

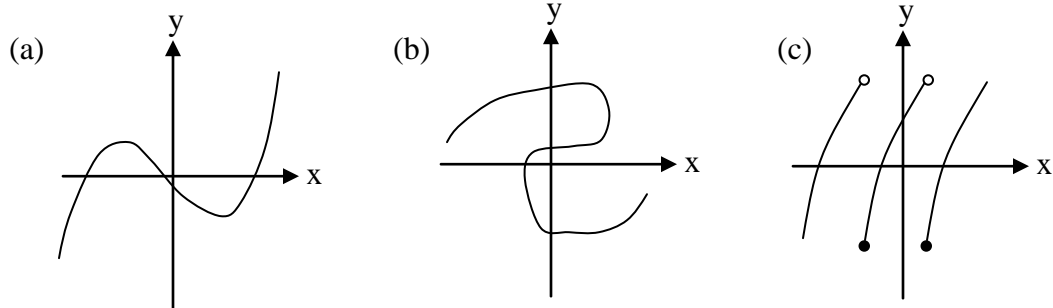
Assignment 1

MATH 1500

(Follows Unit 4 in the manual)

Values

- [6] 1. Determine which of the following graphs is the graph of a function of the type $y = f(x)$. Give reasons for your answers. [cf. Section 1.1]



- [6] 2. For each of the following functions, find the domain and the range.

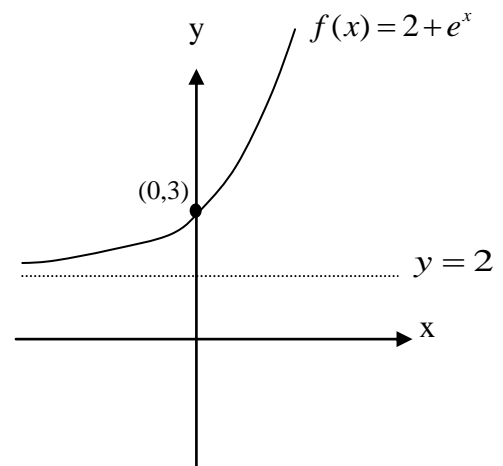
(a) $f(x) = \sqrt{x-4}$ (b) $f(x) = \sqrt{x^2-1}$ (c) $f(x) = \frac{x^2-4x+5}{x^2-4x+4}$

- [5] 3. Given $f(x) = \sqrt{x+3}$ and $g(x) = x^2 - 7$, find the composite functions $f \circ g$ and $g \circ f$. Find also the domains of $f \circ g$ and $g \circ f$. [cf. Section 1.3]

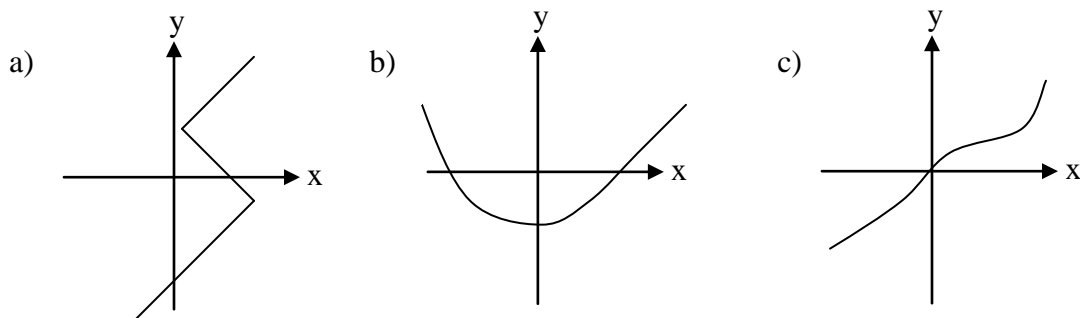
- [6] 4. The function $f(x) = 2 + e^x$ has the graph shown.

- (a) Find the inverse function $f^{-1}(x)$.
(b) Find the domain and the range of $f^{-1}(x)$.
(c) Sketch the graph of $f^{-1}(x)$.

[cf. Sections 1.5 and 1.6]



- [6] 5. Each of the following graphs is the graph of a function of the type $y = f(x)$. For which of these functions does an inverse function $y = f^{-1}(x)$ exist? Give reasons for your answers.



- [9] 6. Each of the following functions is invertible. Find the inverse function $f^{-1}(x)$. Give the domain and range of the inverse function.

(a) $f(x) = 3x + 4$ (b) $f(x) = \sqrt{x-4}$ (c) $f(x) = \frac{1}{x-2}, x > 2$

- [6] 7. Pictured on the right is the graph of a discontinuous function $f(x)$. Use this graph to determine the following limits for $f(x)$. [cf. Section 2.2]

(a) $\lim_{x \rightarrow 1^-} f(x)$

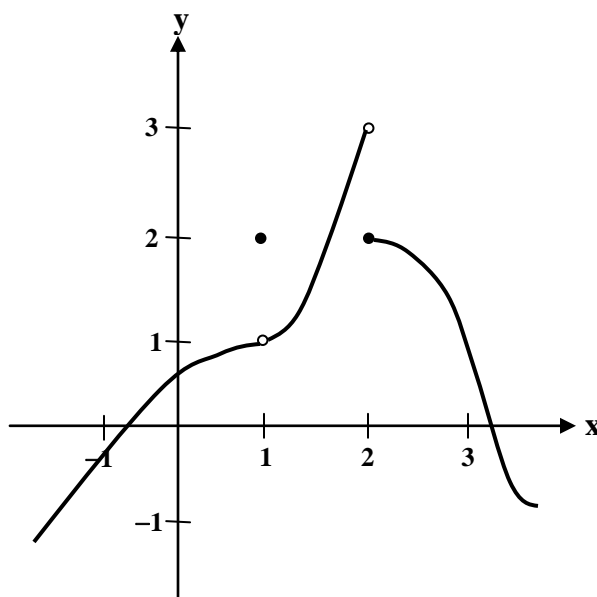
(b) $\lim_{x \rightarrow 1^+} f(x)$

(c) $\lim_{x \rightarrow 1} f(x)$

(d) $\lim_{x \rightarrow 2^-} f(x)$

(e) $\lim_{x \rightarrow 2^+} f(x)$

(f) $\lim_{x \rightarrow 2} f(x)$



[20] 8. Evaluate each of the following limits or explain why it does not exist.
[cf. Section 2.3]

(a) $\lim_{x \rightarrow 2} \frac{x^2 - x - 2}{x^2 + x - 6}$

(b) $\lim_{x \rightarrow 0} \frac{x}{\sqrt{x+1} - 1}$

(c) $\lim_{x \rightarrow 8} \frac{x-8}{x^{1/3} - 2}$

(d) $\lim_{x \rightarrow 1} \sqrt{x-1}$

[6] 9. Use the Squeeze Theorem to find $\lim_{x \rightarrow 0} \sqrt{x^2 \cos^2 \frac{1}{x}}$.

Total = 70