Tel : +9712 4488 025
Fax : +9712 4489 002

مـدرسـة أبوظبـي الـهنـديـة
Abu Dhabi Indian School
E-mail: adiscbse@emirates.net.ae | Web : www.adisuae.com

P.O. Box 46492
Abu Dhabi, U.A.E.

SAMPLE QP-MID-TERM EXAMINATION

CLASS:9 DATE:

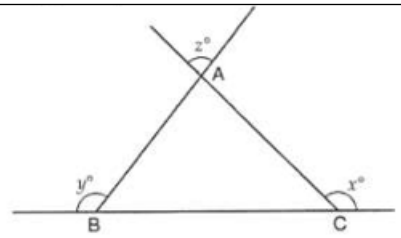
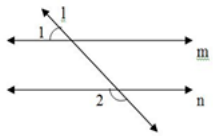
SUBJECT- MATEMATICS (041) DURATION: 3 hours

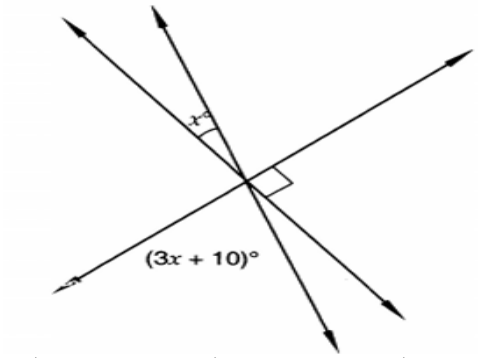
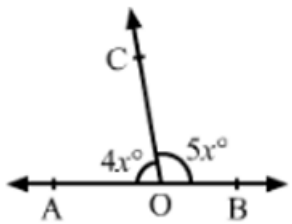
MAXIMUM MARKS: 80

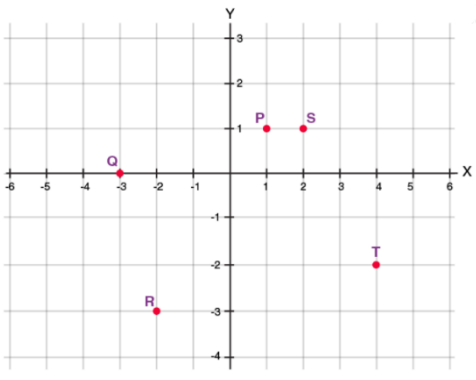
General Instructions:

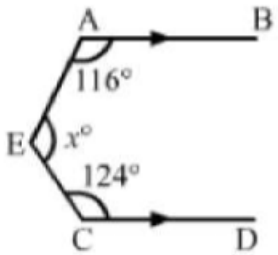
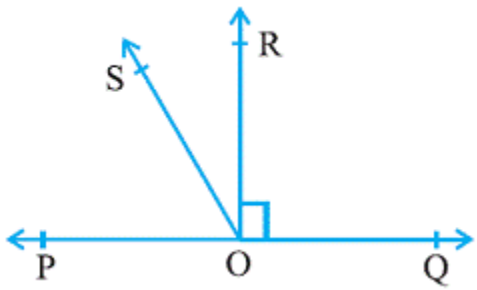
1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 2 marks, 2 Questions of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

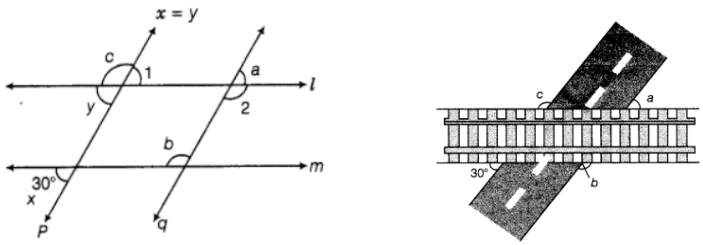
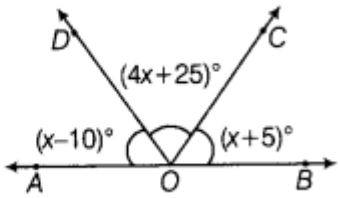
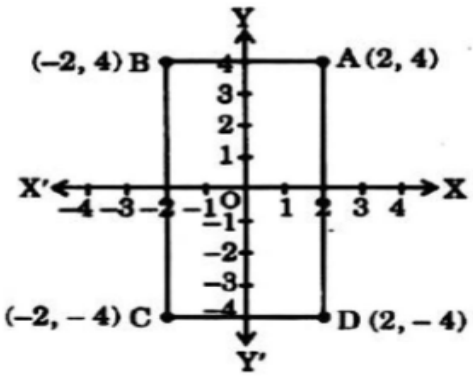
	Section A	
	Section A consists of 20 questions of 1 mark each	
		Marks
1	Every rational number is a) natural number b) an integer c) a real number d) a whole number	1
2	$\sqrt{2}$ is a polynomial of degree (a) 2 (b) 0 (c) 1 (d) Not defined	1
3	The linear equation $2x - 5y = 7$ has (a) a unique solution (b) two solutions (c) infinitely many solutions (d) no solution	1
4	In figure, what is z in terms of x and y	1

