

Year 2 Term 2 class test 1 solutions

Q1a) $8x - y = 27$ — ①
 $4x - 3y = 1$ — ②

Fr ①: $y = 8x - 27$ — ③

Sub ③ into ②:

$$4x - 3(8x - 27) = 1$$

$$4x - 24x + 81 = 1$$

$$-20x = -80$$

$$x = 4$$

$$y = 8(4) - 27$$

$$= 5$$

$$x = 4, y = 5 \#$$

b) $\frac{x}{3} + \frac{y}{4} = 3x - 7y - 37 = 0$

Eqⁿ ①: $\frac{x}{3} + \frac{y}{4} = 0$

$$4x + 3y = 0$$
 — ①

Eqⁿ ②: $3x - 7y - 37 = 0$

$$3x - 7y = 37$$
 — ②

① $\times 3$: $12x + 9y = 0$ — ③

② $\times 4$: $12x - 28y = 148$ — ④

④ - ③: $-37y = 148$

$$y = -4$$

$$4x = -3(-4)$$

$$x = 3$$

$$\therefore x = 3, y = -4 \#$$

Q2a) Grad of AB = $\frac{5-1}{4-(-4)}$
 $= \frac{1}{2}$

Eqⁿ of AB:

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

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

At $(-1, p)$,

$$p = \frac{1}{2}(-1) + 3$$

$$p = 2.5 \# \text{ shown}$$

Q4a) $y = \frac{1}{2}(x - 1)$

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

\therefore the point $(3, 1)$ lies on the line #

b) Grad of OC = $\frac{2-5}{-1}$
 $= -2.5$

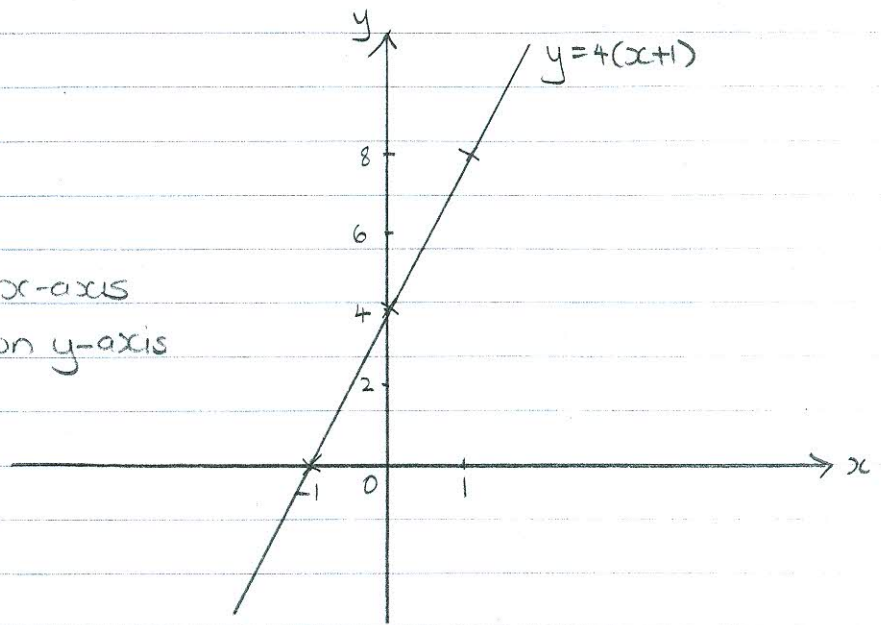
Eqⁿ of OC: $y = -2.5x$ #

4b)

$$y = 4(x+1)$$

x	-1	0	1
y	0	4	8

Scale: 1cm to 1 unit on x-axis
1cm to 2 units on y-axis



4c)

$$m = -\frac{2}{4}$$

$$= -\frac{1}{2}$$

$$\text{Eq}^n: y = -\frac{1}{2}x + 6 \quad \#$$

Q5a) Gradient = -1 for both

∴ they are parallel lines, hence no solution

b) change 2nd eqⁿ to: $2y = -2x + 12$ (same grad & y-intercept)or change 1st eqⁿ to: $2y = -2x + 8$ c) change 2nd eqⁿ to: $y = x + 4$ (diff. grad)Q6 Let fraction be $\frac{x}{y}$

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

$$\frac{x}{y+5} = \frac{1}{5} \quad \text{--- (2)}$$

Fr (1): $x+8 = 2y \quad \text{--- (3)}$

Fr (2): $5x = y+5 \quad \text{--- (4)}$

① × 5: $5x + 40 = 10y \quad \text{--- (5)}$

⑤ - ④: $0 = 9y - 45$

$9y = 45$

$y = 5 \quad \therefore x = 2$

Hence, fraction is $\frac{2}{5} \quad \#$

Q7a) Eqⁿ of AC: $y = 2$ #

bi) $y = 8 + 2x$

Sub $y = 2 \Rightarrow 2 = 8 + 2x$

$$2x = -6$$

$$x = -3$$

\therefore A is $(-3, 2)$ #

ii) Area of $\Delta ABC = \frac{1}{2} \times 3 \times 6$
 $= 9$ units #

Q8)

