

(1) Determine the simultaneous solution to the following equations by first drawing the graphs:

(a) $x + y = 1$ and $2x - y = 5$

$$\begin{array}{ll}
 x + y = 1 & \text{and} \quad 2x - y = 5 \\
 \underline{x\text{-int: } (y=0)} & \underline{x\text{-int: } (y=0)} \\
 x + 0 = 1 & 2x - 0 = 5 \\
 x = 1 & 2x = 5 \\
 \therefore (1; 0) & x = \frac{5}{2} \therefore (\frac{5}{2}; 0) \\
 \underline{y\text{-int: } (x=0)} & \underline{y\text{-int: } (x=0)} \\
 0 + y = 1 & 2(0) - y = 5 \\
 y = 1 & y = -5 \\
 \therefore (0; 1) & \therefore (0; -5) \\
 & \therefore P(2; -1)
 \end{array}$$

(b) $3x - 4 = 2y$ and $9x = 6y$

$$\begin{array}{ll}
 2y = 3x - 4 & \text{and} \quad 6y = 9x \\
 y = \frac{3}{2}x - \frac{4}{2} & y = \frac{9}{6}x \\
 y = \frac{3}{2}x - 2 & y = \frac{3}{2}x + 0 \\
 \therefore m = \frac{3}{2} \uparrow & \\
 c = -2 &
 \end{array}$$

$\therefore$ No simultaneous solution, because the lines are parallel.

(2) Determine the solution graphically: $\{(x; y) / 2x = -y - 1\} \cap \{(x; y) / 2y = 4x + 6\}$

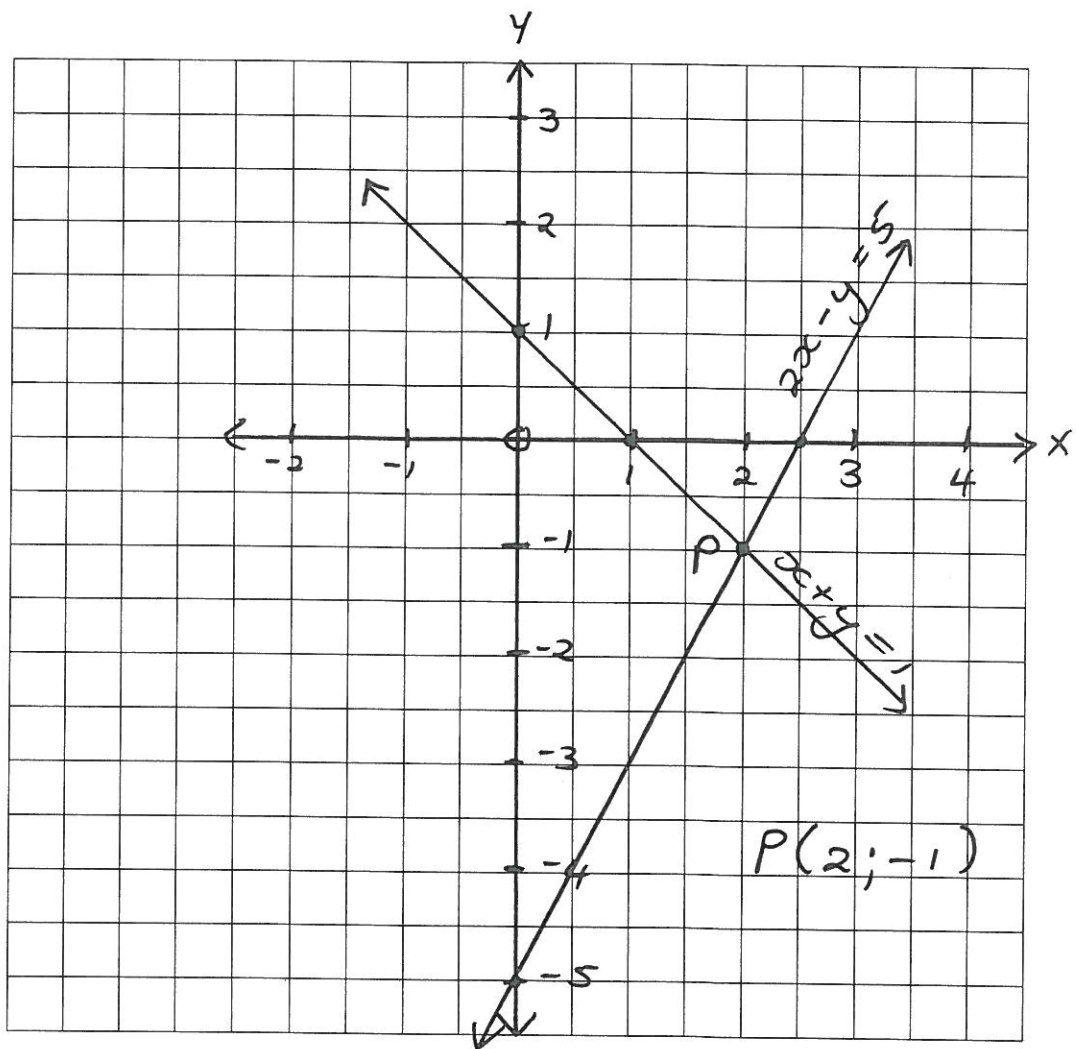
$$\begin{aligned} 2x &= -y - 1 & \text{and} & & 2y &= 4x + 6 \\ y &= -2x - 1 & & & y &= \frac{4x}{2} + \frac{6}{2} \\ & & & & y &= 2x + 3 \\ \therefore m &= \frac{-2}{1} \downarrow \rightarrow & & & \therefore m &= \frac{2}{1} \uparrow \text{ or } \frac{-2}{-1} \downarrow \rightarrow \\ c &= -1 & & & & \end{aligned}$$