	 a) x+y-180^0 b) x+y+180^0 c) x+y-360^0 d) x+y+360^0	
5	Find the value of k, if y+3 is a factor of $3y^2 + ky + 6$ (a) 11 (b) -13 (c) -11 (d) 13	1
6	What is the distance of point (3,4) from the x- axis? (a)3 units (b) 4 units (c) 1 unit (d) 5 units	1
7	On adding $2\sqrt{3}$ and $3\sqrt{2}$, we get a)$5\sqrt{5}$ b) $5\ (\sqrt{3} + \sqrt{2})$ c) $2\sqrt{3} + 3\sqrt{2}$ d) none of these	1
8	In the adjoining figure, m||n, if ∠1 = 50°, then ∠2 is equal to  a)50° b)40° c)120° d)130°	1
9	Euclid stated that all right angles are equal to each other in the form of (a) an axiom (b) a definition (c) a postulate (d) a proof	1
10	**In between any two numbers, there are:** a. Only one rational number b. Two rational numbers c. Infinite rational numbers d. No rational number	1
11	The simplified value of $(16)^{\frac{-1}{4}} \times (16)^{\frac{1}{4}}$ a)16 b) 4 c) 1 d) 0	1
12	In figure, the value of x is	1

	 a)8° b)20° c)15° d)12°	
13	It is known that, if x + y = 10, then x+y + z = 10+ z. The Euclid's axiom that illustrates this statement is (a) Things which are equal to the same thing are equal to one another. (b) If equals are added to equals, the wholes are equal. (c) If equals are subtracted from equals, the remainders are equal. (d) Things which coincide with one another are equal to one another	1
14	The value of 104 × 96 is (a) 9984 (b) 9469 (c) 10234 (d) 11324	1
15	**Which of these statements do not satisfy Euclid's axiom?** a. Things which are equal to the same thing are equal to one another b. If equals are added to equals, the wholes are equal. c. If equals are subtracted from equals, the remainders are equal. d. The whole is lesser than the part.	1
16	In the given figure, AOB is a straight line. If ∠AOC=4x° and ∠BOC=5x° then ∠AOC= ?  a)60° b)40° c)100° d)80°	1
17	What is the common factor of $x^3 - x^2$ and $-22x^2 + 142x - 120$ (a)x (b)(x-1) (c) x^2 (d)2	1
18	**The number obtained on rationalising the denominator of 1/ (√7 – 2) is** a. (√7+2)/3 b. (√7-2)/3 c. (√7+2)/5 d. (√7+2)/45	1
19	DIRECTION: In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option	1

	Assertion: The value of $(25)^3 + (-16)^3 + (-9)^3$ is 12600. Reason: If $a + b + c = 0$, then $a^3 + b^3 + c^3 = 3abc$ (a) Assertion and reason are true and reason is the correct explanation of assertion. (b) Both assertion and reason are true but reason is not the correct explanation of assertion. (c) Assertion is true but reason is false. (d) Assertion is false but reason is true.	
20	Assertion: Supplement of angle is one fourth of itself. The measure of the angle is 144^0 Reason: Two angles are said to be supplementary if their sum of measure of angles is 180^0 (a) Assertion and reason are true and reason is the correct explanation of assertion. (b) Both assertion and reason are true but reason is not the correct explanation of assertion. (c) Assertion is true but reason is false. (d) Assertion is false but reason is true.	1
	Section B	
	Section B consists of 5 questions of 2 marks each	
21	Find four rational numbers between $\frac{1}{5}$ and $\frac{2}{3}$	2
22	If a point C lies between two points A and B such that AC = BC, then prove that $AC=\frac{1}{2}AB$. Write the axiom used.	2
23	Find the remainder when $x^4 + x^3 - 2x^2 + x + 1$ is divided by $x+2$	2
24	Write the coordinates of the vertices of a square whose each side is 5 units , one vertex at (2,1) and all the vertices lie in the same quadrant OR Write the coordinates of each of the points P, Q, R, and S from the figure given.  	2
25	Represent $\sqrt{5}$ on number line. OR	2

