

Calculus for Everyone

Finding Limits Algebraically and Numerically



Please contact Mary.Lester@arkansas.gov,
if you would like the original PowerPoint slides

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**These are template slides
meant to be filled out by
teachers and students**

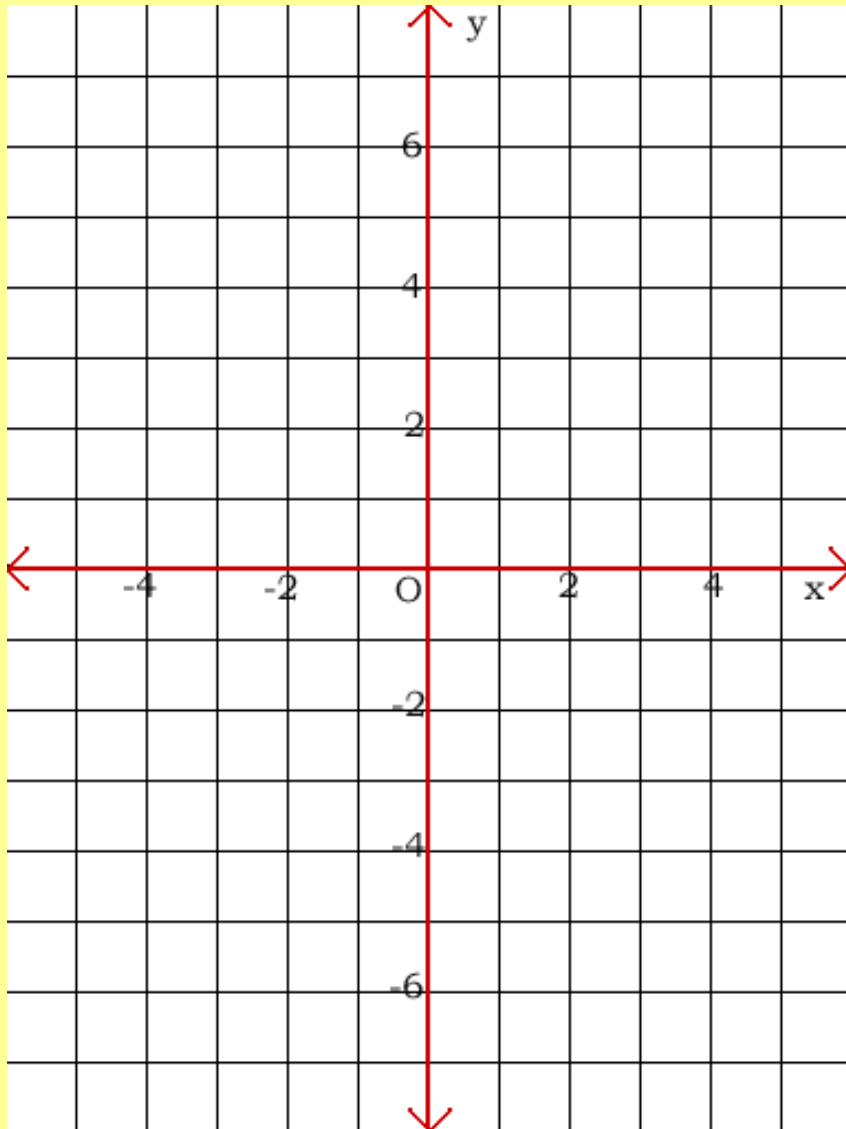


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An Introduction to Limits



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Graph

$$f(x) = \frac{x^3 - 1}{x - 1}, x \neq 1$$

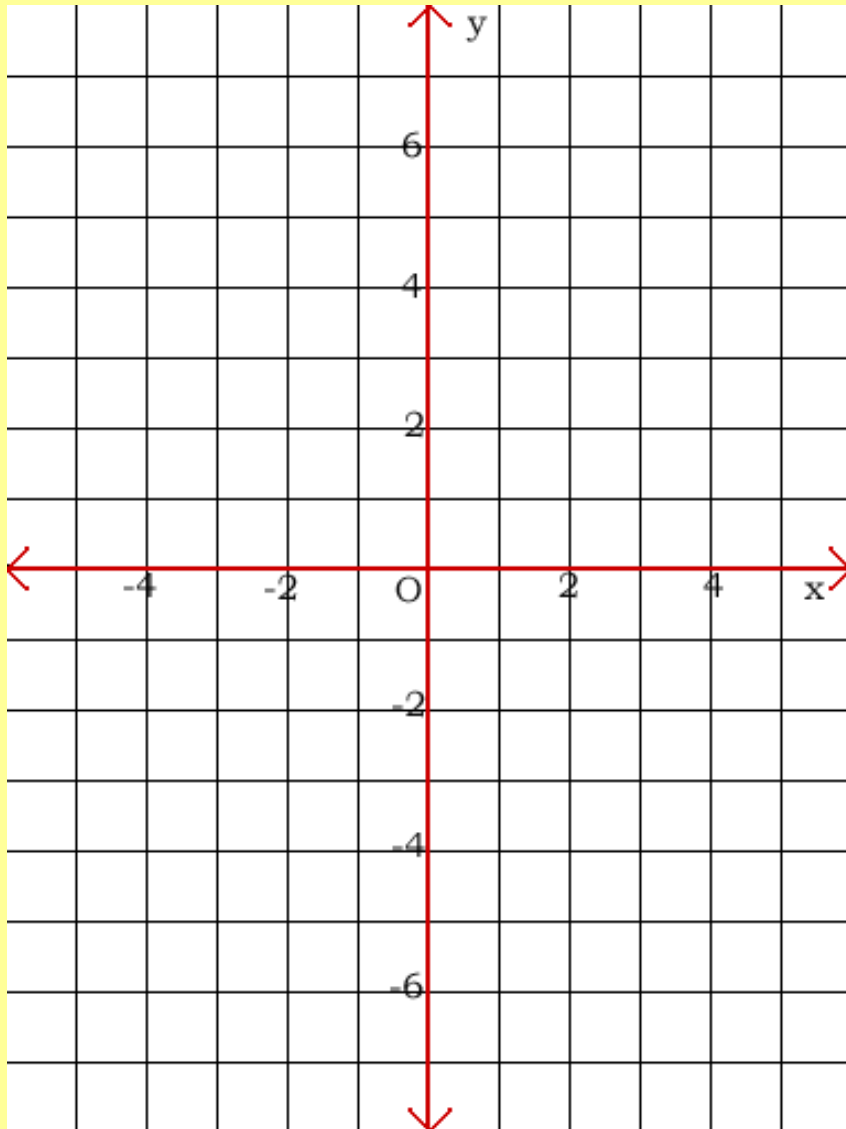
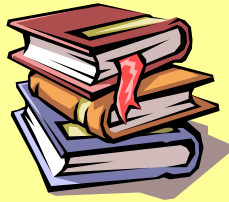
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Symbols used for limits...

