

Assignment 1

Math 1500

(Follows Unit 4 in the manual)

Values

- [6] 1. Find the domain and range of $f(x) = \frac{1}{\sqrt{4-x^2}}$.
- [4] 2. Solve the inequality $x^2 - 7x + 12 < 0$
- [9] 3. Determine whether each of the following functions is odd, even, or neither and justify your answer.
- a) $f(x) = 2 + 3x^3$ b) $f(x) = 1 + x^2 + x^4$ c) $f(x) = \sin x$
- [4] 4. Find the inverse of the function $y = \frac{5x+1}{1+2x}$.
- [4] 5. Simplify the following expression.
- $$3\ln^3 \sqrt{x} + 4\ln^4 \sqrt{x}$$
- [6] 6. A rectangle has area 16m^2 . Express the perimeter of the rectangle as a function of the length of one of its sides.
- [6] 7. Let $f(x) = \sqrt{x-1}$ and $g(x) = x^2$. Find $f \circ g$ and $g \circ f$ and state their domains.
- [15] 8. Evaluate each of the following limits or explain why it does not exist.
- (a) $\lim_{x \rightarrow 3^-} \frac{4}{x-3}$ (b) $\lim_{x \rightarrow 1} \frac{x^2 + x - 2}{x^2 - 3x + 2}$ (c) $\lim_{x \rightarrow 0} \frac{\sqrt{2-x} - \sqrt{2}}{x}$
- (d) $\lim_{x \rightarrow 1} \frac{\sqrt{x} - x^2}{1 - \sqrt{x}}$ (e) $\lim_{x \rightarrow -4^-} \frac{|x+4|}{x+4}$
- [6] 9. Use the Squeeze Theorem to answer the following question.

If $3x \leq f(x) \leq x^3 + 2$ for $0 \leq x \leq 2$ then find $\lim_{x \rightarrow 1} f(x)$

[10] 10. Consider the following function:

$$h(x) = \begin{cases} x & \text{if } x < 0 \\ x^2 & \text{if } 0 \leq x \leq 2 \\ 8 - x & \text{if } x > 2 \end{cases}$$

Sketch the graph of the function and find the following:

$$\lim_{x \rightarrow 0} h(x), \lim_{x \rightarrow 0^-} h(x), \lim_{x \rightarrow 1} h(x), \lim_{x \rightarrow 2^-} h(x), \lim_{x \rightarrow 2^+} h(x), \lim_{x \rightarrow 2} h(x)$$

Total = 70