Name:
Group A
Result:

1. [2 *points*]

Solve the following inequalities:

a) $x^2 - 5x \geqslant 14$

b) $\dfrac{x - 2}{2x + 1} > 1$

2. [2 *points*]

Let $f(x) = x^2 + 10x + 17$, where $x \in \mathbb{R}$.

(a) Write $f(x)$ in the vertex form.

(b) Hence state the minimum value of $f(x)$.

3.   [2 *points*]

Sketch the graph of $f(x) = \frac{1}{4}(x-6)(x+2)$. Clearly indicate the x-intercepts, y-intercept and the vertex.

4.   [2 *points*]

Find the possible values of k for which the equation:

$$\frac{1}{2}x^2 + (k+2)x - 3k + 14 = 0$$

has exactly one solution.

5.   [2 *points*]

Solve the simultaneous equations:

$$\begin{cases} y = x^2 - 2x + 3 \\ y - x = 7 \end{cases}$$

6.   [4 *points*]
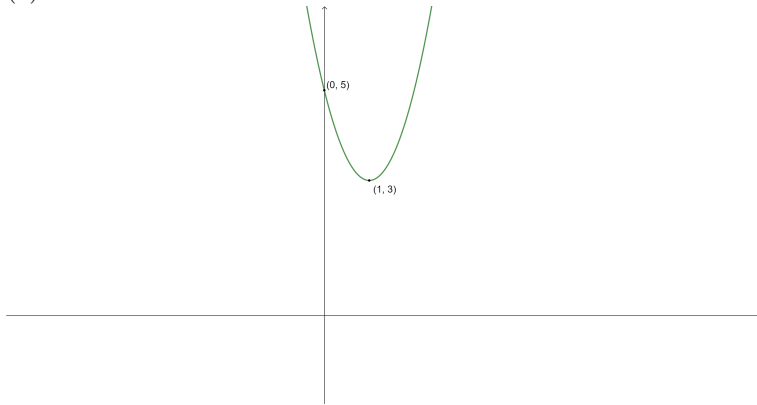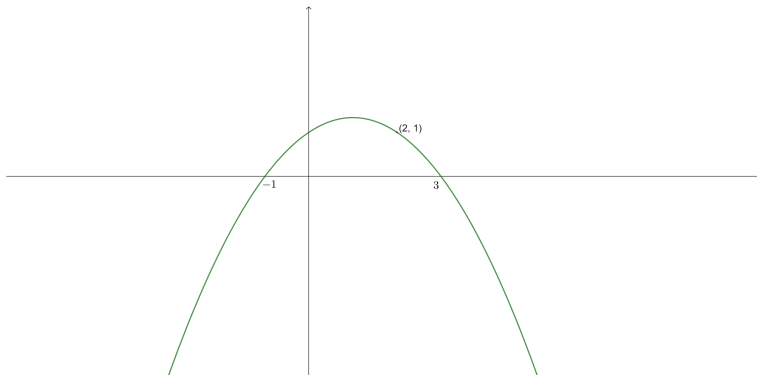
Find the equation of the quadratic given its graph:

(a)

(b)

7.   [2 *points*]

Solve the equation:

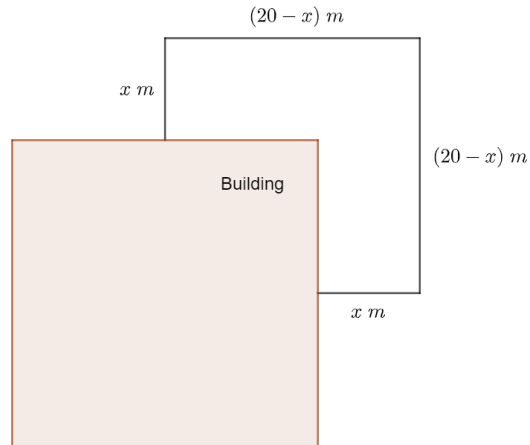$$4\left(\frac{x}{x+1}\right)^2 + 11\left(\frac{x}{x+1}\right) = 3$$

8.   [4 *points*]

A farmer has 40 metres of fencing and wants to enclose a piece of land. He decides to use a right-angled corner of a building, as in the diagram:

(a) Show that area he can enclose is given by the expression:

$$A(x) = 40x - 3x^2 \ \ [m^2]$$

(b) For what value of x is the area maximal, find this maximal area.