

Math 251
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Assignment #4
Partial Solutions

Additional Exercise:

1. Let $f(x) = mx + b$ be an arbitrary linear function. Prove $\lim_{x \rightarrow 0} f(x) = b$ using the $\varepsilon \delta$ definition of limits.

[Hint: your δ should involve m]

Solution: Given $\varepsilon > 0$ set $\delta = \varepsilon/|m|$ and assume $|x| < \delta$. Then we know

$$|(mx + b) - b| = |mx| = |m||x| < |m|\delta = |m| \left(\frac{\varepsilon}{|m|} \right) = \varepsilon.$$