INTRO TO CALCULUS

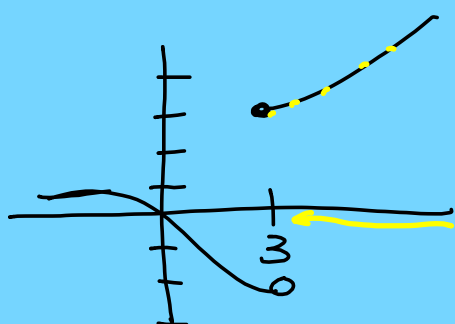
A derivatives represents.....

Integration represents the area between a function and the axis

Definition of Deriv.

$$\lim_{x \to a} \frac{f(x)-f(a)}{x-a}$$

Limits - find y-coord.!



$$\lim_{x \to 3^-} f(x) = -2$$

$$\lim_{x \to 3^+} f(x) = 3$$

$$\lim_{x \to 3} f(x) = DNE$$

$$f(3) = 3$$

$$\lim_{x \to 4} \frac{3x^2-12x}{x^2-6x+8} = \frac{48-48}{16-24+8} = \frac{0}{0}$$

$$\lim_{x \to 4} \frac{3x\cancel{(x-4)}}{\cancel{(x-4)}(x-2)} = \lim_{x \to 4} \frac{3x}{x-2} = \frac{12}{2} = 6$$

1) Sub # in

2) If $\frac{0}{0}$,

a) factor

b) conjugates

May 5, 2023

DERIVATIVES

Find $f'(a)$. $\quad f(x) = 2\sqrt{x} - 4$

$\qquad\qquad\qquad\quad\;\; 2x^{1/2} - 4$

$f'(x) = x^{-1/2} = \frac{1}{\sqrt{x}}$

$$\lim_{x \to a} \frac{2\sqrt{x} - \cancel{4} + (-2\sqrt{a} + \cancel{4})}{x - a}$$

$$\lim_{x \to a} \frac{2\sqrt{x} - 2\sqrt{a}}{x - a}$$

$$\lim_{x \to a} \frac{2(\sqrt{x} - \sqrt{a})}{x - a} \cdot \frac{(\sqrt{x} + \sqrt{a})}{(\sqrt{x} + \sqrt{a})}$$

$$\lim_{x \to a} \frac{2\cancel{(x - a)}}{\cancel{(x-a)}(\sqrt{x} + \sqrt{a})} = \frac{2}{\sqrt{a} + \sqrt{a}} = \frac{\cancel{2}}{\cancel{2}\sqrt{a}}$$

$$= \boxed{\frac{1}{\sqrt{a}}}$$

$$f(x) = \left(3x^7 - 4x^8 + 5\right)^{10}\left(\frac{7x^4 - 2x}{x^5 + 9}\right)$$

$$f'(x) = \left(3x^7 - 4x^8 + 5\right)^{10} \cdot \left[\frac{(x^5+9)(28x^3-2) - (7x^4-2x)(5x^4)}{(x^5+9)^2}\right] +$$

$$\left(\frac{7x^4 - 2x}{x^5+9}\right) \cdot 10\left(3x^7 - 4x^8 + 5\right)^9 \cdot \left(21x^6 - 32x^7\right)$$

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$$\int_{-1}^{8} \left(2\sqrt[3]{x} + 2\right) dx$$

$\sqrt[3]{-1^4}$

$$\int_{-1}^{8} \left(2x^{1/3} + 2\right) dx$$

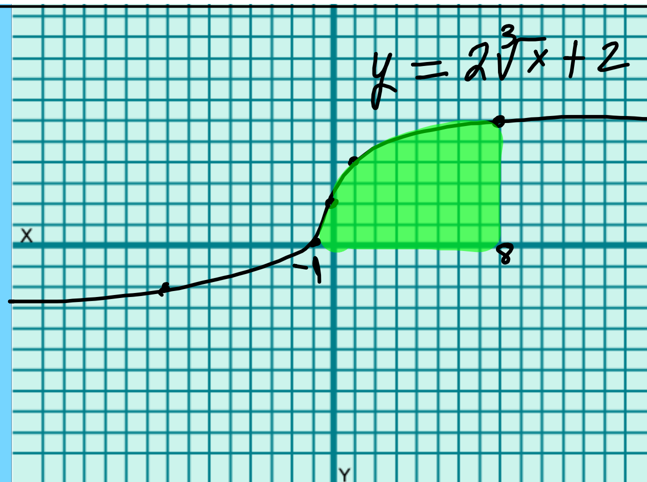
$$\frac{3}{4}\cdot 2x^{4/3} + 2x \Big|_{-1}^{8}$$

$\sqrt[3]{8^4}$

$$3/2 \cdot 16 + 16 + \left[-\frac{3}{2}(1) + 2\right]$$

$$24 + 16 - 3/2 + 2$$

$$42 - 3/2 = \frac{84}{2} - \frac{3}{2} = \frac{81}{2}$$



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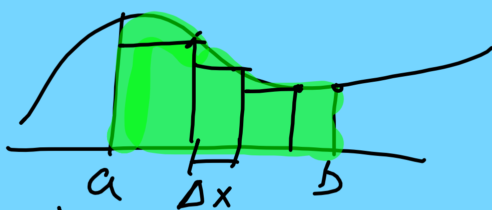

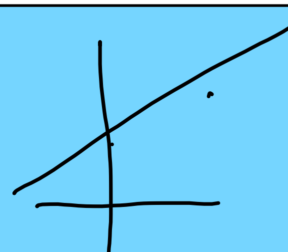

$$\lim_{\Delta x \to 0} \sum_{x=a}^{b} f(x)\Delta x = \int_a^b f(x)\,dx$$

sum of rectangle

$$\int \quad = 10.5$$