

What is a **limit**?

What symbols do we use to represent it?

What is it used for?

Limit Problems

$$1) \lim_{x \rightarrow 4} \frac{\sqrt{x+5} - 3}{x-4}$$

$$4) \lim_{x \rightarrow \infty} \frac{5+x-4x^2}{6-18x+7x^x}$$

$$2) \lim_{x \rightarrow \frac{5}{2}} \frac{4x^2 - 25}{6x^2 - 7x - 20}$$

$$5) \lim_{x \rightarrow \infty} \frac{(x+2)(x^3 - 64)}{16 - x^3}$$

$$3) \lim_{x \rightarrow -\infty} \frac{3 - 2x^2 + 5x - \sqrt{x}}{\sqrt[3]{x} + 4 - 3x + 8x^2}$$

$$6) \lim_{x \rightarrow 0} \frac{\ln(1-x) - \sin x}{1 - x - \cos^2 x}$$

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What is a **derivative**?

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Derivative Problems

7) Let $f(x) = 4x - 7x^2$. Find the derivative of the function **using the definition of the derivative**.

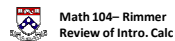
8) Let $y = x^2 e^{-x}$. Find the local minimum value of the function.

9) $y = xy^2 - 2x^2$ is a function that is defined implicitly.
Find the slope of the tangent line at the point $(1, -1)$.

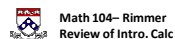
10) Let $f(x) = \frac{x^2 - 8x}{x+1}$. Find the absolute minimum value of f on $[0, 4]$.

11) Let $f(x) = x^2 - 8x^{3/2}$. Find the x -value of the inflection point of f .

12) Let $y = \arcsin(\sqrt{x})$. Find $y'\left(\frac{1}{2}\right)$.



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What is a **integral**?

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Integral Problems

13) Use $n = 4$ rectangles and left endpoints to estimate $\int_0^8 \left(\frac{2}{2+x} \right) dx$

14) Evaluate $\int \left(\sqrt{x} + \frac{1}{x} + \frac{2}{x^3} \right) dx$.

15) Evaluate $\int_3^0 (2x^3 - 6x^2) dx$.

16) Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \cos^3(t) \sin(t) dt$.

17) Evaluate $\int_1^{e^4} \frac{\sqrt{\ln x}}{x} dx$.

18) Evaluate $\int_0^4 x\sqrt{x^2+9} dx$.



Math 104- Rimmer
Review of Intro. Calc

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