	Represent $\sqrt{4.5}$ on number line.	
	Section C	
	Section C consists of 6 questions of 3 marks each	
26	Express $0.6 + 0.\overline{7} + 0.4\overline{7}$ in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$	3
27	Factorise: $x^3 - 3x^2 - 9x - 5$	3
28	In a Co-Educational School a teacher conduct a mathematical quiz to solve a question on black board. She needs two students and prize will be given to the students who solve the question first? For this purpose she choose a boy and a girl. The problem is given in the figure. AB || CD find x  (OR) In the given fig. POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that $\angle ROS = x = \frac{1}{2}(\angle QOS - \angle POS)$.  	3
29	(OR) Write any three solutions of the linear equation $y = 4x - 11$.	3
30	Simplify : $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + 2\sqrt{225}$	3
31	Prove that when two lines intersect each other vertically opposite angles are equal.	3
	Section D	
	Section D consists of 4 questions of 5 marks each.	
32	Find 'a', if linear equation $3x - ay = 6$ has one solution as (4, 3). Hence draw the graph of the equation so formed. OR Rupinder and Deepak two students of a Vidyalaya contribute to charity.	5

	The Contribution of Rupinder is 2/5 of the contribution of Deepak. Write a linear equation According to the above statement and draw the graph for the linear equation.	
33i)	If and b are rational numbers and $\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a - b\sqrt{3}$, find the values of a and b	3
ii)	If $\sqrt{3} = 1.732$, then find the value of $\sqrt{27} - 3\sqrt{75} + 5\sqrt{48} + 2\sqrt{108}$	2
34	(i)Calculate the perimeter of a square whose area is $49a^2 + 70ab + 25b^2$. (ii) Expand $\left(\frac{4}{5}x - 2\right)^3$ OR (i) If $\left(x+\frac{1}{x}\right) = 3$, find the value of $x^4 + \frac{1}{x^4}$. (ii) Evaluate: $301^2 - 299^2$ using suitable identities.	5
35	a) A road crosses a railway line at an angle of 30° as shown in the figure. Find the values of a, b and c  b) In the given figure, find the value of ∠BOC, if points A, O and B are collinear.  	2
	Section E	
	Case study-based questions are compulsory.	
36	Case Study-1 Four friends Ram, Raju, Ravi, Ritu are standing in reference to a well situated at the origin with the following respective coordinates A(2,4), B(−2,4), C(−2, −4) and D(2, −4).  	

Based on the above information answer the following questions.

I.	Raju stands on which quadrant?	1
II.	Find the distance between Ram and Raju.	1
III.	By plotting these points on a single graph paper, the figure obtained is rectangle. find the perimeter of the rectangle. OR By plotting these points on a single graph paper, the figure obtained is rectangle. find the area of the rectangle.	2

37 Case Study-2

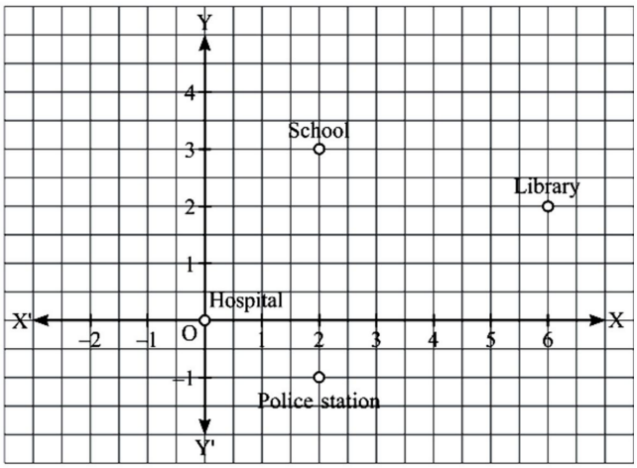
On his birthday, Manoj planned that this time he celebrates his birthday in a small orphanage centre. He bought apples to give to children and adults working there. Manoj donated 2 apples to each child and 3 apples to each adult working there along with birthday cake. He distributed 60 total apples.

Based on the above information answer the following questions.

I.	How to represent the above situation in linear equations in two variables by taking the number of children as 'x' and the number of adults as 'y'?	1
II.	If the number of children is 15, then find the number of adults? OR If the number of adults is 12, then find the number of children?	1
III.	Find 4 solutions for the above equation obtained and represent it in a solution table	2

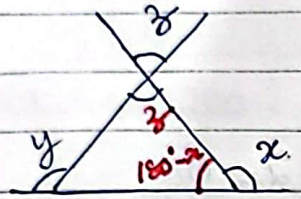
38 **Case Study based-1**

Aditya is a Class IX student residing in a village. One day, he went to Hospital along with his grandfather for general check-up. From there he visited three places - School, Library and Police Station. After returning to his village, he plotted a graph by taking Hospital as origin and marked three places on the graph as per his direction of movement and distance. The graph is shown below:

		
	What are the coordinates of School?	
	What are the coordinates of Police Station?	
	Distance between school and police station?	

