Theorem 3.1  
If *f* is differentiable at *x=c* then *f* is continuous at *x=c*.

According to the definition of continuity, we want to prove that *limx🡪c f(x) = f(c)*. This is equivalent to proving that *limx🡪c f(x) – f(c) = 0.*

1. *f(c) = limx🡪c f(c)*

*f(c)* is a constant – Theorem 2.1.1

1. *limx🡪c f(x) – f(c) = limx🡪c f(x) - limx🡪c f(c)*

Algebraic Manipulation

1. *limx🡪c f(x) – f(c) = limx🡪c[f(x) – f(c)]*

Theorem 2.2.2

1. *limx🡪c f(x) – f(c) = limx🡪c[(x-c)(f(x)-f(c))/(x-c)]*

Multiply by a clever form of 1, *(x-c)/(x-c)*

1. *limx🡪c f(x) – f(c) = limx🡪c[x-c] \* limx🡪c[(f(x)-f(c))/(x-c)]*

Theorem 2.2.3

1. *limx🡪c f(x) – f(c) = 0 \* limx🡪c[(f(x)-f(c))/(x-c)]*

Direct substitution; x-c = 0 when x = c

1. *limx🡪c f(x) – f(c) = 0*
2. *limx🡪c f(x) = f(c)*