

os·cu·late /'äskyə,lāt/

verb

1. (of a curve or surface) touch (another curve or surface) so as to have a common tangent at the point of contact.
 2. kiss.
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os·cil·late /'äsə,lāt/

verb

1. move or swing back and forth at a regular speed.
 2. vary in magnitude or position in a regular manner around a central point.
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$$19. f(x) = \begin{cases} 3 - x, & x < 2 \\ \frac{x}{2} + 1, & x > 2 \end{cases}$$

$$\lim_{x \rightarrow 2^-} f(x) = 3 - 2 = 1$$

$$\lim_{x \rightarrow 2^+} f(x) = \frac{2}{2} = 1$$

$$f(2) = \text{?} \text{ (sad face)}$$

$$20. f(x) = \begin{cases} 3 - x, & x < 2 \\ \text{?}, & x = 2 \\ x/2, & x > 2 \end{cases}$$

$x < 2$ contin.

$x > 2$ "

$x = ?$?

removable discont. @ $x=2$
 b/c we can remove
 the discont. by setting
 $f(2) = 1$

$$21. f(x) = \begin{cases} \frac{1}{x-1}, & x < 1 \\ x^3 - 2x + 5, & x \geq 1 \end{cases}$$

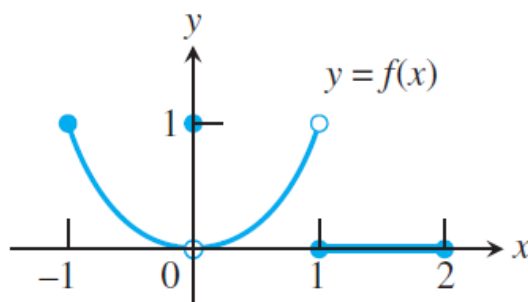
@ $x=1$ infinite
discont. not
removable b/c
cannot make contin.
with a single value

$$\lim_{x \rightarrow -1} f(x) = 1 - (-1)^2 = 0$$

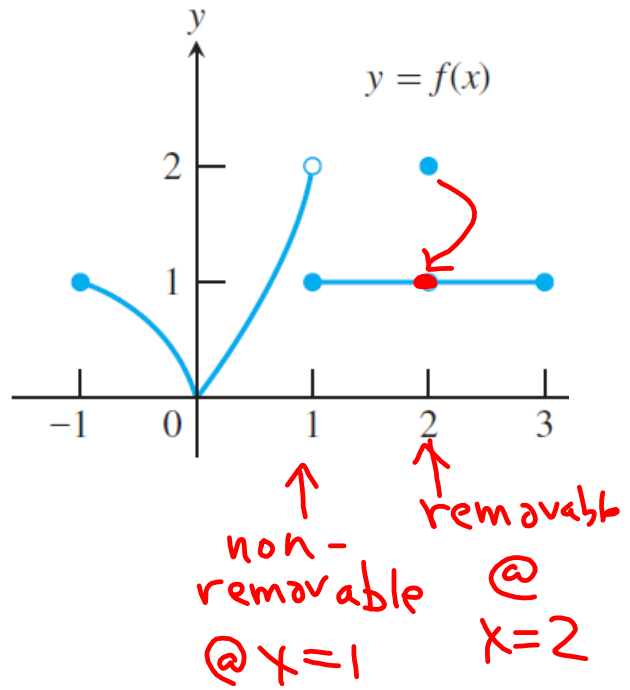
$$22. f(x) = \begin{cases} 1 - x^2, & x \neq -1 \\ 2, 0 & x = -1 \end{cases}$$

$x \neq -1$ contin.
removable discont. @ $x=-1$ b/c
can remove by setting $f(-1)=0$

23.



24.



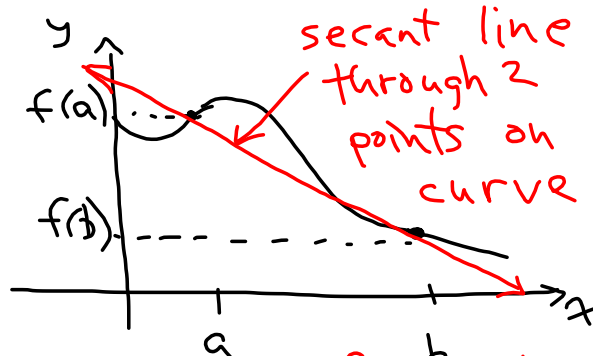
Topic: rates of change, tangent and normal lines.