IX Homework-12 (20th Friday)

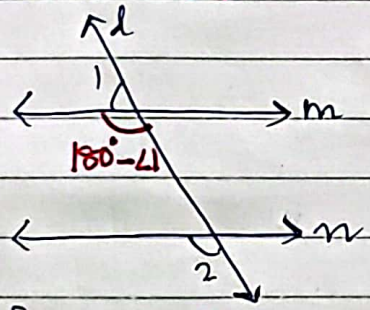
1) a real number (c)
2) 0 (b)
3) infinitely many solutions (c)
4)



Using exterior angle property,
$z + 180° - x = y$
$z = x + y - 180°$ (a)

5) $p(y) = 3y^2 + ky + 6$
$p(-3) = 3(-3)^2 + k(-3) + 6 = 3\times 9 - 3k + 6 = 0$
$\Rightarrow 33 - 3k = 0$
$\Rightarrow -3k = -33$
$\therefore k = 11$ (a)

6) 4 units (b)
7) $2\sqrt{3} + 3\sqrt{2}$ (c)
8)



$\angle 2 = 180° - \angle 1 = 180° - 50°$
$= 130°$ (d)

9) a postulate (c)
10) infinite rational numbers (c)
11) $(16)^{-\frac{1}{4}} \times (16)^{\frac{1}{4}} = (16)^{-\frac{1}{4}+\frac{1}{4}} = 16^0 = 1$ (c)
12) $3x + 10° + x + 90° = 180°$ (angles on a straight line)
$\Rightarrow 4x + 100° = 180°$
$4x = 80°$
$x = 20°$ (b)
13) If equals are added to equals, the wholes are equal (b)
14) $104 \times 96 = (100+4)(100-4)$ $[(a+b)(a-b) = a^2 - b^2]$
$= 100^2 - 4^2$
$= 10000 - 16 = 9984$ (a)

15) The whole is lesser than the part (d)

16) $\angle AOC + \angle BOC = 180^\circ$ (linear pair)

$\Rightarrow 4x + 5x = 180^\circ$

$\Rightarrow 9x = 180^\circ$

$x = 20^\circ$

$\therefore \angle AOC = 4x^\circ = 4 \times 20^\circ = 80^\circ$ (d)

17) $x^3 - x^2 = x^2(x-1)$

Let $p(x) = -22x^2 + 142x - 120$

$p(1) = -22 + 142 - 120 = 142 - 142 = 0$

$\Rightarrow (x-1)$ is a factor of $p(x)$

$(x-1)$ (b)

18) $\frac{1}{\sqrt{7}-2} = \frac{\sqrt{7}+2}{(\sqrt{7}-2)(\sqrt{7}+2)} = \frac{\sqrt{7}+2}{(\sqrt{7})^2 - 2^2} = \frac{\sqrt{7}+2}{7-4} = \frac{\sqrt{7}+2}{3}$ (a)

19) $3x25x - 16x - 9 = 10800$

Assertion is False (d)
and Reason is True.

20) Let the angle be x

$180 - x = \frac{1}{4} \cdot x$

$\Rightarrow 720 - 4x = x$

$\Rightarrow 5x = 720$

$x = 144^\circ$

Assertion and reason are true and reason is the correct explanation of assertion (a)

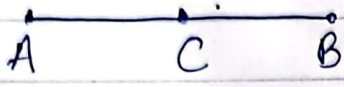
21) $\frac{1 \times 3}{5 \times 3} \quad \frac{2 \times 5}{3 \times 5}$

$\frac{3}{15} \quad \frac{10}{15}$

$\therefore$ four rational numbers are $\frac{4}{15}, \frac{5}{15}, \frac{6}{15}, \frac{7}{15}$

$\Rightarrow \frac{4}{15}, \frac{1}{3}, \frac{2}{5}, \frac{7}{15}$

22)



Given, $AC = BC$

$\Rightarrow AC + AC = BC + AC$

$\Rightarrow 2AC = AB$

$\therefore AC = \frac{1}{2} AB$

Axiom used :- When equals are added to equals, the wholes are equal.

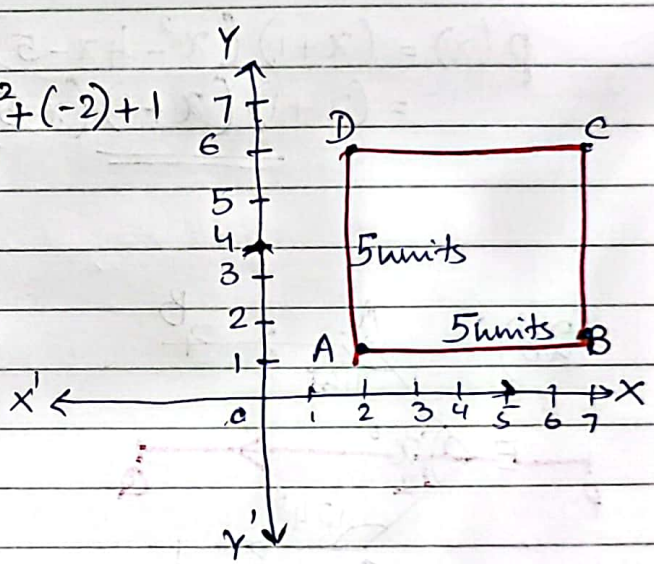
23) let $p(x) = x^4 + x^3 - 2x^2 + x + 1$