$$\lim_{x \rightarrow c} f(x) = L$$

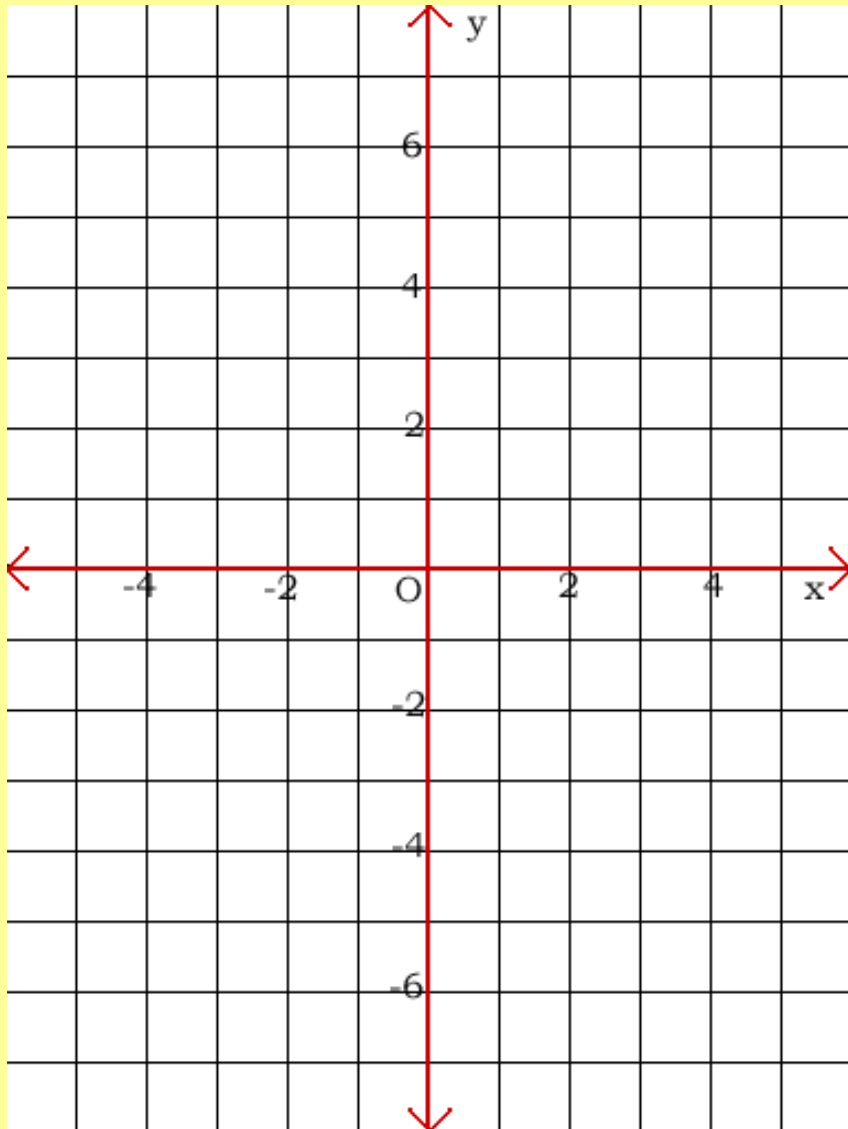


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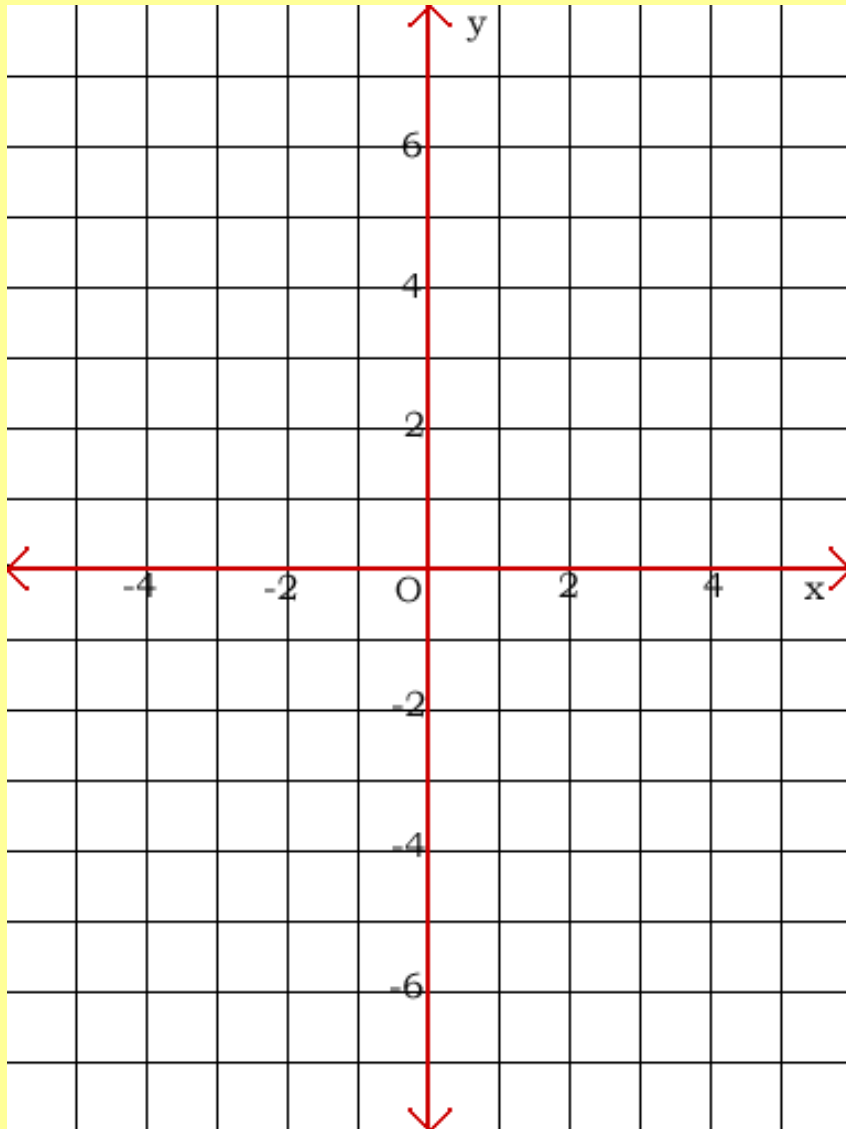
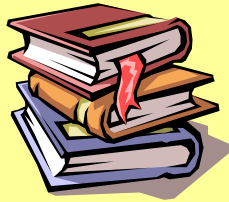
What is a limit?

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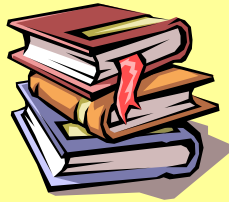
When does a limit occur?

