Name:
Result:

1. [6 *points*]

Find a quadratic equation which satisfies the following conditions:

a) Vertex at $(1, 3)$, y-intercept at $y = 2$.

b) One of the x-intercepts at $(2, 0)$, axis of symmetry at $x = -1$, graph passes through $(4, 4)$.

c) Graph passes through $(2, 2.5), (4, 10)$ and $(8, 37)$.

GDC

2. [4 *points*]

Consider the following equation:

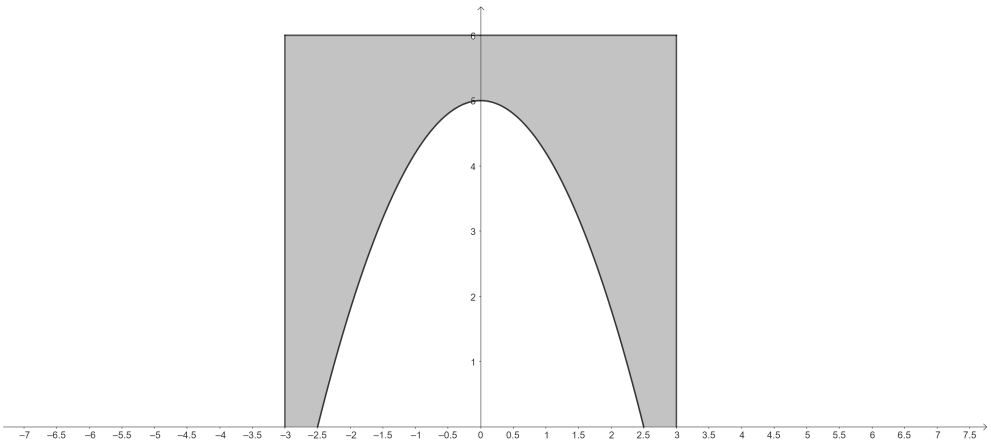
$$2x^2 - 5x + 1 = 0$$

a) Show that this equation has two distinct real solutions.

b) Let the solutions be α and β. Without solving the equation, find quadratic equations whose solutions are α^2 and β^2.

3. [5 *points*]

A large crate is to be pushed through a tunnel in a shape of parabola shown below:



The dimensions of the crate are $4\ m \times 2\ m \times 10\ m$. The tunnel is 5 metres wide at the base and 5 metres high at the highest point. Is is possible to fit the crate? Note that the crate can be placed on the side or on its back etc.

GDC

4. [5 *points*]

Consider the equation:

$$x^2 + (m+2)x + 3m - 2 = 0$$

Find the values of parameter m for which the equation has two real, **negative** solutions.

GDC

5. [5 *points*]
A ball is kicked from a 40-metre high cliff into the sea. It reaches a maximum height of 48 metres after 3 seconds.

a) Find the function $h(t)$ for the height of the ball above the sea level after t seconds.

b) Find the height of the ball after 4 seconds.

c) How long will it take for the ball to hit the water?