Answer Key
Math 221, Lecture 2 - Fall 2010

There are 10 points possible. Partial credit may be given where applicable.

True/False (1 pt. each)
Answer "True" or "False" to the following questions, rather than simply "T" or "F".

1. False The domain of tan(x) is all the real numbers except for x = 0, ±π, ±2π, ±3π, ....
2. False The following graph is the graph of sec(x).

Problem Section
Solve each of the following problems. Show all of your work. (i.e. u = 1-5x, etc.) If you run out of room, you may use additional sheets of paper. Be aware of problems on the back of the page.

1. (4 pts.) Compute the following limit.

\[
\lim_{t \to -1} \frac{t^2 + 3t + 2}{t^2 - t - 2}
\]

\[
= \lim_{t \to -1} \frac{(t+1)(t+2)}{(t+1)(t-2)}
\]

\[
= \lim_{t \to -1} \frac{t+2}{t-2}
\]

\[
= \frac{-1+2}{-1-2}
\]

\[
= \frac{1}{3}
\]

\[
= \frac{1}{3}
\]
2. (4 pts.) Compute the following limit.

\[
\lim_{{x \to 4}} \frac{x + 4}{\sqrt{x^2 + 20} - 6}
\]

\[
= \lim_{{x \to 4}} \frac{x + 4}{\sqrt{x^2 + 20} - 6} \cdot \frac{\sqrt{x^2 + 20} + 6}{\sqrt{x^2 + 20} + 6}
\]

\[
= \lim_{{x \to 4}} \frac{(x + 4)(\sqrt{x^2 + 20} + 6)}{(\sqrt{x^2 + 20})^2 - 6\sqrt{x^2 + 20} + 6\sqrt{x^2 + 20} - 36}
\]

\[
= \lim_{{x \to 4}} \frac{(x + 4)(\sqrt{x^2 + 20} + 6)}{x^2 + 20 - 36}
\]

\[
= \lim_{{x \to 4}} \frac{(x + 4)(\sqrt{x^2 + 20} + 6)}{x^2 - 16}
\]

\[
= \lim_{{x \to 4}} \frac{(x + 4)(\sqrt{x^2 + 20} + 6)}{(x + 4)(x - 4)}
\]

\[
= \lim_{{x \to 4}} \frac{\sqrt{x^2 + 20} + 6}{x - 4}
\]

\[
= \frac{\sqrt{(-4)^2 + 20} + 6}{-4 - 4}
\]

\[
= \frac{\sqrt{36} + 6}{-8}
\]

\[
= \frac{12}{-8}
\]

\[
= -\frac{3}{2}
\]