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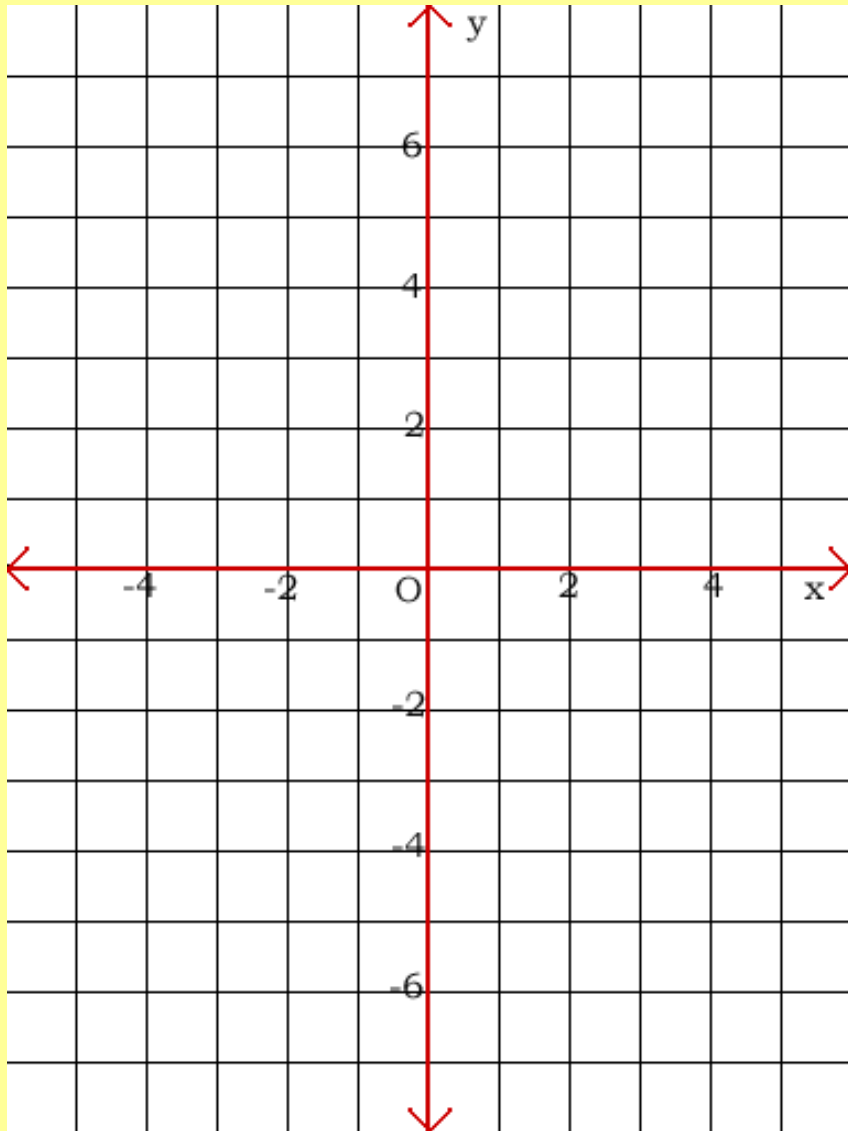
Does the functional value
have to equal the limit?

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ex 1) Estimating a Limit Numerically

$$\lim_{x \rightarrow 0} \frac{x}{\sqrt{x+1} - 1}$$



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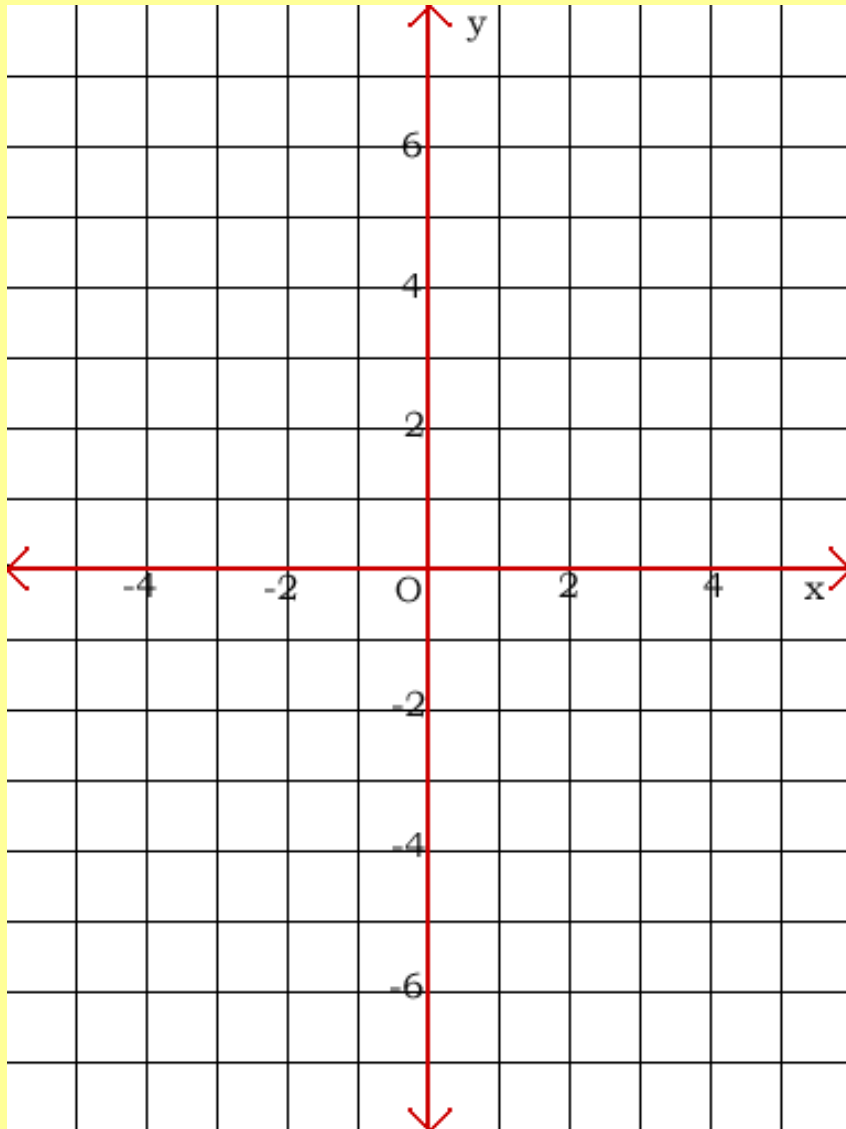
The existence or non-existence of $f(x)$ at c has no bearing on the existence of the limit of $f(x)$ as x approaches c .



