MATH 253 – WORKSHEET 9
PARTIAL DERIVATIVES

1. A triangle problem

A triangle has sides a, b, c and angle θ between the sides of length a, b. The *law of cosines* reads

$$\boxed{}$$

(1) Considering θ as a function of a, b, c find $\frac{\partial \theta}{\partial c}$.

(2) Supposing that $b > c$, find a such that θ is largest.

2. The wave equation

Consider the equation ("wave equation")

$$\boxed{u_{tt} = c^2 u_{xx}}$$

(1) Check that $u(t; x) = \sin(x - ct)$ is a solution.
(2) Let f be any function, and suppose that $u(t; x) = f(x - vt)$ is a solution (such a solution is *travelling at speed* v). What is v?

Date: 25/9/2013.