or

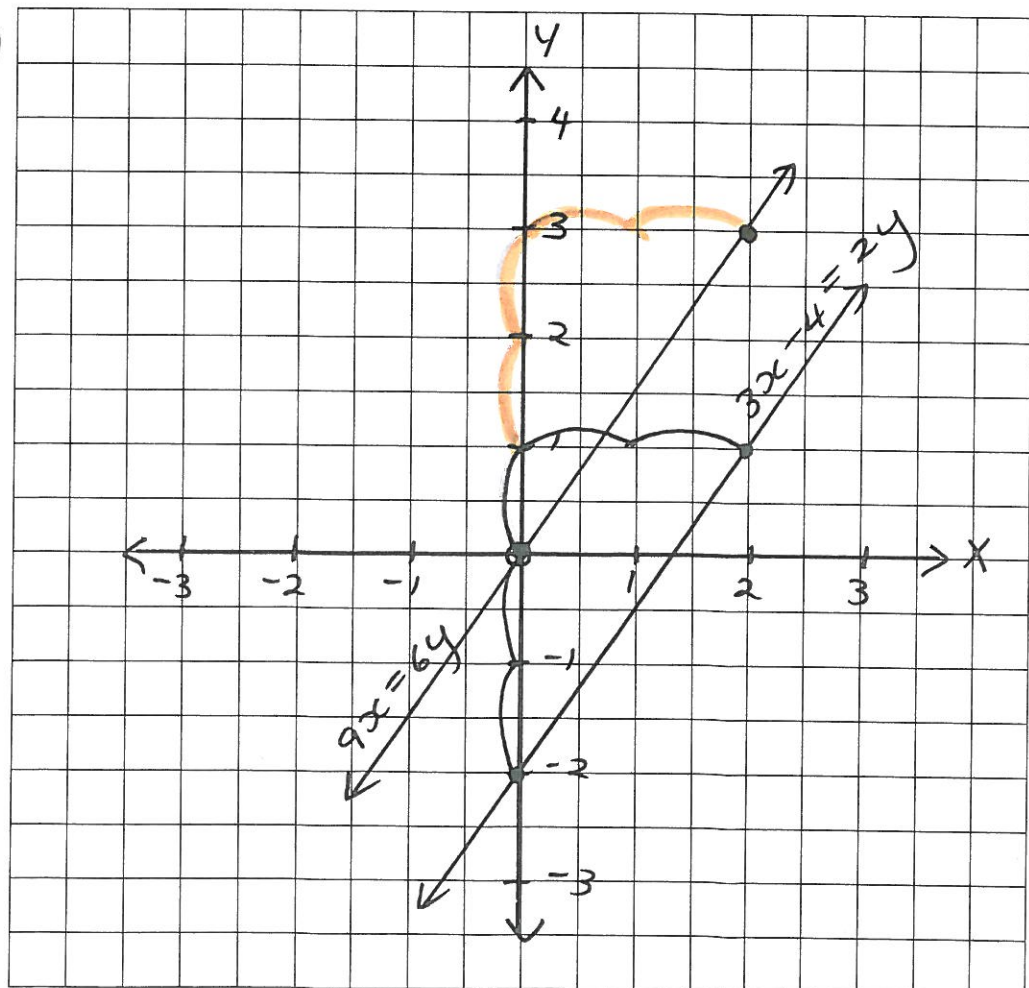
$$\begin{aligned} \text{x-int: } (y=0) & & \text{x-int: } (y=0) & \\ 0 &= -2x - 1 & 2(0) &= 4x + 6 \\ 2x &= -1 & 4x &= -6 \\ x &= -\frac{1}{2} & x &= \frac{-6}{4} = -\frac{3}{2} \\ \therefore (-\frac{1}{2}; 0) & & \therefore (-\frac{3}{2}; 0) & \\ \text{y-int: } (x=0) & & \text{y-int: } (x=0) & \\ y &= -2(0) - 1 & 2y &= 4(0) + 6 \\ y &= -1 & 2y &= 6 \\ \therefore (0; -1) & & y &= 3 \\ & & \therefore (0; 3) & \end{aligned}$$

$$\therefore P(-1; 1)$$

(1)(a)



(1)(b)



(2)

