

NAME: Solution Key

Panther ID: _____

Quiz 3 - MAC 2311, Fall 2015

To receive credit you MUST SHOW ALL YOUR WORK. Answers which are not supported by work will not be considered.

1. (2 pts) True or False? No justification needed.

(a) $\frac{0}{\infty}$ is an indeterminate limit form (exceptional case). False

(b) $+\infty - \infty$ is an indeterminate limit form (exceptional case). True

2. (8 pts) Compute each limit:

(a) (4 pts) $\lim_{x \rightarrow 0} \frac{\cos(5x) - \cos(3x)}{x^2}$ $\frac{0}{0}$ $\lim_{x \rightarrow 0} \frac{-\sin(5x) \cdot 5 + \sin(3x) \cdot 3}{2x}$ =

$\stackrel{\text{e'H}}{=}$

$\lim_{x \rightarrow 0} \frac{-\cos(5x) \cdot 25 + \cos(3x) \cdot 9}{2} = \frac{-25 + 9}{2} = \boxed{-8}$

(b) (4 pts) $\lim_{x \rightarrow 0^+} \sqrt{x} \ln x$ $0 \cdot (-\infty)$ $\lim_{x \rightarrow 0^+} \frac{\ln x}{\frac{1}{\sqrt{x}}}$ = $\lim_{x \rightarrow 0^+} \frac{\ln x}{x^{-\frac{1}{2}}}$ $\frac{\infty}{\infty}$ $\stackrel{\text{e'H}}{=}$

$= \lim_{x \rightarrow 0^+} \frac{\frac{1}{x}}{-\frac{1}{2}x^{-\frac{3}{2}}} = \lim_{x \rightarrow 0^+} \frac{-2x^{\frac{3}{2}}}{x} = \lim_{x \rightarrow 0^+} (-2x^{\frac{1}{2}})$

$= \lim_{x \rightarrow 0^+} (-2\sqrt{x}) = \boxed{0}$