

Full Name: \_\_\_\_\_ Instructor & Section: \_\_\_\_\_

**Instructions:** This Part is calculator-free. Complete it and hand it in after 30 minutes. Show all work, and justify your conclusions. Each problem is worth 3 points.

1. Find the indicated limit, or determine that it does not exist.

(a)  $\lim_{x \rightarrow -3} \frac{x^2 - 9}{x + 3}$

(b)  $\lim_{x \rightarrow 0} \frac{|x|}{x}$

(c)  $\lim_{x \rightarrow 0} \frac{x}{\sin 2x}$

(d)  $\lim_{x \rightarrow \infty} \sqrt{\frac{4 - x^2}{(-x + 2)(x + 2)}}$

(e)  $\lim_{x \rightarrow \infty} \frac{.03x^2 + 100000x + \pi}{.03x^2 + 250000x + 1}$

2. Find  $\frac{dy}{dx}$ .

(a)  $y = (x^2 - 2006)^{2007}$

(b)  $y = 3x \tan 2x$

(c)  $y = \frac{\sec x}{x}$

(d)  $y = \pi^2 + \pi + 1$

(e)  $y = (\sin(x^2))^2$

(f)  $x^2y = 2 - xy^2$