SIT190 - Squire - Weeks 2-3 - OnTrack Assessment

Trimester 1, 2024

Task 1: Finding the equation of a line

1. Find the equation of the line given the points $(2, 3)$ and $(5, 12)$ lie on this line.
2. Explain how you checked that your answer was correct.

Task 2: Simultaneous Equations - graphical interpretation

1. For each of the set of linear simultaneous equations
   (a) Use either the elimination method or substitution method to find the point(s) of intersection (if they exist).
   (b) Find the x- and y-intercepts showing all working.
   (c) Sketch the graphs of the 2 lines represented by these equations on the same set of axes,
   (d) State whether there is one, infinitely many or no solution and explain why using your graphs.
   (e) If there is a unique solution, please state what it is.

Set 1

$$x + 4y = 2$$
$$4x + 8y = 7$$

Set 2

$$3x - 6y = 9$$
$$8y - 4x = -12$$

Task 3: Matrices

A point (x, y) can be represented as a matrix $\begin{bmatrix} x \\ y \end{bmatrix}$.

For example, the point $(3, -2)$ would be $\begin{bmatrix} 3 \\ -2 \end{bmatrix}$. Watch, Read and Think 3.3 demonstrates how to translate points using a transformation matrix. You may find it useful to revise Example 1.

1. Shift the point $(5, 6)$ using the transformation matrix $\begin{bmatrix} -1 \\ 1 \end{bmatrix}$.
2. Shift the point $(2, 7)$ using the transformation matrix $\begin{bmatrix} -1 \\ 1 \end{bmatrix}$.
3. Find the line that connects the two points you found as the answers in Tasks 3.1 and 3.2. Compare this line to the line you found in Task 1.1.

1 Submission

To successfully complete this assessment, you must submit:

Task 1

- Give the equation of the line showing all working.
- Explanation (1-2 sentences) on how you checked your answer was correct.

Task 2 Submit the following for **each** set of equations:

- All working for finding the point of intersection (if it exists) and the x-intercepts and y-intercepts.
- Sketch the graphs labelling the x and y axis, the origin, point of intersection (if it exists) and the x-intercepts and y-intercepts.
- State the number of solutions and explain your answer using the sketch of the graphs (1-2 sentences).
- Give the unique solution (if it exists)

Task 3 Submit the following including all working:

- The points obtained by shifting using the transformation matrix.
- The line connecting these two points.
- Comparison of the line in 3.3 and 1.1 in terms of gradient of the lines.

Useful resources

- Watch, Read and Think 2.2 and 2.3 has useful information on sketching graphs and solving linear equations.

- Watch, Read and Think 3.3 has useful information on matrices.