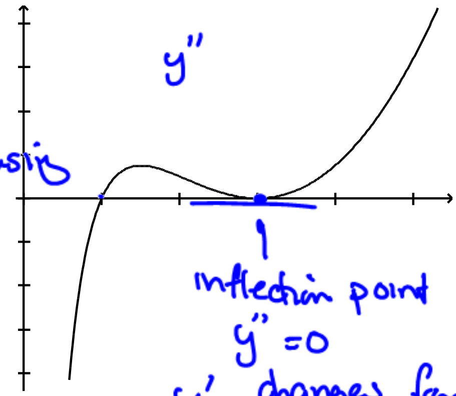
Curve Sketching Review

The graph of f' on $[0,5]$ is shown. Use this graph for #1 and 2.



1. f has a local minimum at x= ? $\boxed{x=1}$

$f'=0$

decreasing → increasing

$f'<0$ $f'>0$

2. f has an inflection point at x= ?

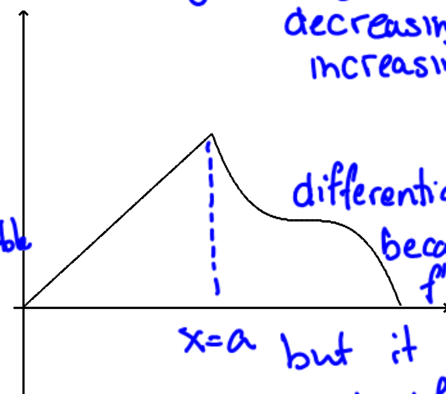
- concavity changes
- $y''=0$

inflection point

$y''=0$

y' changes from decreasing to increasing.

3. It follows from the graph of f', shown at the right, that



a) f is not continuous at $x = a$
b) f is continuous but not differentiable at $x = a$
c) f has a relative maximum at $x = a$ f' not changing sign.
d) f has a point of inflection at $x = a$ not second differentiable
e) none of these

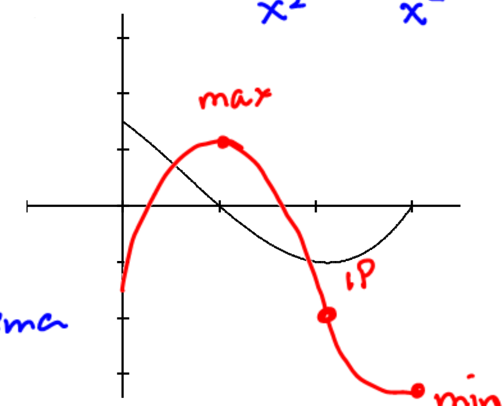
differentiable because f' exists

$x=a$ but it is not second differentiable

4. A local minimum value of the function $y = \frac{e^x}{x}$ is $\boxed{x=1}$

$y = e^x(x)^{-1}$ $\quad y' = \frac{e^x}{x} + -1(x)^{-2}\cdot e^x = \frac{xe^x}{x^2} - \frac{1e^x}{x^2} = \frac{e^x(x-1)}{x^2}$

5. Given f' as graphed, sketch a possible graph for f



possible extrema

$x=1$ or $x=0$

	$\frac{1}{2}$	1	2
y'	⊖	0	⊕

$f(0)$ does not exist

$\therefore$ not extrema

6. If $f(x) = xe^x$, then at $x=0$

a) f is increasing
b) f is decreasing
c) f has a relative maximum
d) f has a relative minimum
e) f' does not exist

$f'(x) = 1e^x + xe^x$

$= e^x(x+1)\big|_{x=0}$

$= e^0(0+1)$

$f'(0) = 1$