Worksheet for 11/7/13

Part 1: compute the following limits:

① $\lim_{x \to \infty} \left(x \cdot e^{-x} \right)$

② $\lim_{x \to \infty} \left(x \cdot \sin\left(\frac{3}{x}\right) \right)$

③ (PSet9, A6) $\lim_{x \to 0^+} (1+x)^{1/x}$

④ $\lim_{x \to \infty} (x^{1/x})$

⑤ $\lim_{x \to 0^+} (x^x)$

⑥ $\lim_{x \to 0^+} \left(\frac{1}{\sin x} - \frac{1}{x} \right)$

⑦ $\lim_{x \to \infty} \left(\sqrt{x^2+x} - x \right)$

Part II

(8) An object in free fall on the moon accelerates downward at about 1.6 m/s^2. (about 17% of Earth's gravity).

If you jump off a 5m tall ledge on the moon, how long will it take to hit the bottom? How fast will you be falling when you land?

(9) Find <u>some</u> antiderivative for each function.

a) x^7

b) 3^x

c) $2\cos x$

d) x^2+7

e) $x+\cos x$

f) e^{7x}

g) $\frac{x+x^7}{x^2}$

h) $x \cdot e^x$ (this one is a challenge... be creative)