

Section 3.2

Differentiability

Domain

Continuous points	discont. pts.
Differentiable	

To determine if you can find the derivative at a point, ask these questions:

- 1) Is the point in the domain?
- 2) Is the function continuous at that point?

1. $f(c)$ exists

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

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

$$\lim_{x \rightarrow c^-} f(x) = \lim_{x \rightarrow c^+} f(x)$$

(closed interval)

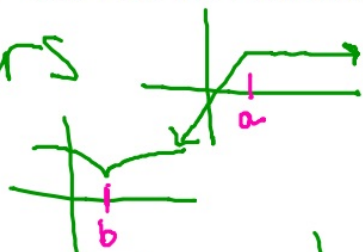
- 3) Is the function differentiable at that point?

1. no corners

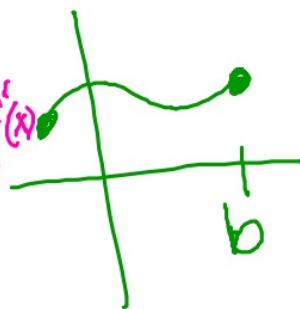
2. no cusps

3.

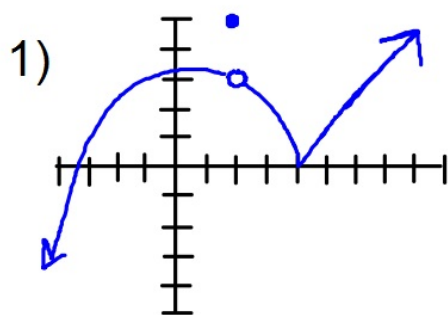
no vertical tangent



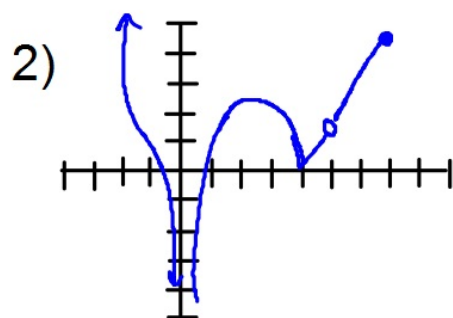
$$\lim_{x \rightarrow c^-} f'(x) = \lim_{x \rightarrow c^+} f'(x)$$



State the domain of the function. Identify where the function is continuous and differentiable.



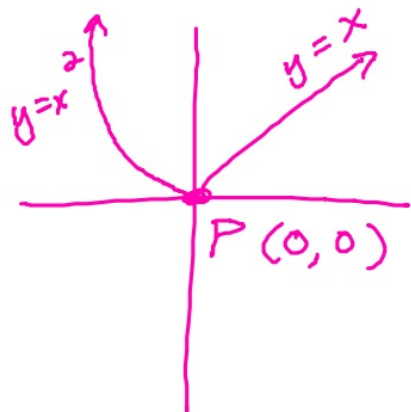
D: $(-\infty, \infty)$
 Cont: $(-\infty, 2)(2, \infty)$
 Diff: $(-\infty, 2)(2, 4)(4, \infty)$



D: $(-\infty, 0)(0, 5)(5, \infty)$
 Cont: $(-\infty, 0)(0, 5)(5, \infty)$
 Diff: $(-\infty, 0)(0, 4)(4, 5)(5, \infty)$

Sec 3.2

#1



y' left $2x$ y' right 1

$$\lim_{x \rightarrow 0^-} y' = 0 \quad \lim_{x \rightarrow 0^+} y' = 1$$

f is not dif.f. at $x=0$

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