has no real roots **Reason** – The value of discriminant is -12 (a.) Both Assertion and Reason are correct, and Reason is the correct explanation for Assertion (b.) Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion. (c.) Assertion is true but the reason is false. (d.) Assertion is false but reason is true	1
6	Prove that $\sqrt{5}$ is irrational number.	2
7	Find the zeroes of the quadratic polynomial $x^2 + 7x + 12$ and verify the relationship between the zeroes and its coefficients.	2
8	Solve $25x^2 - 30x + 9 = 0$	2
9	A card is drawn from a well shuffled pack of cards. Find the probability of the card to be a (i) queen of heart (ii) face card	2
10	Find x and y by substitution method $x + 2y = -1$ $2x – 3y = 12$	2
11	A fraction becomes 4/5 if 1 is added to both numerator and denominator. If however 5 is subtracted from both numerator and denominator the fraction becomes ½. What is the fraction?	3
12	. Find HCF and LCM of numbers 336 and 54. Also verify that product of numbers = HCF x LCM	3
13	Determine graphically whether the system of equations x – 2y = 2 and 4x -2y = 5 is consistent or inconsistent?	3
14	Determine the nature of roots of quadratic equation $2x^2 – 7x + 5 = 0$. Also find the roots if exist.	3
15	If α and β are zeroes of quadratic polynomial $f(x) = x^2 – (k+6)x + 2(2k -1)$, then find the value of k if $\alpha + \beta = \frac{1}{2}\alpha\beta$	3

Marking Scheme PT2 (2024)
Class X Sub-(Maths)
Set (B)
M.M-30

Q.No.	Answers	Marks
Q1)	(d) None of these	(1)
Q2)	(a) $\frac{1}{4}(4x^2-x-4)$	(1)
Q3)	K has any real value except $-4/3$	(1)
Q4)	(c) 4	(1)
Q5)	(c)	(1)
Q6)	$x^2-4x+3 = (x-3)(x-1)$	
	$\alpha+\beta = -b/a = -(-4) = 4$	$(\frac{1}{2})$
	$\alpha\beta = c/a = 3/1 = 3$	
	For zeroes either $x-3=0$ or $x-1=0$	
	$x=3$ or $x=1$	
	$\alpha=3$ $\beta=1$	$(\frac{1}{2})$
	$\alpha+\beta = 3+1 = 4$ | $\alpha\beta = 3\times1 = 3$	
	$S = -b/a = -(-4)/1 = 4$ | $P = c/a = 3/1$	$(\frac{1}{2})$
	$\alpha+\beta = -b/a = 4$ | $\alpha\beta = c/a = 3$	$(\frac{1}{2})$
	Hence verified	
Q7)	Solve $5x^2-3x-2=0$	
	$5x^2-5x+2x-2=0$	$(\frac{1}{2})$
	$5x(x-1)+2(x-1)=0$	
	$(x-1)(5x+2)=0$	$(\frac{1}{2})$
	Either $x-1=0$ or $5x+2=0$	$(\frac{1}{2})$
	$x=1$ $5x=-2$	
	$x=-2/5$	$(\frac{1}{2})$
	$1, -2/5$	
Q8)	Let $\sqrt{3}$ be a rational number	
	So $\sqrt{3} = P/Q$ (where P and Q are integers, $Q\neq0$ and HCF $(P,Q)=1$	$(\frac{1}{2})$
	Squaring on both sides	

$(\sqrt{3})^2 = \left(\frac{p}{q}\right)^2$

$3 = \frac{p^2}{q^2}$

$3q^2 = p^2$

$q^2 = p^2/3$

$\Rightarrow$ 3 divides p^2, so 3 also divides p — (1) $(\frac{1}{2})$

Let $p = 3a$

$q^2 = \frac{(3a)^2}{3} = \frac{9a^2}{3} = 3a^2$

$\Rightarrow a^2 = q^2/3$

$\Rightarrow$ 3 divides q^2, so 3 divides q also — (2) $(\frac{1}{2})$

From (1) and (2)

