UNIVERSITY OF SASKATCHEWAN
Department of Mathematics & Statistics
Mathematics 101.3 Quiz #2

November 8, 2000 Time:50 minutes Instructor: *Doug MacLean*

CLOSED BOOK — NO CALCULATORS PERMITTED Each question is worth 4%

PART I

The possible answers to all questions in Part I are the digits in the **ANSWER SET:**

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4 (F) 5 (G) 6 (H) 7 (I) 8 (J) 9

Evaluate the limits:

(1) $\lim_{x\to 3} \dfrac{-84+19x-x^2}{x-7}$ **(2)** $\lim_{h\to 0} \dfrac{f(x+h)-f(x)}{h}$ if $f(x)=4\sqrt{x}$ and $x=4$

Using the limit definition to compute the derivative of $f(x)=x^3-x^2$, we arrive at $f'(x)=\lim_{h\to 0}\dfrac{f(x+h)-f(x)}{h}=\lim_{h\to 0}\dfrac{[3x^2-2x^2+(ax-b)h+h^2]h}{h}=3x^2-2x$, where **(3)** $a=$ and **(4)** $b=$

Find $f'(1)$ if:

(5) If $f(x)=5x^6-6x^4-2x^3+5x+9\ln(\pi^e)$

(6) $f(x)=\dfrac{1}{256}(5x-1)^4$ **(7)** $f(x)=7\sqrt{x^4+3}$ **(8)** $f(x)=48\dfrac{x+2}{x+3}$

(9) $f(x)=\dfrac{1}{6}(x^2+1)^3$ **(10)** $f(x)=-\dfrac{3(x+1)^4}{32x^4}$ **(11)** $f(x)=\ln\left(2\,(e^\pi)^3\right)+3x^2$

(12) The y-intercept of the line tangent to the graph $y=\dfrac{2}{x}$ at the point $(1,2)$ is:

Solve for x:

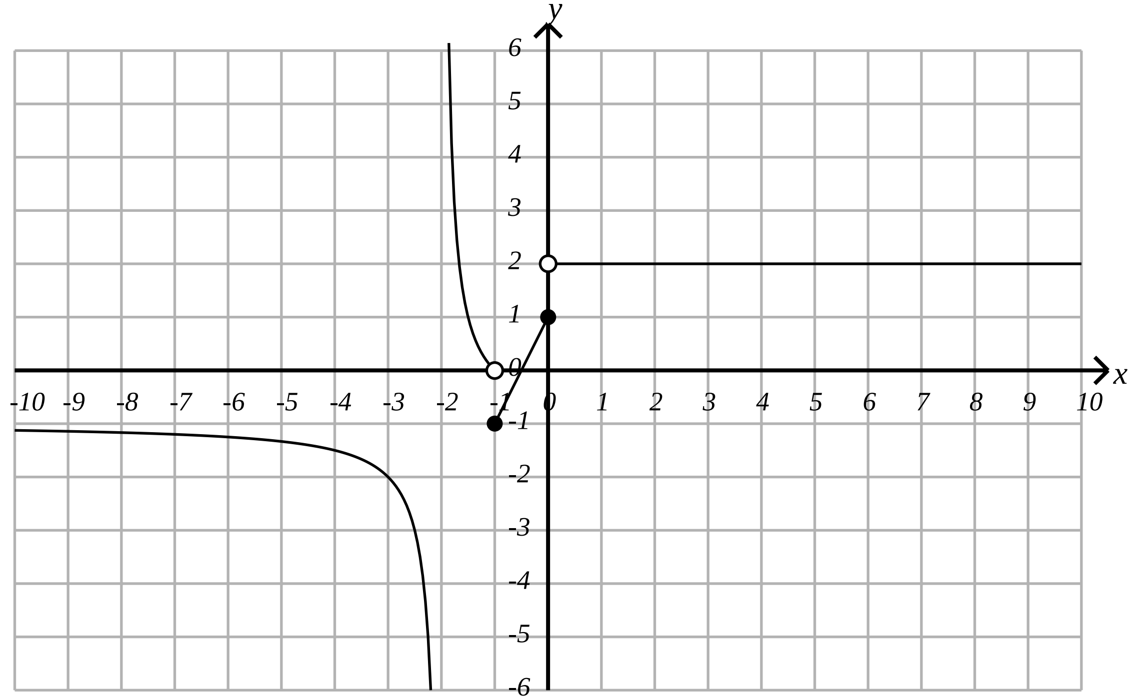
(13) $\log_e e^x=4$ **(14)** $\log_5 x^2+\log_5 x^3=5$

(15) $\log_{16} x^{\frac{7}{2}}-\log_{16}\sqrt{x^3}=\log_{16} 81$ **(16)** $\log_4 4^{4x}=16$

PART II

The possible answers to all questions in Part II are in the **ANSWER SET:**

(A) $-\infty$ (B) -4 (C) -2 (D) -1 (E) 0 (F) 1 (G) 2 (H) 4 (I) 8 (J) ∞



Part of the graph of $y = f(x) = \begin{cases} \dfrac{x-3}{2-x} & \text{if } x \le 1 \text{ and } x \neq -2 \\ 2x+1 & \text{if } -1 \le x \le 0 \\ 2 & \text{if } 0 < x \end{cases}$ is shown above. Find:

(17) $\lim\limits_{x\to-\infty} f(x)$ **(18)** $\lim\limits_{x\to-2^-} f(x)$ **(19)** $\lim\limits_{x\to-2^+} f(x)$ **(20)** $\lim\limits_{x\to-1^-} f(x)$

(21) $\lim\limits_{x\to-1^+} f(x)$ **(22)** $\lim\limits_{x\to 0^-} f(x)$ **(23)** $\lim\limits_{x\to 0^+} f(x)$ **(24)** $\lim\limits_{x\to\infty} f(x)$

(25) $f(0)$