Remainder $= p(-2)$

$= (-2)^4 + (-2)^3 - 2(-2)^2 + (-2) + 1$

$= 16 - 8 - 8 - 2 + 1$

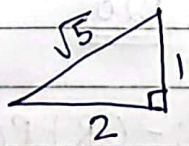
$= 16 - 16 - 1 = -1$



24) A(2,1)
B(7,1)
C(7,6)
D(2,6)

OR P(1,1)
Q(-3,0)
R(-2,-3)
S(2,1)

25) Do yourself



26) $0.6 + 0.\overline{7} + 0.4\overline{7}$

$0.6 = \frac{6}{10}$

Let $x = 0.7777\ldots$

$10x = 7.7777\ldots$

$9x = 7$

$x = \frac{7}{9}$

Let $y = 0.47777\ldots$

$10y = 4.7777\ldots$

$100y = 47.7777\ldots$

$90y = 43$

$y = \frac{43}{90}$

$\frac{6 \times 9}{10 \times 9} + \frac{7 \times 10}{9 \times 10} + \frac{43}{90}$

$= \frac{54 + 70 + 43}{90}$

$= \frac{167}{90}$

21) Let $p(x) = x^3 - 3x^2 - 9x - 5$

Factors of 5 are $\pm 1, \pm 5$

$p(1) = 1 - 3 - 9 - 5 = 1 - 17 = -16 \neq 0$

$p(-1) = (-1)^3 - 3(-1)^2 - 9(-1) - 5$

$= -1 - 3 + 9 - 5$

$= -9 + 9 = 0$

$\therefore (x+1)$ is a factor of $p(x)$

On dividing $p(x)$ by $(x+1)$,

$$\begin{array}{r} x^2 - 4x - 5 \\ x+1 \overline{)\, x^3 - 3x^2 - 9x - 5} \\ \underline{(-)\, x^3 \overset{3(-)}{+} x^2} \\ -4x^2 - 9x - 5 \\ \underline{(+)\, -4x^2 \overset{(+)}{-} 4x} \\ -5x - 5 \\ \underline{(+)\, -5x \overset{(+)}{-} 5} \\ 0 \end{array}$$

$p(x) = (x+1)(x^2 - 4x - 5)$

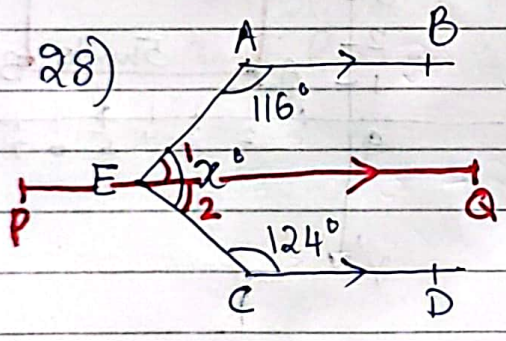
$= (x+1)(x+1)(x-5)$

S P

$-4 \quad -5$

$-1, -5$

28)



Construction:- draw PQ parallel to AB

$AB \parallel PQ \parallel CD$.

Since $AB \parallel PQ$,

$\angle 1 = 180° - 116°$ (cointerior angles)

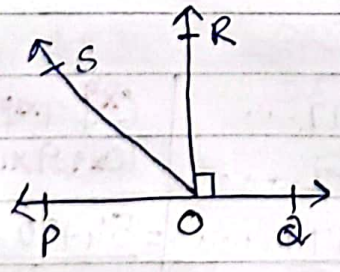
$= 64°$

$\angle 2 = 180° - 124°$ (cointerior angles)

$= 56°$

$\therefore x = \angle 1 + \angle 2 = 64° + 56° = \underline{120°}$

OR



Given:- $OR \perp PQ$

To prove:- $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$

Proof:- $\angle QOS = \angle ROS + \angle ROQ$

$\angle QOS = \angle ROS + 90° \rightarrow (1)$

$\angle QOR + \angle ROP = 180°$ (linear pair)

$\therefore \angle QOR = \angle ROP = 90°$

Also, $\angle POS = \angle POR - \angle ROS = 90° - \angle ROS \rightarrow (2)$

$(1) - (2)$, $\angle QOS - \angle POS = \angle ROS + 90° - 90° + \angle ROS$

$\therefore \angle QOS - \angle POS = 2\angle ROS$

$\Rightarrow \angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$

Hence Proved.

