## 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:
(i) $f(x)=\frac{2 x+1}{x^{2}+x-2}$
(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) $y=x^{2}-4 x+2$
(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 $\ell_{1}$ be the line with slope $1 / 2$ and $y$-intercept -4 . Let $\ell_{2}$ be the line which passes through the points $(-1,4)$ and $(5,-2)$.
(a) Find equations for the lines $\ell_{1}$ and $\ell_{2}$ of the form $y=m x+b$.
(b) Which line is increasing as a function of $x$ ? Which line is decreasing?

