MA161 Quiz 7

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Problem 7.1. In the following expressions, find the indicated limits. (**This may include one sided limits!!**)

(a) $\displaystyle\lim_{x\to 3} \frac{x-3}{x^2 - x - 6}$.

(b) $\displaystyle\lim_{x\to -1^+} \frac{x-4}{x^2(x+1)}$.

(c) $\displaystyle\lim_{x\to\infty} \sqrt{16x^2 + x} - 4x$.

Problem 7.2. The limit
$$\lim_{x\to 2} \frac{\ln(x^2/2)}{x-2}$$
represents $f'(a)$, the derivative of some function f at a point a. Find f and a.

Problem 7.3. Suppose f satisfies the following condition, that

$$x + 1 \le f(x) \le e^x \text{ for all } x.$$

Which of the following are true?

(a) $\lim_{x\to\infty} f(x) = \infty$

(b) $\lim_{x\to-\infty} f(x) = -\infty$

(c) $\lim_{x\to-\infty} f(x) = 0$

(d) $f(x)$ is continuous at $x = 0$.