OR $y = 4x - 11$

When $x = 0$, $y = -11$ $\quad (0, -11)$

When $x = 1$, $y = 4 - 11 = -7$ $\quad (1, -7)$

When $x = 2$, $y = 8 - 11 = -3$ $\quad (2, -3)$

30) $\sqrt[4]{81} = 3^{4\times\frac{1}{4}} = 3$

$\sqrt[3]{216} = 6^{3\times\frac{1}{3}} = 6$

$\sqrt[5]{32} = 2^{5\times\frac{1}{5}} = 2$

$\sqrt{225} = 15$

$\therefore \sqrt[4]{81} - 8\sqrt[3]{216} + 15 \times \sqrt[5]{32} + 2 \times \sqrt{225}$

$= 3 - 8\times6 + 15\times2 + 2\times15$

$= 3 - 48 + 30 + 30$

$= 63 - 48 = \underline{15}$

31) **Do yourself**

32) When $x = 4$ and $y = 3$, $3\times4 - a\times3 = 6$

$\Rightarrow 12 - 3a = 6$

$\Rightarrow -3a = -6$

$\boxed{a = 2}$

$3x - 2y = 6$

$-2y = 6 - 3x$

$2y = 3x - 6$

$y = \frac{3x-6}{2}$

x	0	2	4
y	-3	0	3

(graph)

(OR) Let the contribution of Deepak be ₹x and that of Rupinder be ₹y.

ATQ, $y = \frac{2}{5}x$

$\Rightarrow 5y = 2x$

$\Rightarrow 2x - 5y + 0 = 0$ is the required linear equation in two variables.

$y = \frac{2}{5}x$

x	0	5	10
y	0	2	4

(graph)

33) (i) $\frac{(5+2\sqrt{3})(7-4\sqrt{3})}{(7+4\sqrt{3})(7-4\sqrt{3})} = \frac{35-20\sqrt{3}+14\sqrt{3}-24}{49-48}$

$= 11 - 6\sqrt{3}$

On comparing, $a = 11, b = 6$

(ii) $3\sqrt{3} - 3 \times 5\sqrt{3} + 5 \times 4\sqrt{3} + 2 \times 6\sqrt{3}$

$= 3\sqrt{3} - 15\sqrt{3} + 20\sqrt{3} + 12\sqrt{3}$

$= 20\sqrt{3} = 20 \times 1.732 = \underline{34.64}$

34) (i) area $= S \times S = 49a^2 + 70ab + 25b^2$

$= (7a+5b)^2$ $[\because x^2 + 2xy + y^2 = (x+y)^2]$

$\therefore$ Side $= 7a + 5b$

Perimeter $= 4 \times$ Side $= 4(7a+5b) = \underline{28a + 20b}$ units

(ii) $\left(\frac{4}{5}x - 2\right)^3$

$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

$= \left(\frac{4}{5}x\right)^3 - 3 \times \left(\frac{4}{5}x\right)^2 \times 2 + 3 \times \frac{4}{5}x \times (2)^2 - (2)^3$

$= \frac{64}{125}x^3 - \frac{6 \times 16}{25}x^2 + \frac{48}{5}x - 8$

$= \frac{64x^3}{125} - \frac{96}{25}x^2 + \frac{48}{5}x - 8$

OR (i) $\left(x+\frac{1}{x}\right)^2 = (3)^2$

$x^2+\frac{1}{x^2}+2 = 9$

$x^2+\frac{1}{x^2} = 7$

Squaring on both sides, $\left(x^2+\frac{1}{x^2}\right)^2 = 49$

$x^4+\frac{1}{x^4}+2 = 49$

$\therefore x^4+\frac{1}{x^4} = 47$ //

(ii) $301^2 - 299^2$

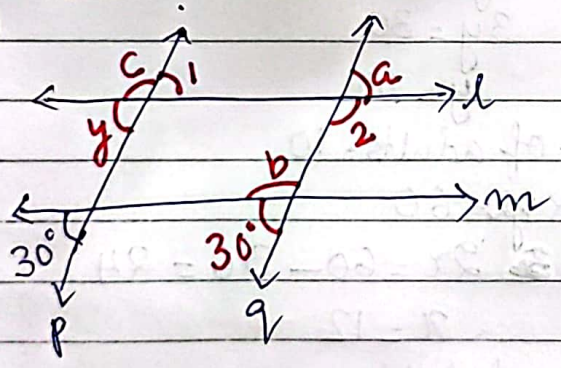
$a^2-b^2 = (a+b)(a-b)$

$= (301+299)(301-299)$

$= 600 \times 2$

$= 1200$

35) (a)



$b = 180° - 30° = 150°$ (linear pair)

$\angle 2 = b = 150°$ (alternate interior angles)

$a = 180° - 150°$ (linear pair)

$= 30°$

$y = 30°$ (corresponding angles)

$c = 180° - y = 180° - 30°$ (linear pair)

$= 150°$

(b) $x+10+4x+25+x+5 = 180°$ (angles on a straight line)

