ECON101 - Maths seminar material - Week 1

Algebra

1. Given the following pair of coordinate points (x, y), find and sketch the linear equation $y = ax + b$. Where necessary, make sure you enter any rational number as a fraction, and not as a decimal number.

   (a) $A = (-2, -1)$, $B = (9, -4)$ **[3]**

2. Given $A = \begin{pmatrix} 9 & 8 \\ 2 & -5 \end{pmatrix}$, $B = \begin{pmatrix} -1 & 2 \\ 1 & 1 \end{pmatrix}$, calculate the following matrix operations. Where necessary, make sure you keep any rational number as a fraction, and not as a decimal number.

   (a) $A + B$ **[1]** (b) $2A - 3B$ **[1]**

   (c) $5A + 2B$ **[1]** (d) AB **[3]** (e) $|A|$ **[2]** (f) $|B|$ **[2]**

   (g) A^{-1} **[2]** (h) B^{-1} **[2]**

3. Find the values of x which solve the following equations. Note that $x_1 < x_2$ and make sure to enter your answers in square brackets, e.g.$[-5, 3]$.

   (a) $-2x^2 + 10x + 9 = 0$ **[3]** (b) $x^2 + 20x + 11 = 0$ **[3]**

4. Solve the following pair of equations. Make sure to enter your answers in square brackets, e.g. $[5, -3]$.

   (a) $\begin{cases} 16x - 3y = 50 \\ 8x + 2y = 4 \end{cases}$ **[2]**