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ex 2) Finding a Limit

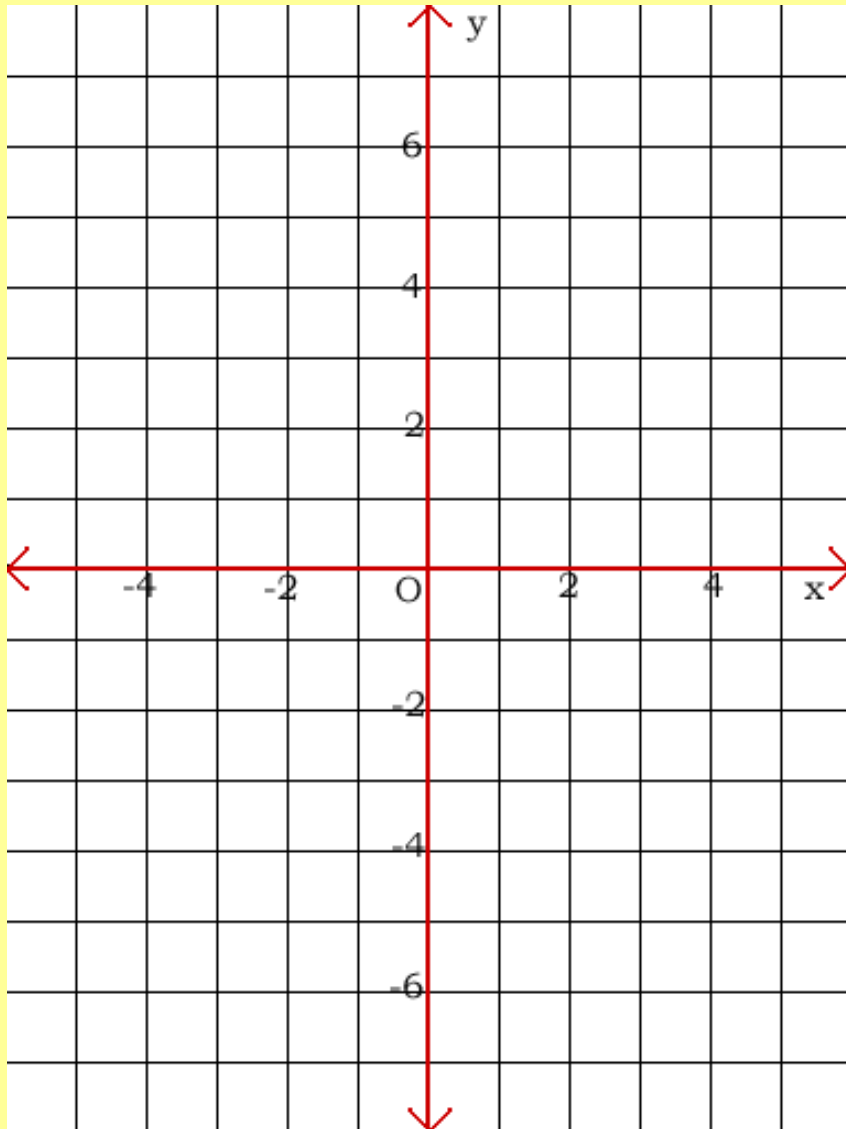


$$\lim_{x \rightarrow 2} \frac{1, x \neq 2}{0, x = 2}$$

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ex 3) Finding a Limit



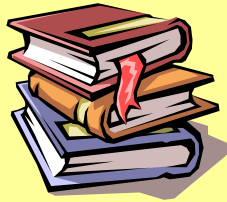
$$\lim_{x \rightarrow 0} \frac{|x|}{x}$$

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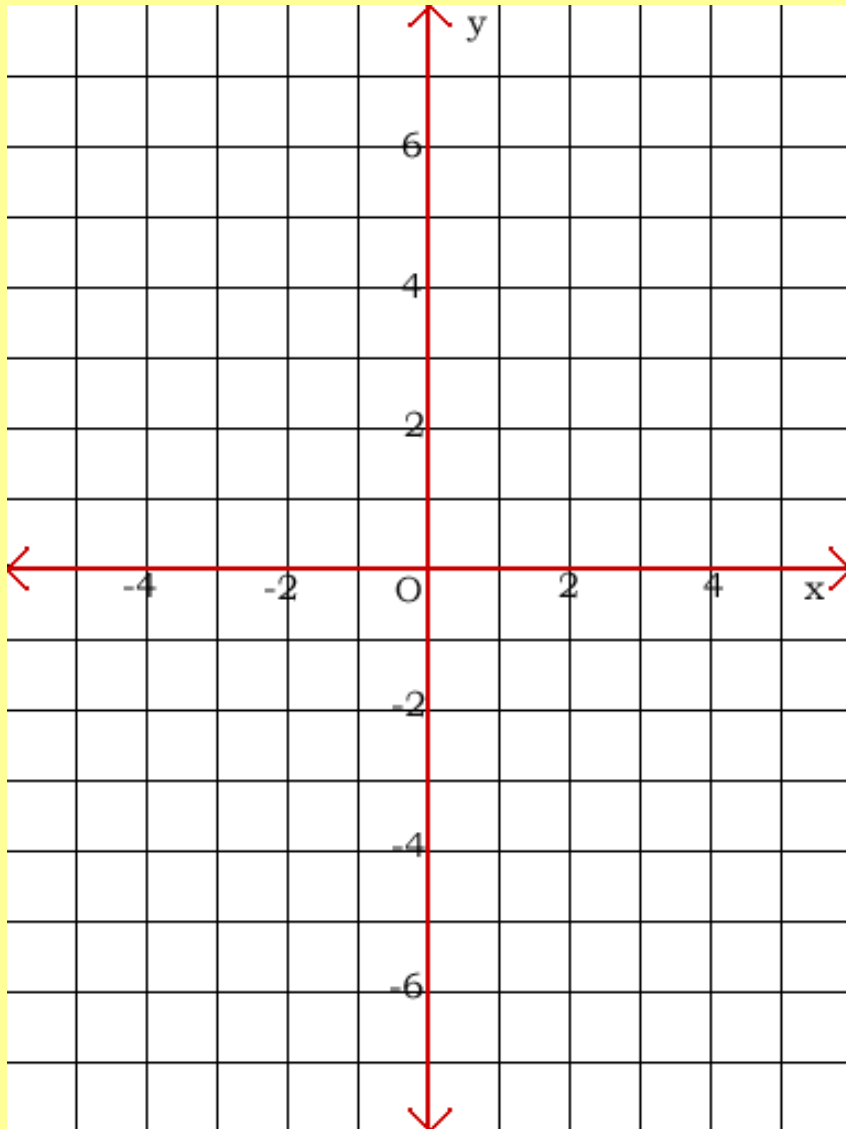
Limits that Fail to Exist



