

Math 21
Module 1: Limits and Continuity

Nile Jocson
<atraphaxia@gmail.com>

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1.3

Do as indicated.

1.3.1

Find $\lim_{x \rightarrow 10} f(x)$ where $f(x) = x^2$ for all $x \neq 10$ but $f(10) = 99$.

$$\lim_{x \rightarrow 10} f(x) = 100$$

As x gets closer to 10, $f(x)$ goes to 100.



1.3.2

Determine the values of the constants a and b such that $\lim_{x \rightarrow 0} \frac{x}{\sqrt{ax+b}-2} = 1$

$\sqrt{ax+b}-2=0$ $\sqrt{b}-2=0$ $b=4$	<p>Find a value for b such that the limit is in indeterminate form of type $\frac{0}{0}$.</p> <p>$ax=0$ since $x \rightarrow 0$.</p>
$\lim_{x \rightarrow 0} \frac{x}{\sqrt{ax+4}-2} = 1$ $\lim_{x \rightarrow 0} \frac{x}{\sqrt{ax+4}-2} \cdot \frac{\sqrt{ax+4}+2}{\sqrt{ax+4}+2} = 1$ $\lim_{x \rightarrow 0} \frac{x(\sqrt{ax+4}+2)}{a\cancel{x}+\cancel{4}-4} = 1$ $\frac{\sqrt{a(0)+4}+2}{a} = 1$ $\frac{4}{a} = 1$ $a=4$	<p>Rationalize.</p>
$a=4, b=4$	<p>Final answer.</p> <p>■</p>