

This Quiz is due at the beginning of class  
on Tuesday, February 18.

For full credit, show all steps, using correct notation. Unless otherwise indicated, present the exact value of all answers.

1. (2 points each) Compute each of the following limits.

a)  $\lim_{x \rightarrow 2^+} \frac{x^2 - 4}{x^2 + 2x - 8}$

d)  $\lim_{a \rightarrow -5} \frac{\frac{1}{a} + \frac{1}{5}}{a + 5}$

f)  $\lim_{\theta \rightarrow \infty} \frac{\sin \theta}{\theta^3}$

b)  $\lim_{x \rightarrow -4^-} \frac{x^2 - 4}{x^2 + 2x - 8}$

g)  $\lim_{x \rightarrow 0} \frac{|x|}{x}$

c)  $\lim_{t \rightarrow 0} \frac{\sqrt{t^2 + 9} - 3}{t^2}$

e)  $\lim_{x \rightarrow \infty} \frac{\log_2 24x^2}{\log_2 6x^3}$

2. a) (2 points) Sketch the graph of  $f(x) = -3(x+2)x(x-4)^2$ .

b) (2 points) Solve the inequality  $-3(x+2)x(x-4)^2 \geq 0$

3. (3 points) Suppose that  $a$ ,  $b$ , and  $c$  are constants. Prove (using the definition of the derivative as the limit of the difference quotient) that if  $f(x) = ax^2 + bx + c$ , then  $f'(x) = 2ax + b$ .