Carleton University

Math 1007A, Pretest #2

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1. Find exact value of

$$(a)\ \log_{10} 25 + 2\log_{10} 2, \qquad (b)\ \sin(\cos^{-1}(\frac{4}{5})).$$

$$(c)\ \tan(\arcsin\frac{1}{2})$$

2. Find the domain and range of $h(x) = \ln(x+6)$ and sketch the graph of h.

3. Consider the following function

$$f(x) = \begin{cases} \sqrt{-x} & \text{if } x < 0 \\ 3 - x & \text{if } 0 \leq x < 3 \\ (x-3)^2 & \text{if} x > 3 \end{cases}$$

Discover whether f is continuous at 0 and 3, and explain why. Find the type of discontinuity, if there is any.

4. For what value(s) of the constant c is the function f continuous on $(-\infty, \infty)$

$$f(x) = \begin{cases} 4cx^2 + 2x & \text{if } x < 1 \\ 6x^3 - c^2x & \text{if } x \geq 1 \end{cases}$$

5. Find the limit. Justify your answer. Determine whether each of the given function have a horizontal or vertical assymptotes.

$$(a)\ \lim_{x\to\infty}\frac{\sqrt{x^2-9}}{2x-6} \quad (b)\ \lim_{x\to-\infty}\frac{\sqrt{x^2-9}}{2x-6}$$

$$(c)\ \lim_{x\to0^+}\tan^{-1}(1/x) \quad (d)\ \lim_{x\to-4}\frac{\sqrt{x^2+9}-5}{x+4}$$

$$(e)\ \lim_{x\to0}(\frac{1}{x}-\frac{1}{|x|})$$

6. Find the horizontal and vertical asymtotes of the following functions. Justify your answer.

(a)

$$y = \frac{1 + x^4}{x^2 - x^4}$$

(b)

$$y = \frac{1 + x^2}{2x^2 - 3x - 2}$$