Ph1105 Problem Sheet A

- Simplify the following 1.
- $(i) \quad (\frac{8}{125})^{-\frac{1}{3}}$
- $64^{\frac{5}{6}}$ (ii)
- $3\log_a 2 + \log_a 8 \log_a 4.$ (iii)
- (iv) $\frac{1}{2}\ln 7 + 2\ln 3$.
- Solve for x2.
- $\log_a 5 + \log_a (x 3) = \log_a (2x 3)$ (i)
- $2\log_{10} x \log_{10}(20 x) = 1.$ (ii)
- (iii) $\ln x = 2 + \ln 3.$
- $\log_2(x^{\frac{5}{2}}) + \log_2\sqrt{x} = 6$ (iv)

Let the functions f and g be defined by $f(x) = \sqrt{x-2}$ and $g(x) = x^2 + 3$. Give 3. the rule that defines the functions $f \circ g$ and $g \circ f$.

- Evaluate the following limits 4.
- (i)
- (ii)
- $\lim_{x \to 2} (x^3 + 3x^2 x 5)$ $\lim_{x \to 3} \frac{x^2 3x + 2}{2x^2 + x 5}$ $\lim_{x \to 2} \frac{5x^3 + 4}{x 3}.$ (iii)
- Consider the function f(x) defined by 5.

$$f(x) = -2$$
, if $x < 1$,
 $f(x) = +2$, if $x \ge 1$.

Does $\lim_{x \to 1} f(x)$ exist? Is f(x) continuous at x = 1?