1. (2 pts each) Find the following limits (JUSTIFY YOUR ANSWER):

(a) \( \lim_{x \to 0} \frac{x^2}{|x|} = \lim_{x \to 0} |x| = 0 \)

(b) \( \lim_{x \to 2} \frac{x + 4}{x + 2} = \frac{\lim_{x \to 2}(x + 4)}{\lim_{x \to 2}(x + 2)} = \frac{6}{4} \)

2. (6 pts) Suppose you have two linear functions \( f \) and \( g \) shown below.

Then find \( \lim_{x \to a} \frac{f(x)}{g(x)} \) by following the outline below:

(a) Find the slope of the line \( f(x) \):

\[
m_f = \frac{6 - 0}{0 - a} = -\frac{6}{a}.
\]

(b) Find the slope of the line \( g(x) \):

\[
m_g = \frac{3 - 0}{0 - a} = -\frac{3}{a}.
\]

(c) Write an equation for the line \( f(x) \):

\[
f(x) - 6 = m_f(x - 0) \Rightarrow f(x) = -\frac{6}{a}x + 6
\]

(d) Write an equation for the line \( g(x) \):

\[
g(x) - 3 = m_g(x - 0) \Rightarrow g(x) = -\frac{3}{a}x + 3
\]

(e) Write a formula for \( \frac{f(x)}{g(x)} \)

\[
\frac{f(x)}{g(x)} = \frac{-\frac{6}{a}x + 6}{-\frac{3}{a}x + 3} = \frac{6(a - x)}{3(a - x)}
\]

(f) Then \( \lim_{x \to a} \frac{f(x)}{g(x)} = \lim_{x \to a} \frac{6(a - x)}{3(a - x)} = 2. \)