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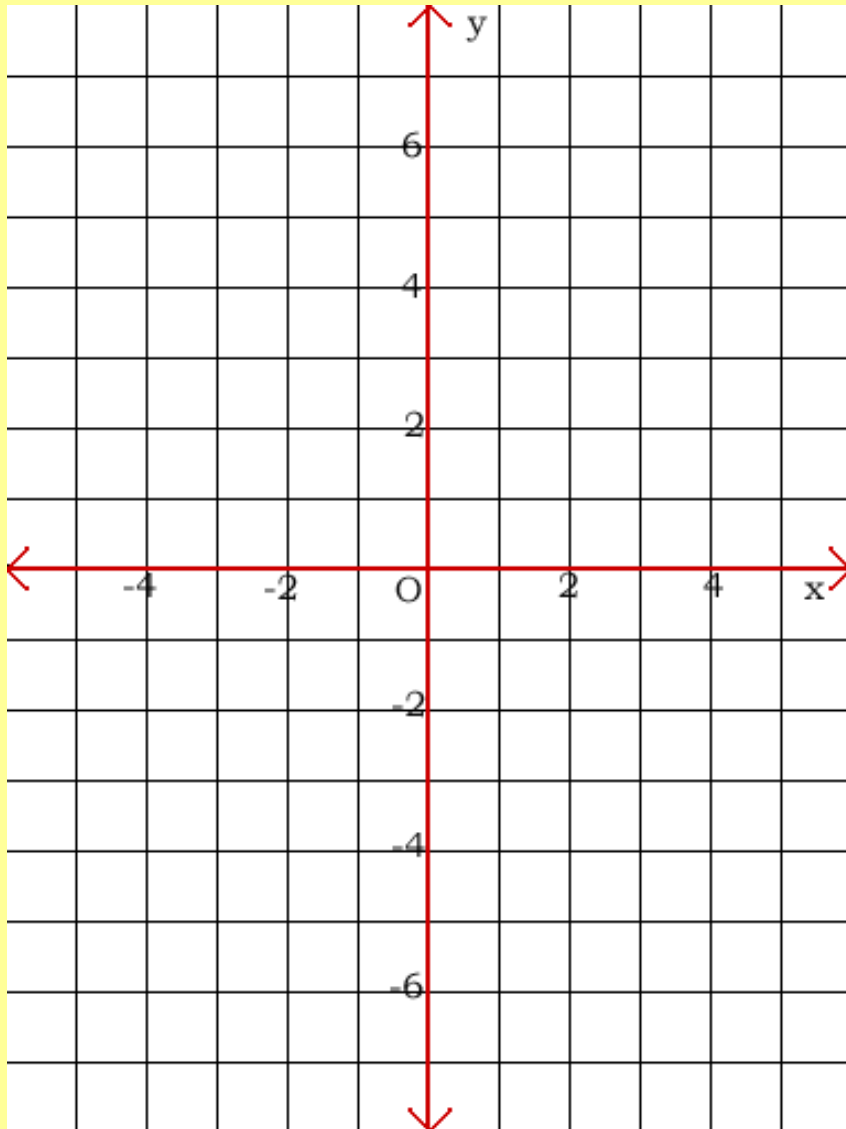


ex 5) Oscillating Behavior



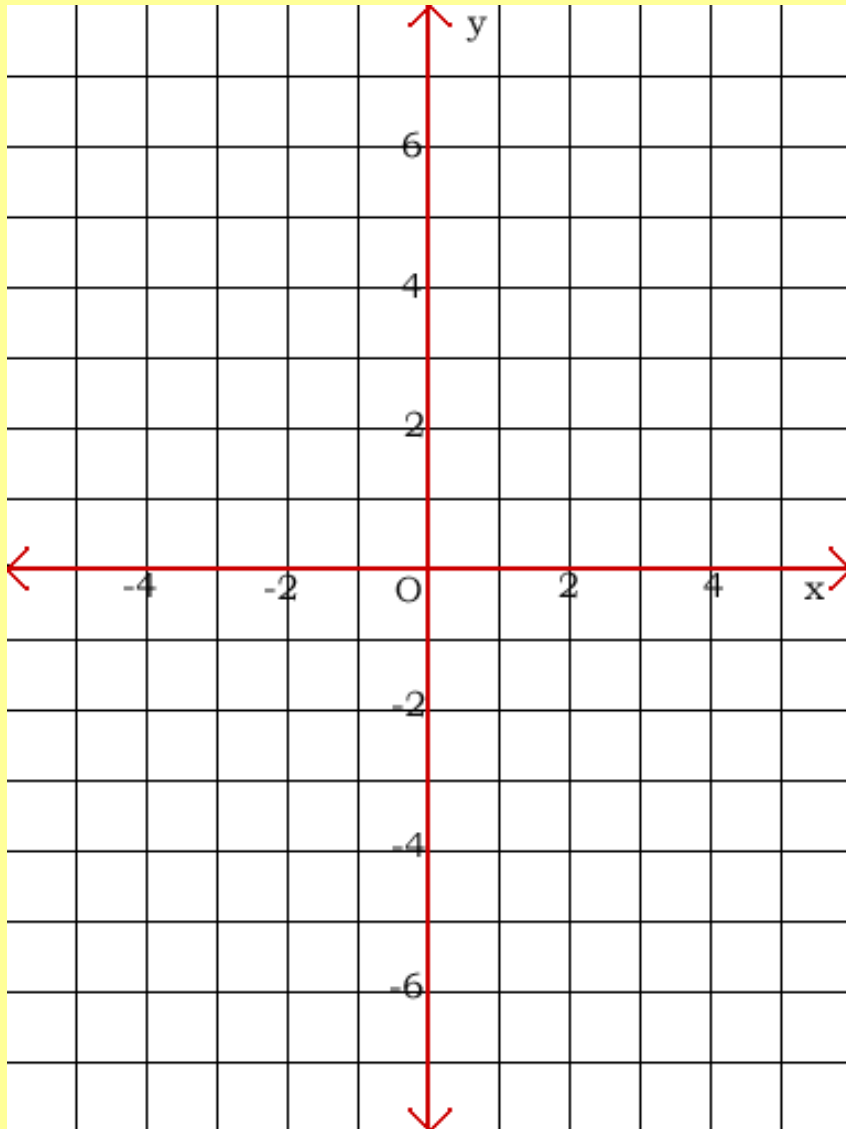
$$\lim_{x \rightarrow 0} \sin \frac{1}{x}$$

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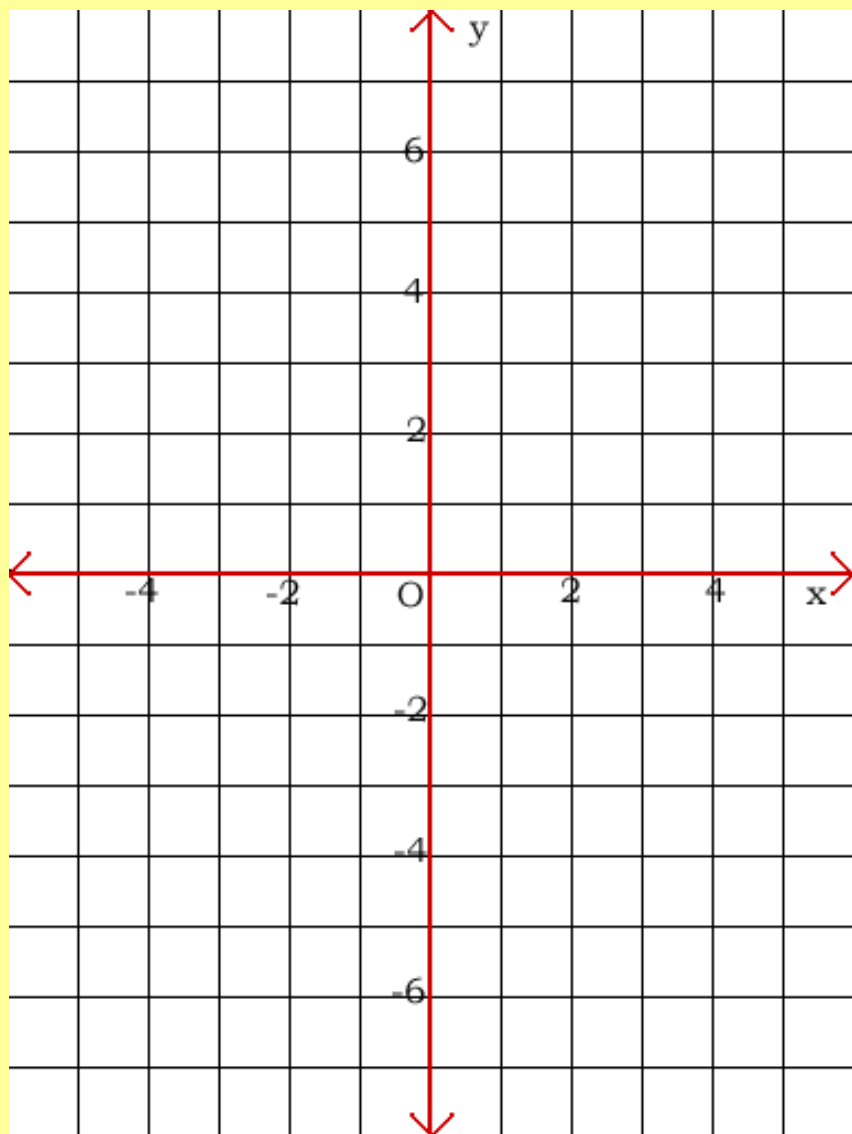
When does a limit occur?

