

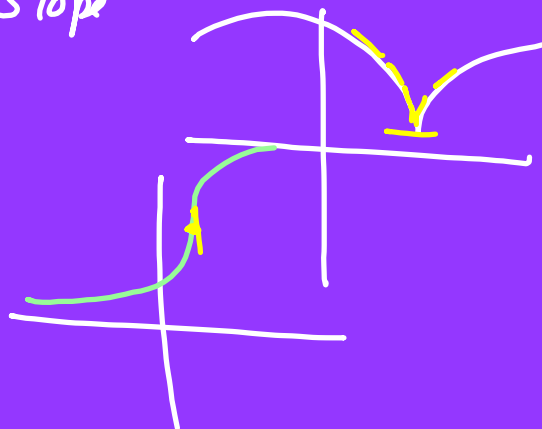
DERIVATIVES REVIEW

Differentiability - no sudden changes in slope

no sharp pts

no vertical tangent lines

* must be continuous



$$f(x) = \begin{cases} \sqrt{x} & \text{if } x \geq 4 \\ 6-x & \text{if } x < 4 \end{cases}; a=4$$

1) $f(a)$ is defined.

2) $\lim_{x \rightarrow a} f(x)$ exists.

3) $f(a) = \lim_{x \rightarrow a} f(x)$
continuous

4) $f'(a)^- = f'(a)^+$

1) $f(4) = \sqrt{4} = 2$

2) $\lim_{x \rightarrow 4^-} 6-x = 6-4 = 2$

$\lim_{x \rightarrow 4^+} \sqrt{x} = \sqrt{4} = 2$

$\lim_{x \rightarrow 4} f(x) = 2$

3) $f(4) = \lim_{x \rightarrow 4} f(x)$ (continuous)

4) $f'(4)^- = -1$
 $f'(4)^+ = \frac{1}{2}x^{-1/2} = \frac{1}{2\sqrt{x}} = \frac{1}{2\sqrt{4}}$

$f'(4)^- \neq f'(4)^+ = \frac{1}{4}$

not differentiable

Write:

- * A derivative represents
- * 1st + 2nd definitions of derivative
- * Derivatives of 6 trig functions

$$f(x) = \cos^2(4x^3) \sin(3x^8 + 7)^5$$

$$= [\cos(4x^3)]^2 \cdot \sin(3x^8 + 7)^5$$

18-19) Find f'' .

20) Find eq. of tangent slope

1) Point: sub x in $f(x)$.

2) Slope: $m = f'(x)$. sub in x

3) $y - y_1 = m(x - x_1)$