

INTRODUCTION TO CALCULUS

MATH 1A

UNIT 9: WORKSHEET

Problem 1: Compute the limit:

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

Problem 2: Evaluate the following limit:

$$\lim_{x \rightarrow 1} (x - 1) / \log(x - 1)$$

Problem 3: Find the limit:

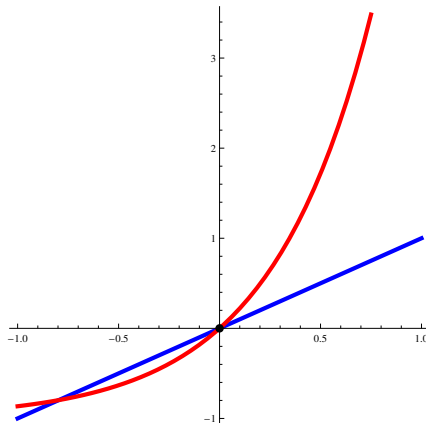
$$\lim_{x \rightarrow \infty} \log(7x + 3) / \log(9x + 4)$$

Problem 4: Find the limit (see Figure 1 below)

$$\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{x} ?$$

Problem 5: And now evaluate the following limit

$$\lim_{x \rightarrow -1} (x^2 + 2x + 1) / (x + 1) .$$

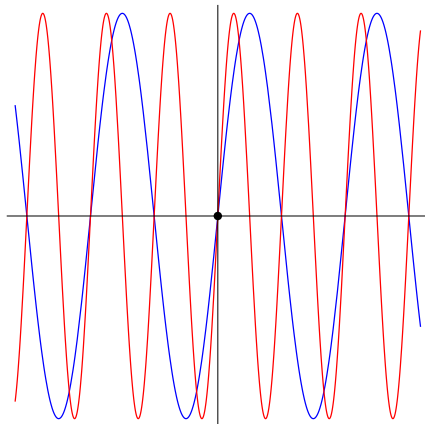


The functions $e^{2x} - 1$ and x .

Problem 6: Apply l'Hospital's rule to get the limit of

$$f(x) = \frac{\sin(200x)}{\sin(300x)}$$

for $x \rightarrow 0$.



Problem 7: What does l'Hospital's rule tell about the limit

$$f(x) = \frac{\sin(200x)}{\sin(300x)}$$

for $x \rightarrow \pi$.

Problem 8: What does l'Hospital's rule tell about the limit

$$f(x) = \frac{\cos(200x)}{\cos(300x)}$$

for $x \rightarrow 0$.

Problem 9: What does l'Hospital tell you about

$$\lim_{x \rightarrow 1} (x + 1)/(x - 1)$$

Problem 10: And finally a joke:

$$f(x) = \lim_{x \rightarrow 0} 1/1 \stackrel{\text{Hospital}}{=} \lim_{x \rightarrow 0} 0/0 = \mathbf{\text{not defined}}$$