$$-2x + y = -7$$

$$y = 2x - 7 \text{ --- } \textcircled{1} L_1$$

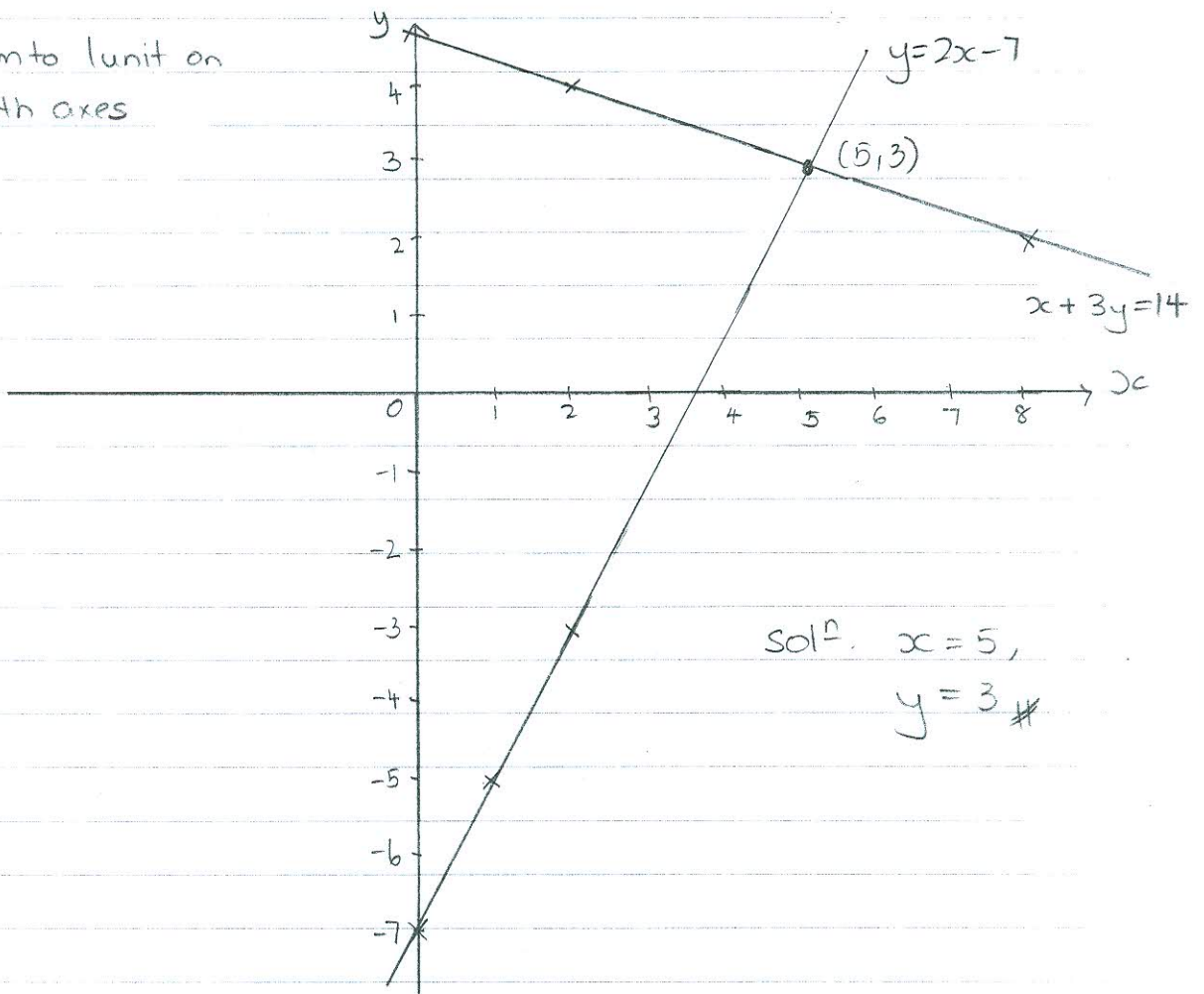
$$x + 3y = 14$$

$$3y = 14 - x$$

$$y = -\frac{1}{3}x + \frac{14}{3} \text{ --- } \textcircled{2} L_2$$

L ₁	x	0	1	2
	y	-7	-5	-3
L ₂	x	2	5	8
	y	4	3	2

Scale: 1cm to 1 unit on both axes



Solⁿ. $x = 5,$
 $y = 3$ #

Q9a) $y = 3x + \frac{1}{2}$

\$0.50 for initial admin charge

\$3 for hourly charge

b) $12a + b = 31.5$ — (1)
 $25a + b = 64$ — (2)

(2) - (1): $13a = 32.5$
 $a = 2.5$ #

$\therefore b = 64 - 25(2.5)$
 $b = 1.5$ # shown.

c) $ac + b = 74$
 $2.5c + 1.5 = 74$
 $c = 29$ hours #

Q10) $ax + (a-1)y = 10$ — (1)
 $(a-2)x + 3ay = 20$ — (2)

Fr (1): $(a-1)y = 10 - ax$
 $y = -\left(\frac{a}{a-1}\right)x + \frac{10}{a-1}$ — (3)

Fr (2): $3ay = 20 - (a-2)x$
 $y = -\left(\frac{a-2}{3a}\right)x + \frac{20}{3a}$ — (4)

For no solution, lines are parallel \therefore same gradient.

$\Rightarrow -\left(\frac{a}{a-1}\right) = -\left(\frac{a-2}{3a}\right)$
 $3a^2 = (a-1)(a-2)$
 $3a^2 = a^2 - 3a + 2$

$2a^2 + 3a - 2 = 0$
 $(2a-1)(a+2) = 0$

$a = -2$ or $\frac{1}{2}$