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When does a limit NOT occur?

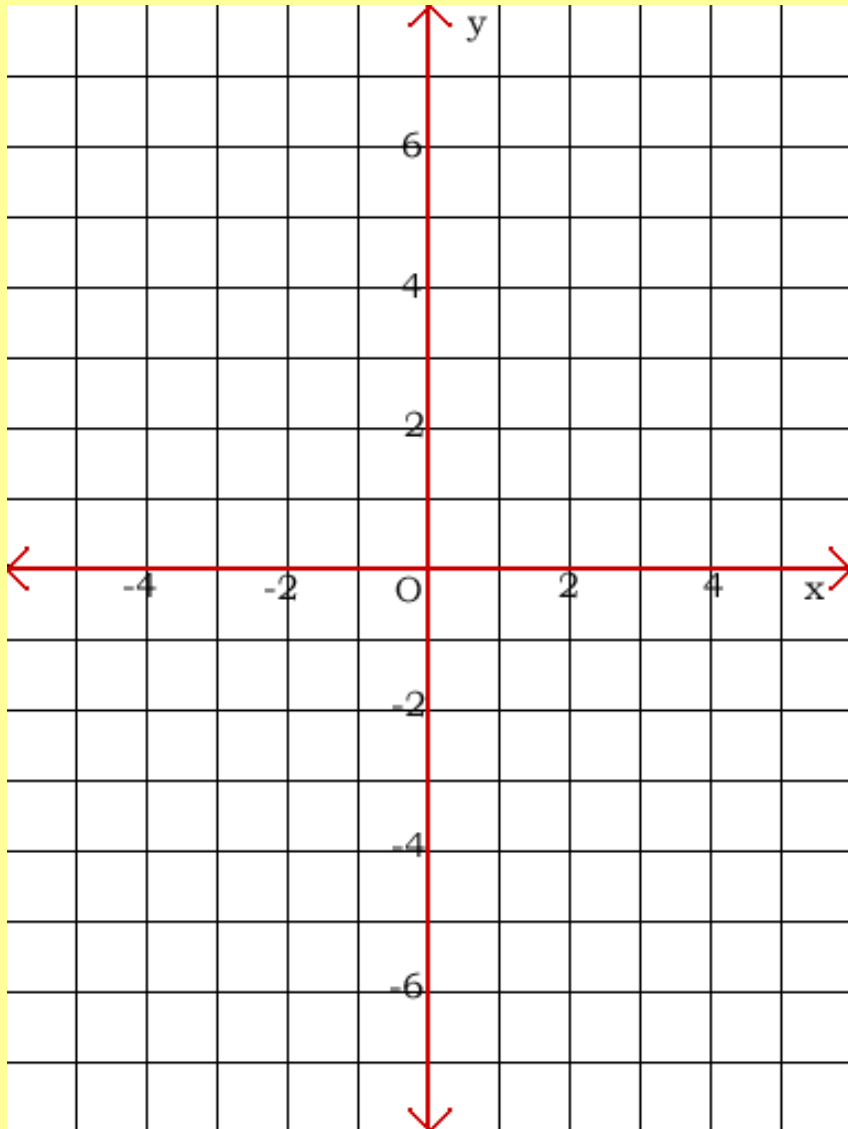
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When does a limit not occur?

...when the function doesn't approach the same value from the left and the right

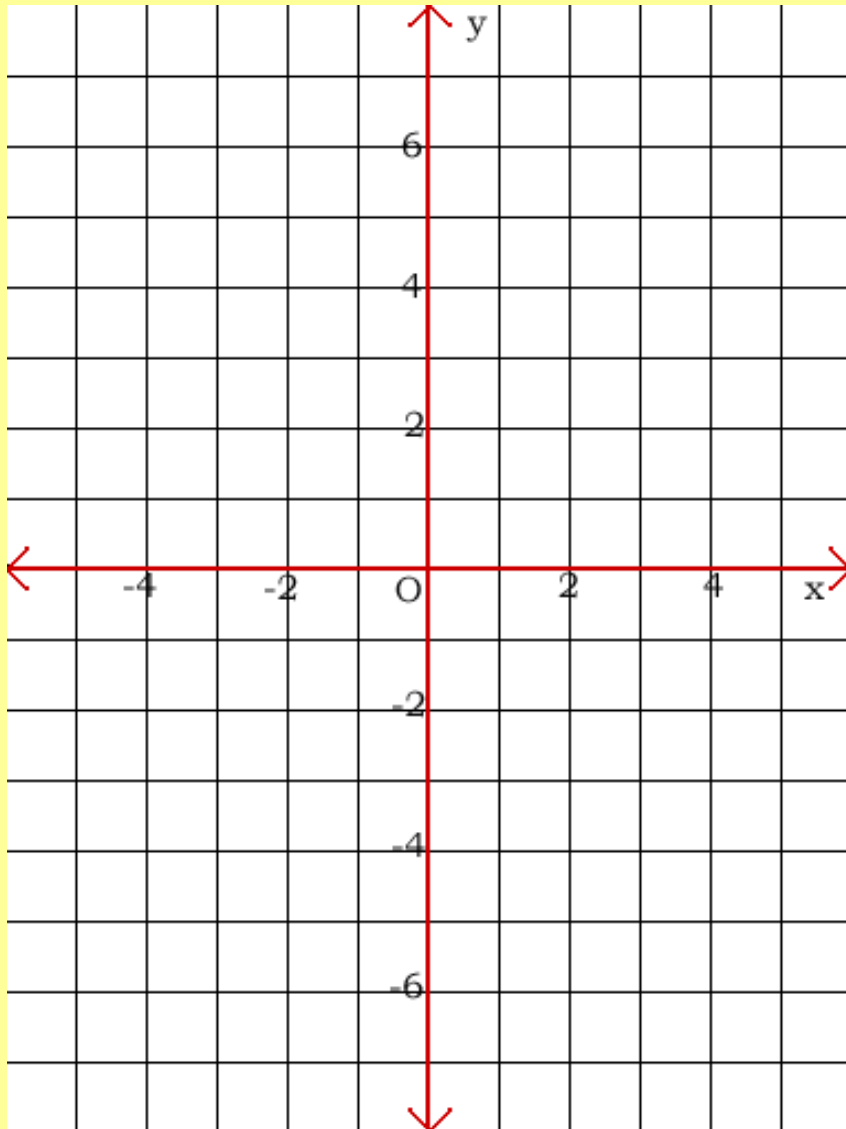
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When does a limit not occur?