3 divides both p and q. So our assumption is wrong as HCF$(p, q) = 1$

So $\sqrt{3}$ is Irrational number $(\frac{1}{2})$

Q9) (i) P(a King of Spade) $= 1/52$ (1)

(ii) P(a black card) $= 26/52 = 1/2$ $(\frac{1}{2}) + \frac{1}{2}$

Q10) $3x - y = 3$ — (1)

$7x + 2y = 20$ — (2)

From eq. (1) $-y = 3 - 3x$

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

Put value of y in Eq. (2)

$7x + 2y = 20$

$7x + 2(3x - 3) = 20$ $(\frac{1}{2})$

$7x + 6x - 6 = 20$

$13x = 20 + 6 = 26$

$x = \frac{26}{13} = 2$ $(\frac{1}{2})$

$y = 3x - 3 = 3 \times 2 - 3 = 6 - 3 = 3$ $(\frac{1}{2})$

$x = 2, \; y = 3$

Q11) $f(x) = x^2 - (k+6)x + 2(2k-1)$

$\alpha + \beta = -[-(k+6)] = k+6$ as $S = -b/a$ $(\frac{1}{2})$

$\alpha\beta = 2(2k-1) = 2(2k-1)$ as $P = c/a$ $(\frac{1}{2})$

ATQ

$$\alpha + \beta = \frac{1}{2}\alpha\beta$$

$$k + 6 = \frac{1}{2}[2(2k-1)] \quad (1)$$

$$k + 6 = 2k - 1$$

$$k - 2k = -1 - 6$$

$$-k = -7$$

$$k = 7 \quad (1)$$

Q12) $2y^2 + 5y - 3 = 0$

$D = b^2 - 4ac = (5)^2 - 4 \cdot 2(-3) = 25 + 24 = 49$ $\frac{1}{2} + \frac{1}{2}$

$D > 0$

Roots are real and unequal $(\frac{1}{2})$

$$x = \frac{-b \pm \sqrt{D}}{2a} = \frac{-5 \pm \sqrt{49}}{2 \times 2} \quad \left(\frac{1}{2}\right)$$

$$= \frac{-5 \pm 7}{4}$$

$$x = \frac{-5+7}{4}, \frac{-5-7}{4}$$

$$= \frac{2}{4}, \frac{-12}{4}$$

$$= \frac{1}{2}, -3 \quad (1)$$

Q13) Let Numerator $= x$

Denominator $= y$

Fraction $= x/y$ $(\frac{1}{2})$

ACC. to Ist Condition

$$\frac{x+1}{y+1} = \frac{7}{8}$$

$$8x - 7y = -1 \quad \text{---} \quad (1) \quad (\frac{1}{2})$$

ACC. to 2nd Condition

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

$$7x - 6y = 1 \quad \text{---} \quad (2) \quad (\frac{1}{2})$$

Solving Eq. (1) and (2)

$x = 13$ (1/2)

$y = 15$ (1/2)

Fraction $= \frac{N}{D} = \frac{13}{15}$ (1/2)

Q14) $2x - y = 2$

x	2	3	0
y	2	4	−2

(1/2)

$4x - y = 8$

x	2	3	1
y	0	4	−4

(1/2)

Graph (1 1/2)

Consistent (1/2)

Q15) $135 = 3^3 \times 5$ (1/2)

$225 = 3^2 \times 5^2$ (1/2)

