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Find an equation of the line that is tangent to the graph of f and parallel to the given line.

(34) $f(x) = 2x^2$, $4x+y+3=0$

$f'(x) = 4x$ $\quad y = 3-4x$, slope $= -4$

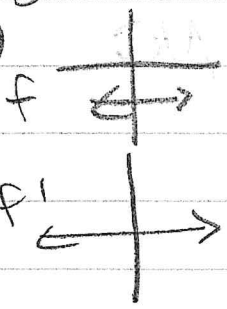
$4x = -4$

$x = -1$ $\quad y - 2 = -4(x+1)$

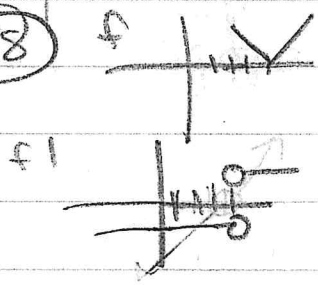
$f(-1) = 2(1) = 2$

Sketch the graph of f'.

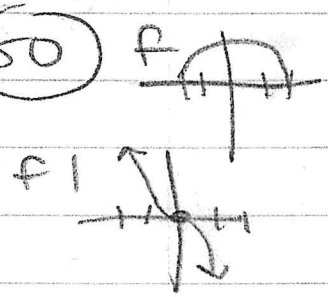
(46)



(48)



(50)



The limit represents $f'(c)$ for a function at c. Find the function and c.

(54) $\lim_{\Delta x \to 0} \frac{(-2+\Delta x)^3+8}{\Delta x}$ $\quad \lim_{\Delta x \to} \frac{f(x+\Delta x)-f(x)}{\Delta x}$

$f(x) = x^3$ $\quad x = -2$

Alternate limit for a derivative.

$\lim_{x \to a} \frac{f(x)-f(a)}{x-a} \sim \frac{y-y_1}{x-x_1}$ still slope

(56) $\lim_{x \to 9} \frac{2\sqrt{x}-6}{x-9}$ $\quad f(x) = 2\sqrt{x}$ $\quad c = 9$

Identify and sketch a function that:

(58) $f(0)=4$, $f'(0)=0$, $f'(x)<0$ for $x<0$ and $f'(x)>0$ for $x>0$

$y = x^2+4$

Is the function differentiable at $x=1$?

(96) $f(x) = \begin{cases} x & x \le 1 \\ x^2 & x > 1 \end{cases}$

Same slope:

top Deriv $= 1$

bottom Deriv $= 2x$

at $x=1$, $f' = 2$

Continuous: yes

$\lim_{x \to 1^-} = 1$ $\lim_{x \to 1^+} = 1$

Since the slopes are not $=$, NO