$\Rightarrow 6x+20 = 180°$

$6x = 160°$

$x = \frac{160°}{6} = \frac{80°}{3}$

$\therefore \angle BOC = x+5° = \frac{80°}{3}+5°$

$= \frac{80°+15°}{3} = \frac{95}{3}$

36) A(2,4), B(-2,4), C(-2,-4), D(2,-4)
Ram Raju Ravi Ritu

(i) II quadrant

(ii) 2+2 = 4 units

(iii) $l = 4+4 = 8$ units

$b = 2+2 = 4$ units

perimeter $= 2(l+b) = 2(8+4) = 2 \times 12 = \underline{24 \text{ units}}$

OR

area $= l \times b = 8 \times 4 = \underline{32 \text{ sq. units}}$

37) no. of children $= x$

no. of adults $= y$

(i) ATQ, $2x + 3y = 60$

$2x + 3y - 60 = 0$ is the required linear equations in two variables.

(ii) when $x = 15$, $2 \times 15 + 3y = 60$

$3y = 60 - 30$

$3y = 30$

$y = 10$

$\therefore$ No. of adults $= 10$

OR

when $y = 12$, $2x + 3 \times 12 = 60$

$2x = 60 - 36 = 24$

$x = 12$

No. of children $= 12$

(iii) $3y = 60 - 2x$

$y = \frac{60-2x}{3}$

x	0	30	60
y	20	0	-20

when $x = 0$, $y = \frac{60}{3} = 20$

when $x = 30$, $y = 0$

when $x = 60$, $y = \frac{60-120}{3} = -\frac{60}{3} = -20$

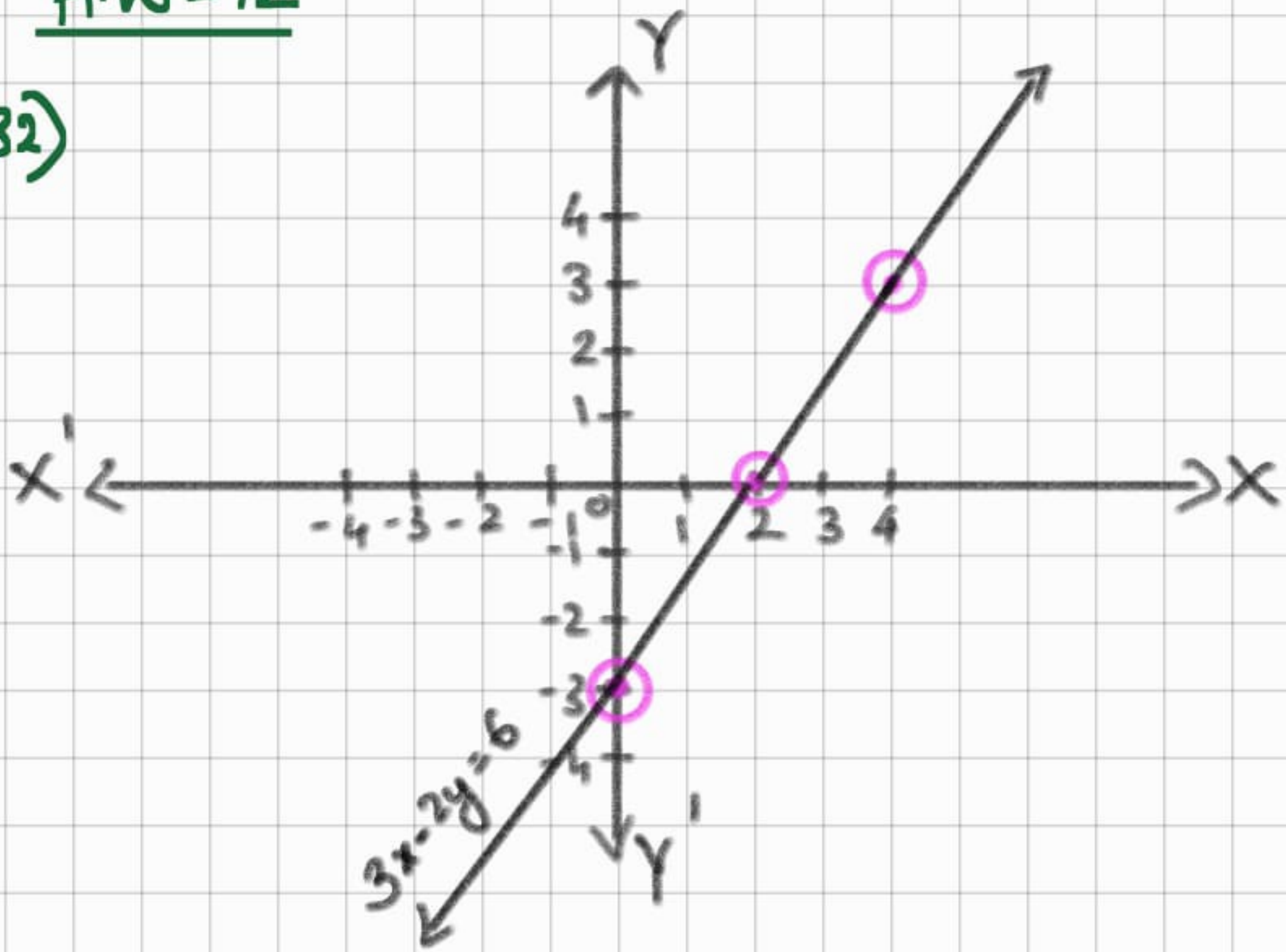
38) (i) (2, 3)

