

Limits Review  
Calculus I  
answer sheet

1.  $\lim_{x \rightarrow 1^-} \frac{\arccos x}{\ln x}$   
use l'hospital's rule

$$\lim_{x \rightarrow 1^-} \frac{-x}{\sqrt{1-x^2}} = -\infty$$

2.  $\lim_{x \rightarrow \infty} \frac{10^8 x^5 + 10^6 x^4 + 10^4 x^2}{10^9 x^4 + 10^5 x^3}$

0

3.  $\lim_{x \rightarrow 0} \frac{x}{\arctan 4x}$   
use l'hospital's rule

$$\lim_{x \rightarrow 0} \frac{1}{\frac{4}{1+16x^2}} = \lim_{x \rightarrow 0} \frac{1+16x^2}{4} = \frac{1}{4}$$

4.  $\lim_{x \rightarrow \infty} e^{x-x^2}$

0

5.  $\lim_{x \rightarrow \infty} \left(1 + \frac{a}{x}\right)^{bx}$

$e^{ab}$

6.  $\lim_{x \rightarrow \pi} \ln(\cos x + 1)$

$-\infty$

7.  $\lim_{x \rightarrow -3} \frac{x+2}{x+3}$

The two-sided limit doesn't exist because the left- and right-hand limits don't agree.

8.  $\lim_{x \rightarrow 0^+} \left(\frac{1}{t} - \frac{1}{t^2 + 1}\right)$

$$= \lim_{x \rightarrow 0^+} \left(\frac{t^2 + 1 - t}{t(t^2 + 1)}\right) = \infty$$