

PROBLEM SET NO. 6 (DUE ON MONDAY, NOVEMBER 17 AT
4:00 PM)

• **Problem 2:**

- (a) What is wrong with the following use of the theorem of de l'Hopit l?
Correct the mistake.

$$\lim_{x \rightarrow 1} \frac{x^3 + x - 2}{x^2 - 3x + 2} = \lim_{x \rightarrow 1} \frac{3x^2 + 1}{2x - 3} = \lim_{x \rightarrow 1} \frac{6x}{2} = 3$$

- (b) Find the following limits using the theorem of de l'Hopit l. (You may use the fact that $(x^{3/2})' = (3/2)\sqrt{x}$.) For part (i), compute the limit also without using de l'Hopit l.

(i) $\lim_{x \rightarrow 2} \frac{3x^2 + 2x - 16}{x^2 - x - 2}$

(ii) $\lim_{x \rightarrow 0^+} \frac{x - \sin x}{(x \sin x)^{3/2}}$