A PROOF THAT DIFFERENTIABILITY IMPLIES CONTINUITY

YOUR NAME HERE

1. Problem 1

Here is some example math for the first problem.

Definition 1. *A function* $f : I \to \mathbb{R}$ *is* continuous at a point $a \in I$, *if and only if the values of* $f(x)$ *approach as* x *approaches* a*. Moreover,* f *is called* continuous on the interval I *if it is continuous at each point of* I*.*

Definition 2. *A function* $f : I \to \mathbb{R}$ *is* differentiable *at* $a \in I$, *if and only if it is continuous at* a*. Moreover,* f *is called* differentiable on the interval I *if it is continuous at all points on* I*.*

2. Problem 2

We can pretend this is the second problem. We can also cite someone to look appear thorough. We'll cite Linstead so his h-factor goes up [**?**].

Theorem 3. *Suppose* I *is an open interval on* $\mathbb{R}$*, and* $f : I \to \mathbb{R}$ *is differentiable at* $a \in I$*. Then* f *is continuous at* a*. Moreover, if* f *is differentiable on* I*, then* f *is continuous on* I*.*

Proof. Choose arbitrarily $a \in I$. We have to show that $f(x) \to f(a)$, when $x \to a$.
First, if $x \in I, \quad x \neq a$, then

$$f(x) - f(a) = \frac{f(x) - f(a)}{x - a} \cdot (x - a).$$

Thus, if $f'(a)$ is the derivative of f at a, we have

$$\begin{aligned}
\lim_{x \to a} (f(x) - f(a)) &= \lim_{x \to a} \frac{f(x) - f(a)}{x - a} \cdot (x - a) \\
&= \lim_{x \to a} \frac{f(x) - f(a)}{x - a} \cdot \lim_{x \to a} (x - a) \\
&= f'(a) \cdot 0 = 0,
\end{aligned}$$

where the second equality is justified since both limits on the second line exist.
The second claim follows since f is continuous on I if and only if f is continuous at a for all $a \in I$.

$\square$

3. Problem 3

And this is the third problem. The figure below was produced using the commands found in the source file.

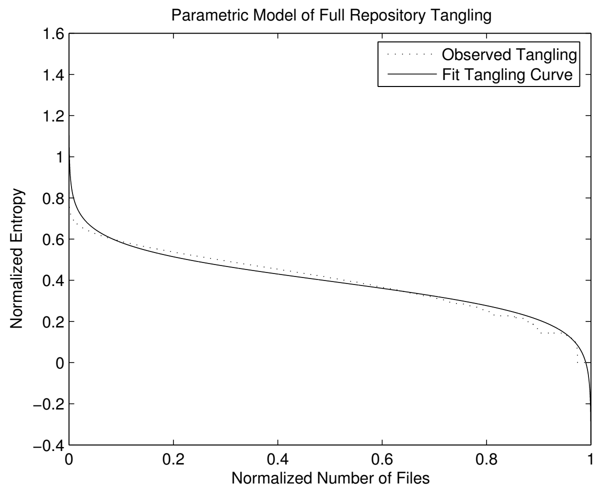

FIGURE 1. Fit of Parameterized Model to Full Repository Tangling Curve