

1) Consider $5x - 2b = \frac{17}{3}$.

a) Find x for $b = \frac{1}{2}, -\frac{1}{4}$: i) $5x - 2\frac{1}{2} = \frac{17}{3}$

$$\Leftrightarrow 5x = \frac{17}{3} + 1 = \frac{20}{3}$$

$$\Rightarrow \underline{\underline{x = \frac{4}{3}}}$$

ii) $5x - 2(-\frac{1}{4}) = \frac{17}{3}$

$$\Leftrightarrow 5x = \frac{17}{3} - \frac{1}{2} = \frac{34}{6} - \frac{3}{6} = \frac{31}{6} \Rightarrow \underline{\underline{x = \frac{31}{30}}}$$

b) x as a function of b : $5x = \frac{17}{3} + 2b$

$$\Leftrightarrow \underline{\underline{x(b) = \frac{1}{5} \left(\frac{17}{3} + 2b \right)}}$$

So $x(\frac{1}{2}) = \frac{1}{5} \left(\frac{17}{3} + 1 \right) = \frac{4}{3}$

$$x(-\frac{1}{4}) = \frac{1}{5} \left(\frac{17}{3} - \frac{1}{2} \right) = \frac{31}{30} \quad \checkmark$$

2) Consider $3x - 16 + 2x^2 = 5$

$$\Rightarrow x^2 + \frac{3}{2}x - \frac{21}{2} = 0 \quad \begin{array}{l} \swarrow \\ \text{equivalent to} \end{array} \Leftrightarrow x^2 + px + q = 0$$

which has the solution $x_{1,2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$

$$\Rightarrow x_{1,2} = -\frac{3}{4} \pm \sqrt{\frac{9}{16} + \frac{21}{2}} = -\frac{3}{4} \pm \frac{1}{4}\sqrt{177} = \begin{cases} +2.576 \\ -4.076 \end{cases}$$

Sorry, typo on homework sheet gave $3x - 16 - 2x^2 = 5$

$$\Leftrightarrow x^2 - \frac{3}{2}x + \frac{21}{2} = 0 \Rightarrow x_{1,2} = \frac{3}{4} \pm \frac{1}{4}\sqrt{-159} \quad ; \text{Complex solution}$$



3) Consider i) $x - 2y = 5$ Solve for x & y .
ii) $3x = -2 + y$

i) $\rightarrow x = 5 + 2y$, plug into ii) $15 + 6y = -2 + y$

$$\Leftrightarrow 5y = -17$$

$$\Rightarrow \underline{y = -\frac{17}{5}}$$

$$\text{plug into i)} \Rightarrow x = 5 + \frac{34}{5}$$
$$= \underline{\underline{-\frac{9}{5}}}$$