* formula: average rate of change of $f(x)$ on $[a, b]$

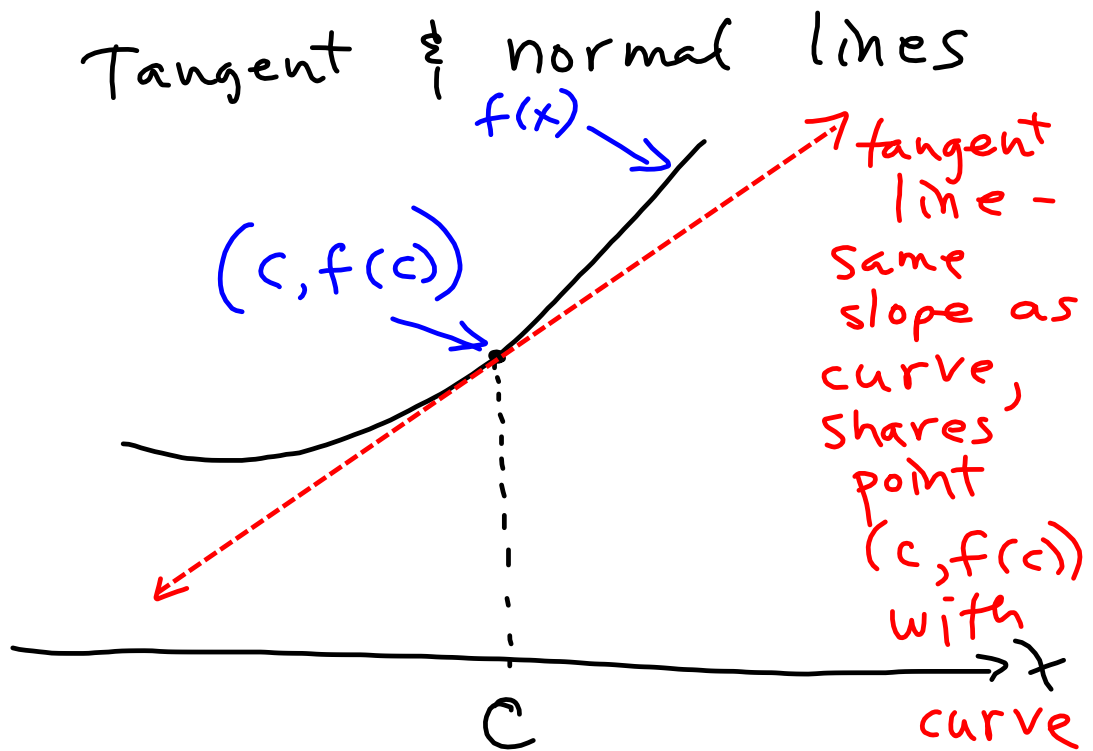
$$= \frac{f(b) - f(a)}{b - a} = \frac{\Delta y}{\Delta x}$$

$$f(b) - f(a) = \Delta y$$

$$b - a = \Delta x$$



avg rate of change = slope of secant line



Equation of tangent line.

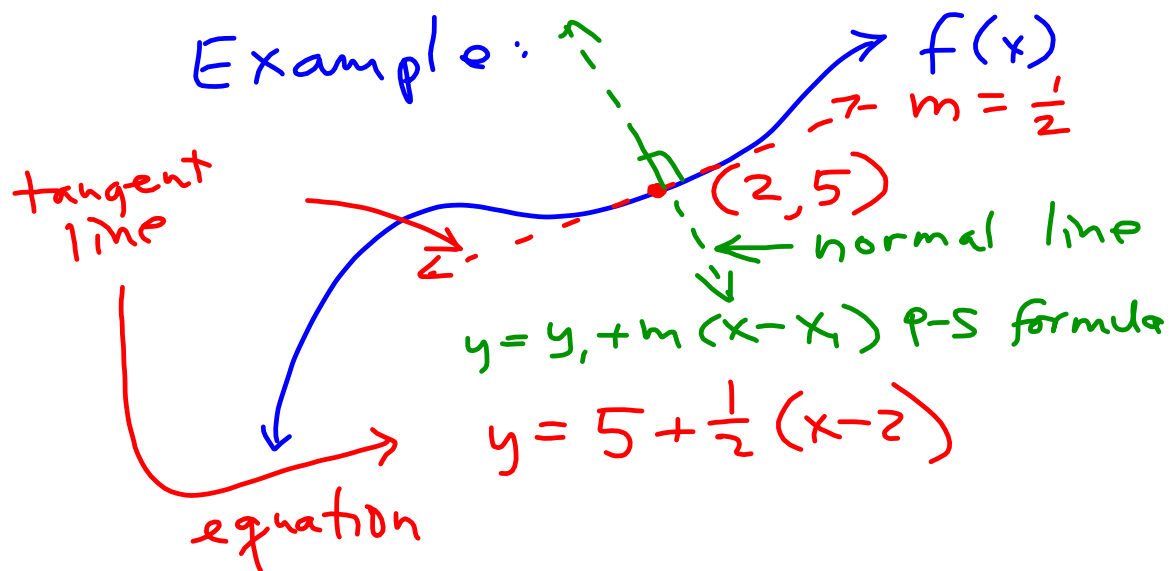
Point-slope formula:

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

where: point = (x_1, y_1)
slope = m

tangent line: point = $(c, f(c))$
slope = m , value of derivative

eq'n tangent line: $y = f(c) + m(x - c)$
@ $x = c$



Normal: shares $(c, f(c))$ with curve,
but is \perp to tangent line

equation normal: $y = 5 - 2(x - 2)$