26 August 2014 Functions

- (1) (a) Define (verbally, to your group, in your own words) the following terms: *function*, *vertical line test, domain, range*.
 - (b) Sketch an example of a graph that is not the graph of a function.

(c) Sketch an example of a function with domain $(0, \infty)$ and range [0, 1).

(d) Find the domain of the following functions: 2r + 1

(i)
$$f(x) = \frac{2x+1}{x^2+x-2}$$

(ii)
$$f(x) = \frac{\sqrt[3]{x}}{x^2 + 1}$$

(iii)
$$h(x) = \sqrt{4-x} + \sqrt{x^2 - 1}$$

(2) Sketch the following graphs:

(a)
$$y = (x-2)^3 + 3$$

(b)
$$y = x^2 - 4x + 2$$

(c)
$$y = 1 + \frac{1}{x}$$

(3) What is the difference between the functions $f(x) = \frac{x^2 - 4}{x - 2}$ and g(x) = x + 2?

- (4) Let ℓ_1 be the line with slope 1/2 and y-intercept -4. Let ℓ_2 be the line which passes through the points (-1, 4) and (5, -2).
 - (a) Find equations for the lines ℓ_1 and ℓ_2 of the form y = mx + b.

(b) Which line is increasing as a function of x? Which line is decreasing?