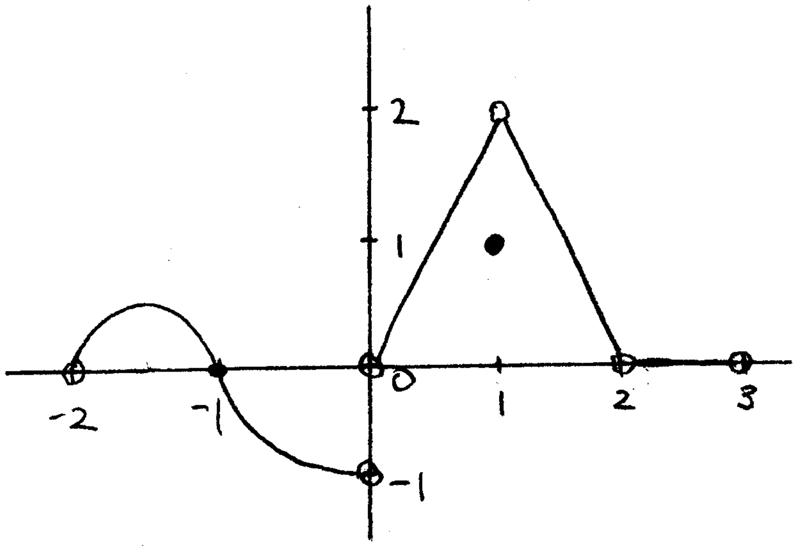
MATH 113 – QUIZ 2 – 6 FEBRUARY 2007

Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

1. (1 pt. each) Consider the function $f(x)$ whose graph is sketched below. Determine whether each of the following statements is true or false (CIRCLE ONE).



(a) $f(x)$ is continuous at $x = -1$. T F (b) $f(x)$ is continuous at $x = 0$. T F
(c) $f(x)$ is continuous at $x = 1$. T F (d) $f(x)$ is continuous at $x = 2$. T F

2. (3 pts. each) Find the slope of the tangent line to the graphs of each of the following functions at the given point *by computing the limit of the difference quotient.* Then find the equation of the tangent line to the graph of the function at that point.

(a) $g(t) = t^2 + 3t$ at $t_0 = 1$. $\lim_{h\to 0} \frac{g(1+h)-g(1)}{h} = \lim_{h\to 0} \frac{(1+h)^2+3(1+h)-4}{h}$

$= \lim_{h\to 0} \frac{\cancel{1}+2h+h^2+\cancel{3}+3h\cancel{-4}}{h} = \lim_{h\to 0} \frac{2h+h^2+3h}{h} = \lim_{h\to 0} 2+h+3 = 5$ //

Tangent line : $y = 4+5(t-1)$ // or $y = 5t-1$ //

(b) $f(x) = \dfrac{2}{x}$ at $x_0 = 4$. $\lim_{h\to 0} \frac{f(4+h)-f(4)}{h} = \lim_{h\to 0} \frac{\frac{2}{4+h}-\frac{1}{2}}{h}$

$= \lim_{h\to 0} \frac{1}{h}\cdot\frac{4-(4+h)}{2(4+h)} = \lim_{h\to 0} \frac{1}{\cancel{h}}\cdot\frac{-\cancel{h}}{2(4+h)} = \lim_{h\to 0} \frac{-1}{2(4+h)} = -\frac{1}{8}$ //

Tangent line : $y = \frac{1}{2} - \frac{1}{8}(x-4)$ // $= -\frac{1}{8}x+1$ //