(ii) (2, -1)

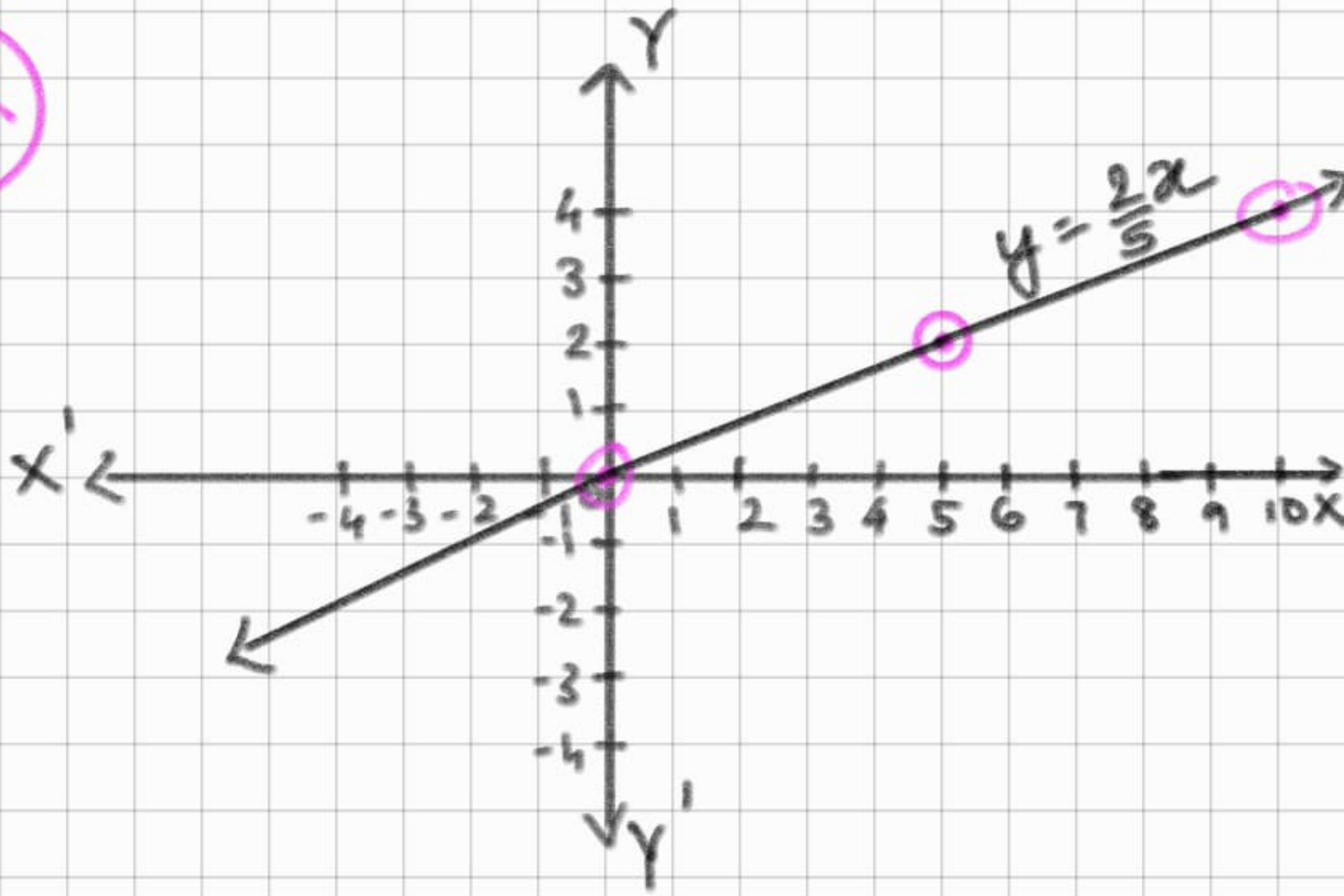
(iii) 3 + 1 = 4 units

H.W - 12

32)


Y
X'
X
Y'
4
3
2
1
-1
-2
-3
-4
-4 -3 -2 -1 0 1 2 3 4
3x-2y=6

OR


Y
X'
X
Y'
4
3
2
1
-1
-2
-3
-4
-4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10
y = 2/5 x