1. (i) The line passing through the points \((-1, 4)\) and \((2, 5)\) is \(y = \frac{13}{3} + \frac{1}{3}x\).

(ii) The line passing through the point \((-1, 4)\) with slope 4 is \(y = 8 + 4x\).

2. Exercise 1 part (i) gives the line passing through the points \((-1, 4)\) and \((2, 5)\) as \(y = \frac{13}{3} + \frac{1}{3}x\). It is only necessary to determine if the line also passes through the additional point \((5, 6)\). Clearly this is the case.

3. For the rational function

\[
y = \frac{2x + 6}{(x + 1)(x - 2)}.
\]

(i) \(y = 0\) requires \(2x + 6 = 0\) or \(x = -3\).

(ii) \(y \to \infty\) if \(x + 1 = 0\) or \(x - 2 = 0\) that is if \(x = -1\) or \(x = 2\).

(iii) We have the following values

\[
\begin{array}{cccccccc}
  x: & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 & 5 \\
  y: & -\frac{1}{9} & 0 & \frac{1}{2} & \infty & -3 & -4 & \infty & 3 & \frac{7}{5} & \frac{8}{5}
\end{array}
\]

(iv) The information obtained in parts (i), (ii) and (iii) enables us to sketch the graph shown in figure 1.

4. The graphs are shown in figures 2 and 3.

5. The graphs are shown in figures 4, 5 and 6.

6. The graphs are shown in figures 7, 8 and 9.
Figure 2: Graph for exercise 4(i).

Figure 3: Graph for exercise 4(ii).

7. We have

\[ f(x) = u(x - 2) + u(x - 4) - 2u(x - 5). \]

Note alternative representations exist.
Figure 4: Graph for exercise 5(i).

Figure 5: Graph for exercise 5(ii).

Figure 6: Graph for exercise 5(iii).
Figure 7: Graph for exercise 6(i).

Figure 8: Graph for exercise 6(ii).

Figure 9: Graph for exercise 6(iii).