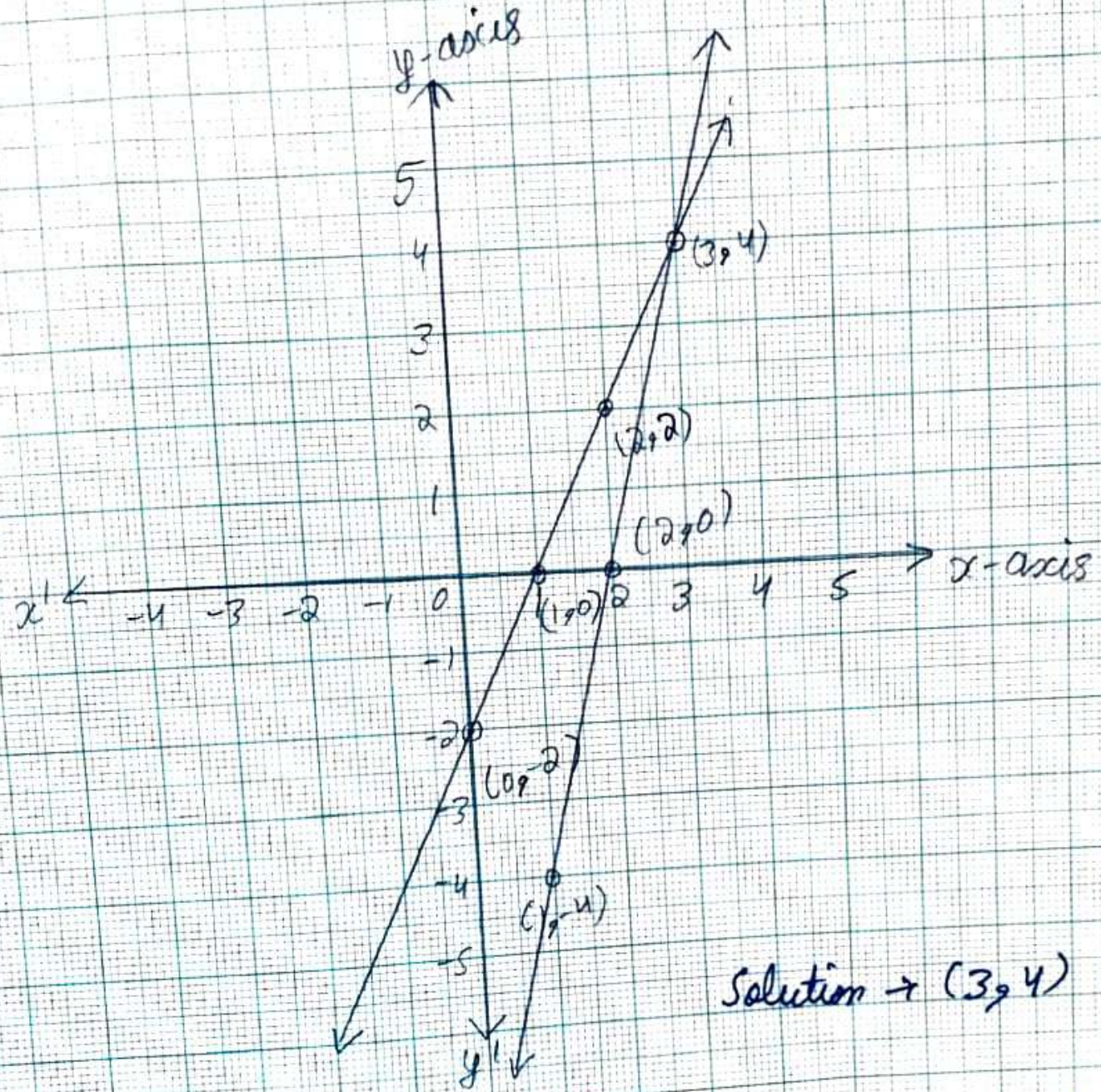
$HCF = 3^2 \times 5 = 9 \times 5 = 45$ (1/2)

$LCM = 3^3 \times 5^2 = 27 \times 25 = 675$ (1/2)

$HCF \times LCM = 45 \times 675 = 30375$ (1/2)

Product of Numbers $= 135 \times 225 = 30375$ (1/2)

(Hence verified)



Solution → (3, 4)

