

Name:

Group A

Result:

1.*[3 points]*

Solve the following inequalities:

(a) $x^2 - 5x \geq 6$

(b) $2x^2 < 3x$

(c) $\frac{2x - 1}{x + 1} > 1$

2.

[2 points]

Let $f(x) = x^2 + 6x + 13$.(a) Write $f(x)$ in the vertex form.(b) Hence state the minimum value of $f(x)$.**3.**

[2 points]

Sketch the graph of $y = (3 - x)(x + 1)$. Clearly indicate the axes intercepts and the position of the vertex.**4.**

[2 points]

Given that the equation:

$$x^2 + 3kx + 5k^2 - k = 0$$

has two distinct real solutions, find the possible values of k , where $k \in \mathbb{R}$.

5.

[3 points]

Solve the simultaneous equations:

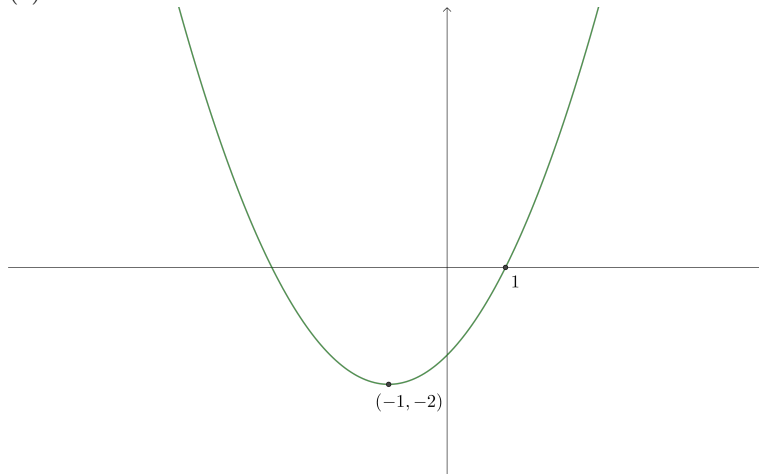
$$\begin{cases} y = x^2 - 3x - 2 \\ 5x - y = -7 \end{cases}$$

6.

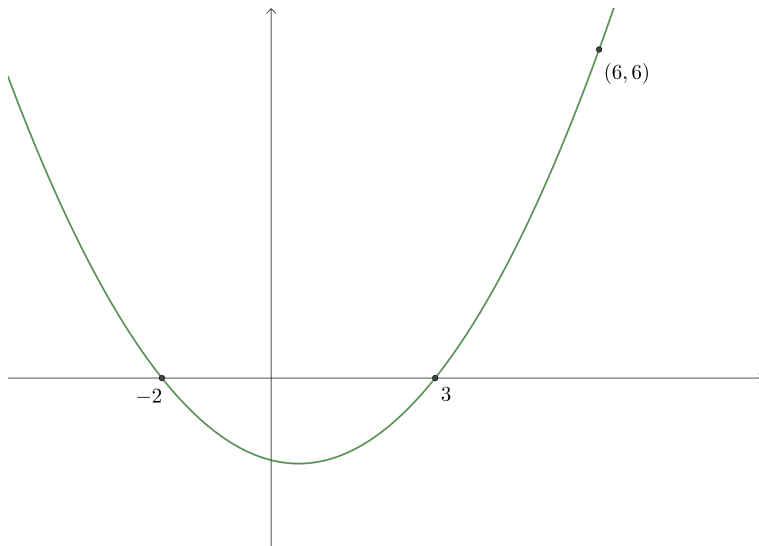
[4 points]

Find the equation of the quadratic given its graph:

(a)



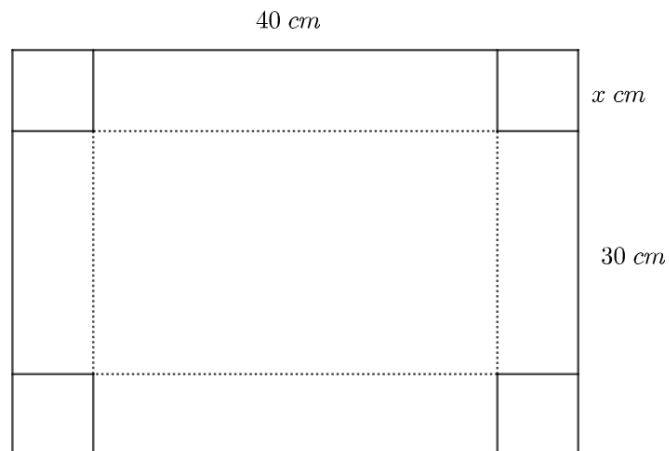
(b)



7.

[4 points]

A rectangular piece of paper has a length of 40 cm and a width of 30 cm . A square of side length $x\text{ cm}$ has been removed from each corner of the piece. The paper has then been folded along the dotted lines to form an open box.



(a) Show that lateral surface area of the outside of the box is given by:

$$A(x) = 140x - 8x^2$$

(b) For what value of x is the lateral surface area maximal? Find this maximal area.