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University of Toronto at Scarborough

MATA32 – Calculus for Management I

Problem Set 2 (due January 21, 2010)

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Read: 4.1-4.2

Problems:

Section 4.1 # 2, 4, 6, 13, 14, 16, 20, 22, 28

Section 4.2 # 10, 12, 16, 18, 20, 22, 24, 30, 32, 36, 64

(a) Evaluate (to four digits of accuracy) $\dfrac{\log_{10}(1+x)}{x}$ for $x = 1, 0.1, 0.01, 0.001, 0.0001,$ and 0.00001. Without calculating it, guess the value (to four digits of accuracy) of this function when $x = 0.0000000000001$.

(b) Evaluate $\dfrac{\log_2(1+x)}{x}$ for $x = 1, 0.1, 0.01, 0.001, 0.0001, 0.00001$. Without calculating it, guess the value (to four digits of accuracy) when $x = 0.0000000000001$.

(c) Evaluate $\dfrac{\log_3(1+x)}{x}$ for $x = 1, 0.1, 0.01, 0.001, 0.0001, 0.00001$. Without calculating it, guess the value (to four digits of accuracy) when $x = 0.0000000000001$.

(d) Approximate which base of the logarithm we would have to use for a function of the above form to tend to 1 as x gets closer and closer to 0. In other words, find a number b (accurate to three digits after the decimal point) such that $\dfrac{\log_b(1+x)}{x} = 1.00$ for $x = 0.0000000000001$.