Question 1:

(a)[5 points] Find the equation of the line through $(1, -3)$ parallel to $2x - 5y + 4 = 0$.

(b)[5 points] Find the points of intersection of the graphs of the linear functions

$$f(x) = 2x - 10 \quad \text{and} \quad g(x) = -3x - \frac{1}{2}$$

Question 2:

(a)[5 points] Express the quadratic function $f(x) = -x^2+6x-10$ in standard form and sketch the graph of the function. Label the y-intercept and the vertex on your graph.

(b)[5 points] Find the the points of intersection of the graphs of

$$y = 2x - 2 \text{ and } y = 1 - x^2$$

Question 3:

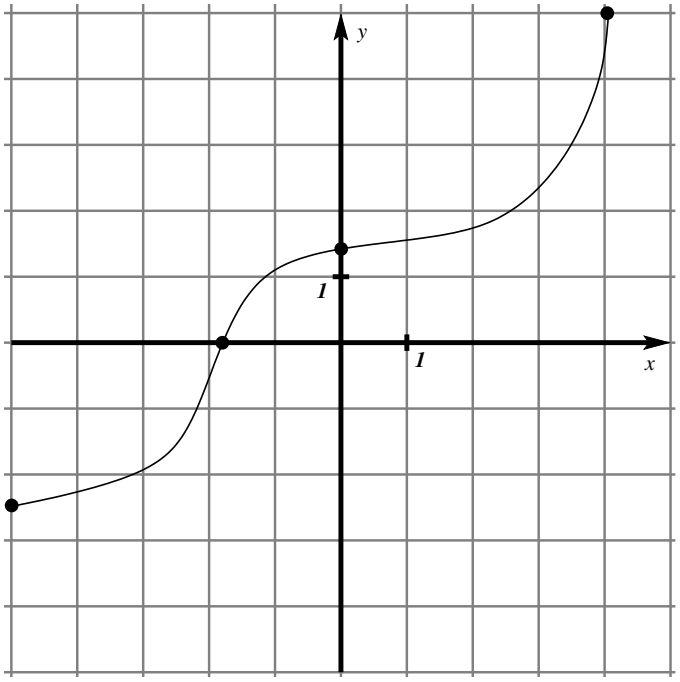
(a)[5 points] Sketch the graph of $y = |5 - 3x|$. Label the x and y intercepts on your graph.

(b)[5 points] Let $f(x) = 2x + \dfrac{1}{x-1}$ and $g(x) = \dfrac{1}{x}$. Compute and simplify $(f \circ g)(x)$ and state the domain.

Question 4:

(a)[5 points] The one-to-one function $f(x) = \dfrac{x+1}{x+2}$ has domain $(-\infty, -2) \cup (-2, \infty)$ and range $(-\infty, 1) \cup (1, \infty)$. Find $f^{-1}(x)$ and state its domain and range.

(b)[5 points] Below is the graph $y = f(x)$ for some function f. Sketch the graph of $y = f^{-1}(x)$ on the same coordinate axes. Your graph must be accurate to receive full marks.



Question 5: A farmer wishes to build two enclosures using fencing. One enclosure must be a square, and the second must be a rectangle with the length of one side equal to the side length of the square. The two enclosure are not connected. 1000 m of fencing is available for the project.

(a)[5 points] Let x represent the side length of the square and $A(x)$ the total area of both enclosures as a function of x. Find a formula for $A(x)$.

(b)[5 points] Find the dimensions of the square and rectangle which enclose the largest area possible. (The solution may appear obvious to you, but prove it using $A(x)$ from part (a).)