

## HW 16: Section 3.2

Due: Monday, November 4th in SQRC by 9pm

**Learning Goals:**

- Identify indeterminate limits.
- Use l'Hopitals rule to evaluate indeterminate limits.

**Questions:**

1. Problem 3.2.4 Find the limit

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

2. Problem 3.2.6 Find the limit

$$\lim_{x \rightarrow 0} \frac{\sin(t)}{e^{3t}-1}$$

3. Problem 3.2.14 Find the limit

$$\lim_{t \rightarrow 1} \frac{\ln(t)}{t-1}$$

4. Problem 3.2.16 Find the limit

$$\lim_{x \rightarrow \infty} \frac{e^x}{x^4}$$

5. Problem 3.2.24 Find the limit

$$\lim_{x \rightarrow \infty} t \sin(1/t)$$

6. Problem 3.2.32 Find the limit

$$\lim_{x \rightarrow \infty} \ln(x) - x$$

**Hint:** rewrite  $x$  as  $\ln(e^x)$ .

7. Problem 3.2.38 Find the limit

$$\lim_{x \rightarrow 0^+} (\cos(x))^{1/x}$$

8. For each of the parts below, find functions  $f(x)$  and  $g(x)$  so that  $\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)}$  has indeterminate form  $\frac{\infty}{\infty}$  but so that

a)  $\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)} = \infty$

b)  $\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)} = -2$

c)  $\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)} = 0$