

(1) [5] Determine an equation of the line containing the point $(2, -5)$ which is parallel to the line containing the points $(2, -9)$ and $(3, -10)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-10 - (-9)}{3 - 2} = \frac{-1}{1} = -1$$

$$\therefore y - y_0 = m(x - x_0)$$

$$y - (-5) = -1(x - 2)$$

$$\boxed{y + 5 = -(x - 2)}$$

$$\text{or } \boxed{y = -x - 3}$$

(2) [5] Determine the point of intersection of the following pair of lines:

$$\textcircled{1} \quad 4x - 3y = 2$$

$$\textcircled{2} \quad x - 2y = 4$$

$$\text{Using } \textcircled{2} : x = 4 + 2y$$

$$\therefore \textcircled{1} \Rightarrow 4(4 + 2y) - 3y = 2$$

$$16 + 8y - 3y = 2$$

$$5y = -14$$

$$y = -\frac{14}{5}$$

$$\therefore x = 4 + 2\left(-\frac{14}{5}\right)$$

$$= 4 - \frac{28}{5}$$

$$= \frac{20 - 28}{5} = -\frac{8}{5}$$

$$\therefore \text{point is } \left(-\frac{8}{5}, -\frac{14}{5}\right)$$

(3) [5] Items are produced at a cost \$0.65 per item and sell for \$0.90 per item. The daily operational overhead is \$320. Determine the number of items which must be produced and sold each day in order to break even.

Let x = number of items produced each day.

$$C = 320 + 0.65x$$

$$R = 0.90x$$

$$C = R$$

$$320 + 0.65x = 0.90x$$

$$0.25x = 320$$

$$x = \frac{320}{0.25} = 1280.$$

∴ 1280 items must be produced to break even.