Unbounded behavior

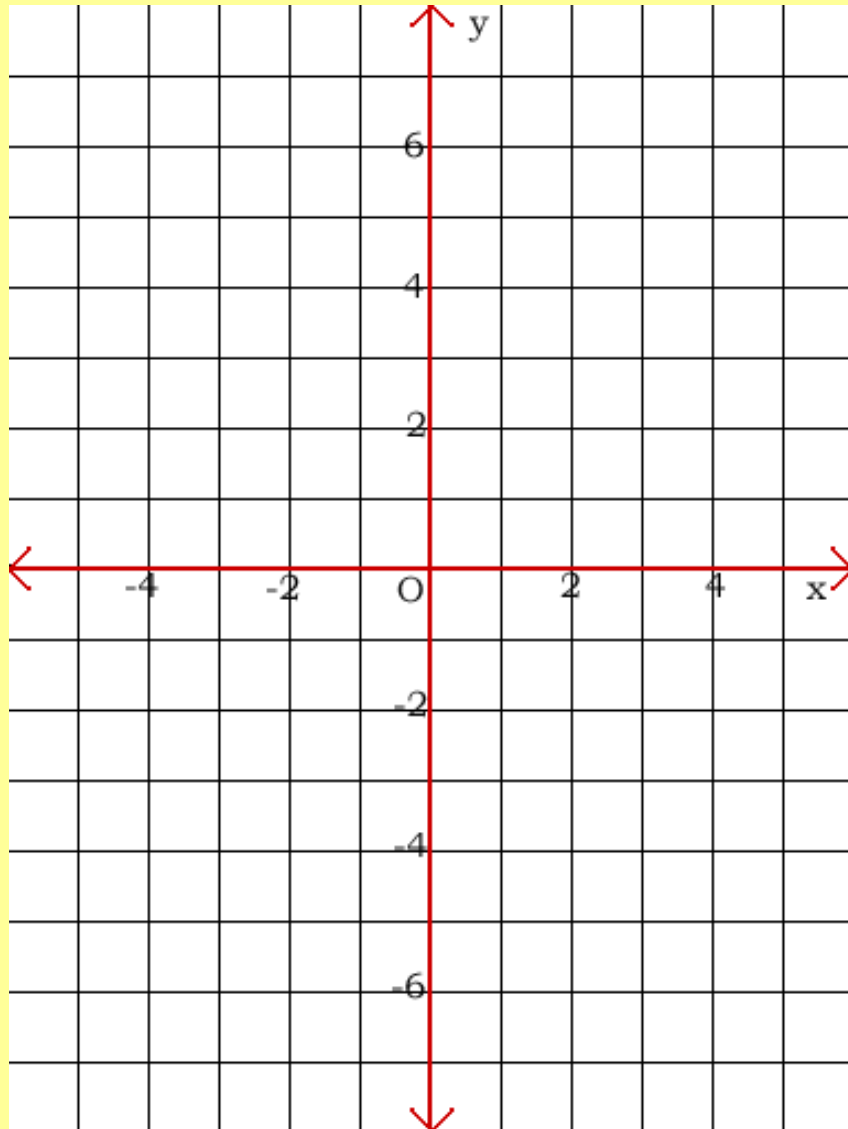
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When does a limit not occur?

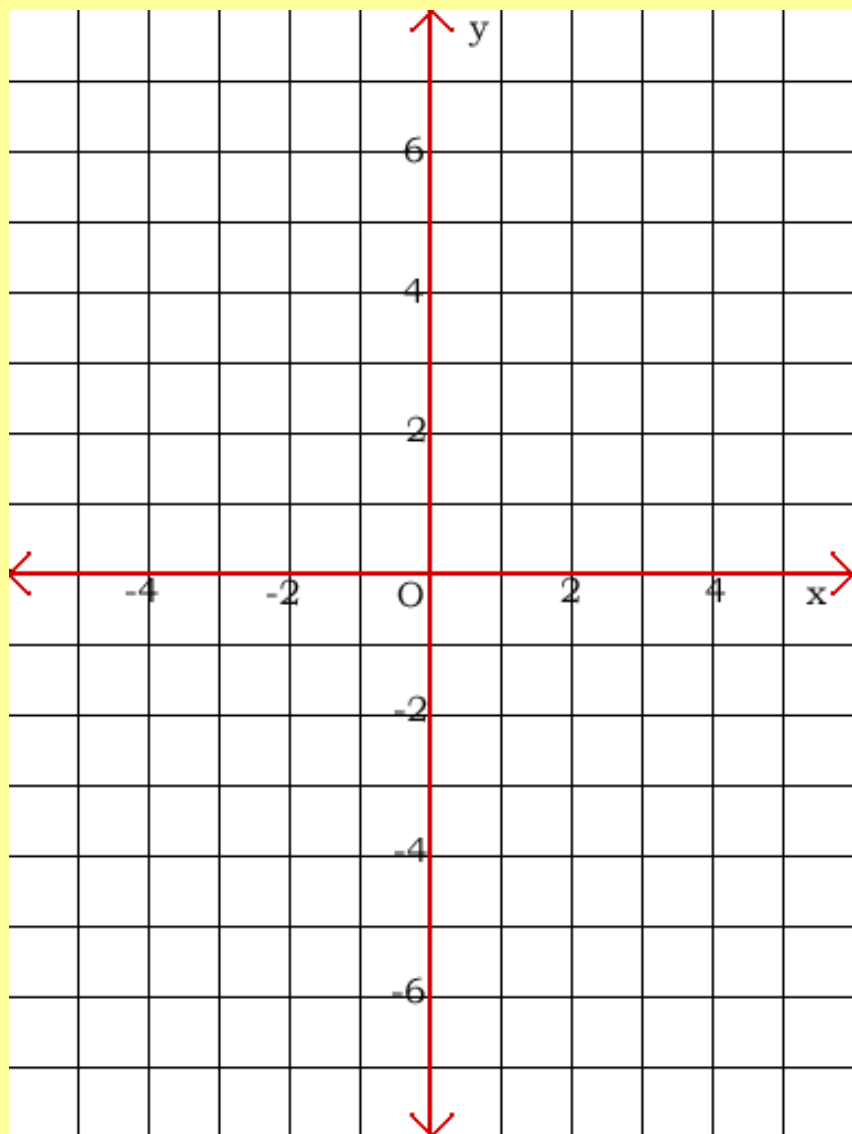
Oscillating Behavior

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What methods do we have of finding a limit?

