

Calculus Precise Definition of Limit

Lesson 261 | Calculus AB | Epsilon-delta limits

<https://www.youtube.com/watch?v=o3XdCfjnp-Q>

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

01

For $f(x)=2x+14$, prove $\lim_{x \rightarrow 7} f(x)=28$ using an epsilon-delta argument.

02

For $f(x)=3x+4$, prove $\lim_{x \rightarrow 2} f(x)=10$ using an epsilon-delta argument.

03

For $f(x)=2x+7$, prove $\lim_{x \rightarrow 7} f(x)=21$ using an epsilon-delta argument.

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04

For $f(x)=9x+14$, prove $\lim_{x \rightarrow 6} f(x)=68$ using an epsilon-delta argument.

05

For $f(x)=5x+4$, prove $\lim_{x \rightarrow 5} f(x)=29$ using an epsilon-delta argument.

06

For $f(x)=6x+12$, prove $\lim_{x \rightarrow 5} f(x)=42$ using an epsilon-delta argument.

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01

For $f(x)=2x+14$, prove $\lim_{x \rightarrow 7} f(x)=28$ using an epsilon-delta argument.

Given $\epsilon > 0$, choose $\delta = \epsilon/2$. If $0 < |x-7| < \delta$, then $|f(x)-28| = 2|x-7| < 2\delta = \epsilon$. This meets the definition.

02

For $f(x)=3x+4$, prove $\lim_{x \rightarrow 2} f(x)=10$ using an epsilon-delta argument.

Given $\epsilon > 0$, choose $\delta = \epsilon/3$. If $0 < |x-2| < \delta$, then $|f(x)-10| = 3|x-2| < 3\delta = \epsilon$. This meets the definition.

03

For $f(x)=2x+7$, prove $\lim_{x \rightarrow 7} f(x)=21$ using an epsilon-delta argument.

Given $\epsilon > 0$, choose $\delta = \epsilon/2$. If $0 < |x-7| < \delta$, then $|f(x)-21| = 2|x-7| < 2\delta = \epsilon$. This meets the definition.

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04

For $f(x)=9x+14$, prove $\lim_{x \rightarrow 6} f(x)=68$ using an epsilon-delta argument.

Given $\epsilon > 0$, choose $\delta = \epsilon/9$. If $0 < |x-6| < \delta$, then $|f(x)-68| = 9|x-6| < 9\delta = \epsilon$. This meets the definition.

05

For $f(x)=5x+4$, prove $\lim_{x \rightarrow 5} f(x)=29$ using an epsilon-delta argument.

Given $\epsilon > 0$, choose $\delta = \epsilon/5$. If $0 < |x-5| < \delta$, then $|f(x)-29| = 5|x-5| < 5\delta = \epsilon$. This meets the definition.

06

For $f(x)=6x+12$, prove $\lim_{x \rightarrow 5} f(x)=42$ using an epsilon-delta argument.

Given $\epsilon > 0$, choose $\delta = \epsilon/6$. If $0 < |x-5| < \delta$, then $|f(x)-42| = 6|x-5| < 6\delta = \epsilon$. This meets the definition.