

## 3.2 day 1

Thursday, September 7, 2017 11:54 AM

Post-its

Find  $f'(1)$  for  $f(x) = \begin{cases} 0.25x + 0.75, & x \geq 1 \\ x^2, & x < 1 \end{cases}$

$$f'(1^+) = 0.25$$

$$f'(1^-) = \lim_{h \rightarrow 0} \frac{(1+h)^2 - 1}{h}$$

$$= \lim_{h \rightarrow 0} \frac{1 + 2h + h^2 - 1}{h}$$

$$= \lim_{h \rightarrow 0} \frac{h^2 + 2h}{h}$$

$$= \lim_{h \rightarrow 0} h + 2$$

$$= 2$$

Since  $f'(1^-) \neq f'(1^+)$ ,

$f'(1)$  does not exist

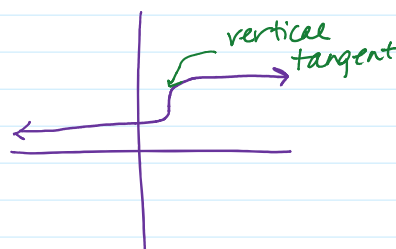
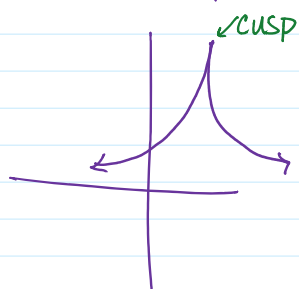
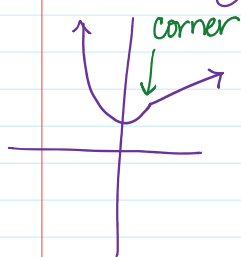
<https://www.desmos.com/calculator/dimg0acdfo>

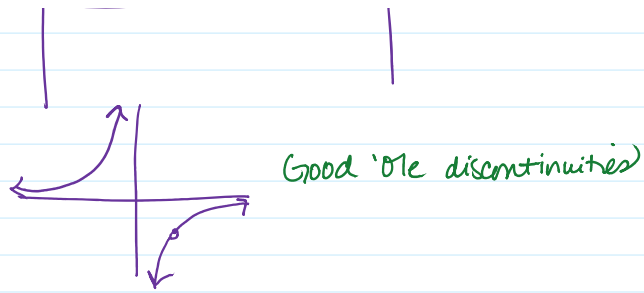
Summarize when derivatives exist:

Continuous AND

the right hand slope = the left hand slope

Special types of non differentiable functions:





## Worksheet Formative Assessment

### Summary regarding continuity and differentiability

- ★ If differentiable, then continuous. ★
- ★ If continuous, then it may be differentiable. ★
- ★ If not continuous, then not differentiable. ★

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