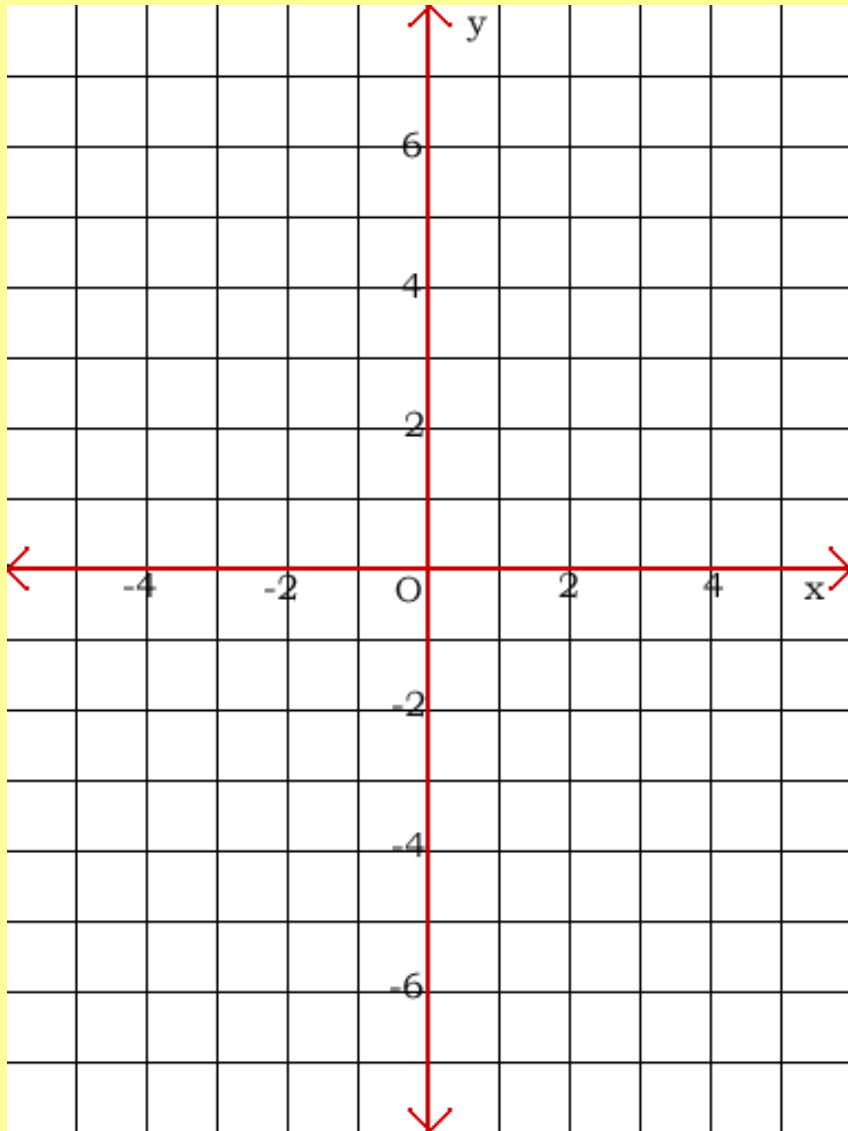
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What methods do we have of finding a limit?

Graphical

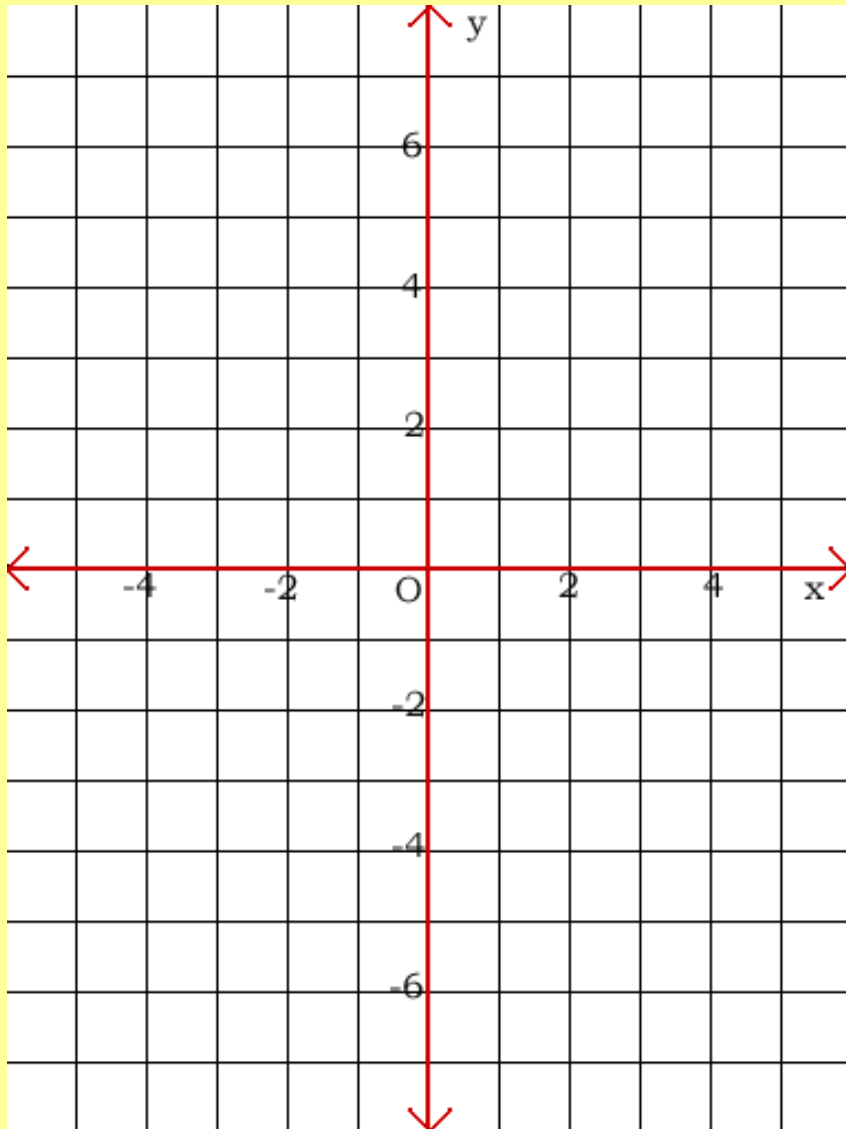
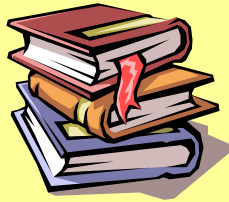
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What methods do we have of finding a limit?

Numerical

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What methods do we have of finding a limit?

Analytical

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Finding Limits Algebraically and Numerically

**Where you go
and what you do
advertises
what you are**



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You Can Do This !