Since lines are intersecting and have a unique solution

So, the equations are consistent

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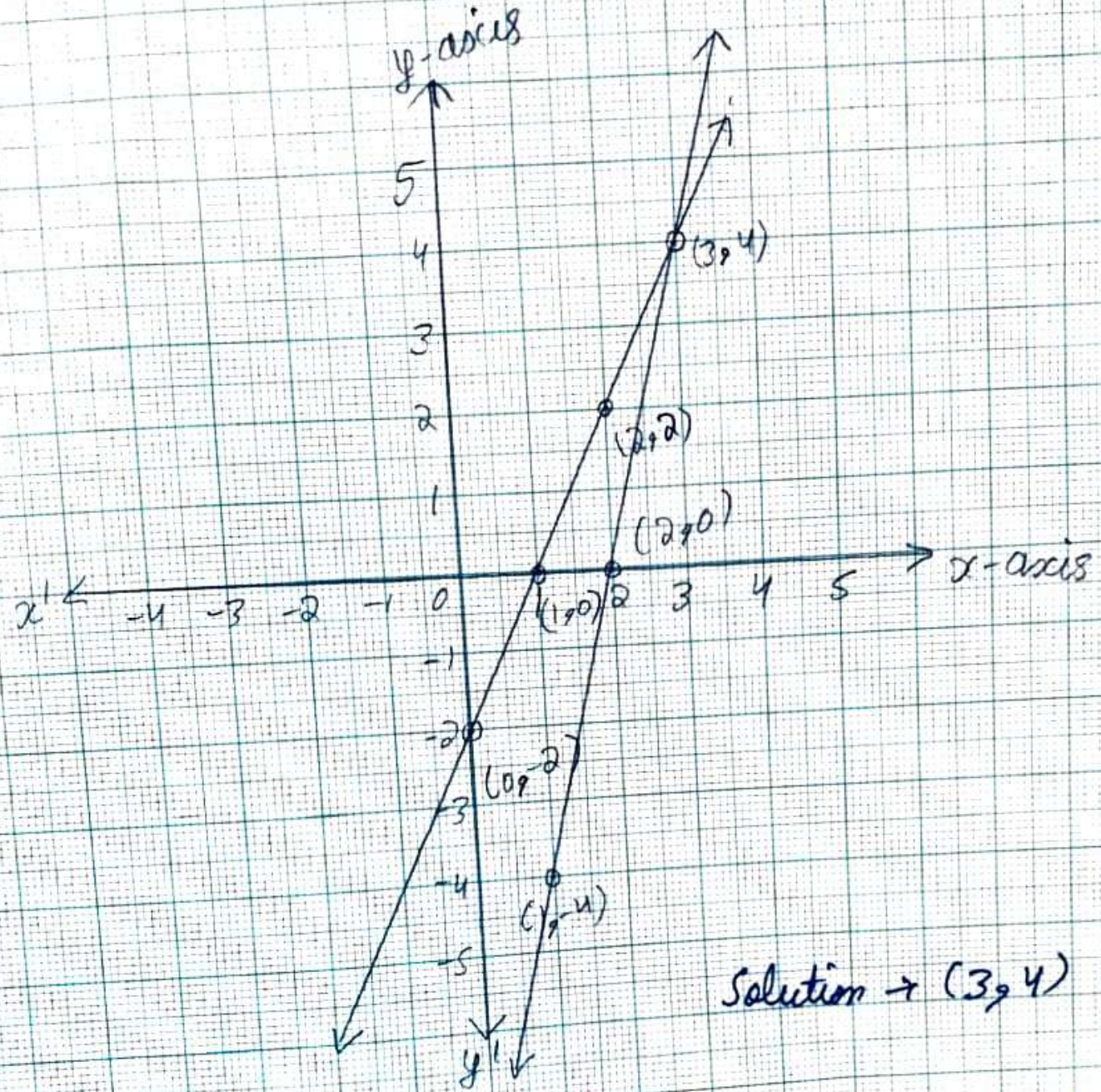

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