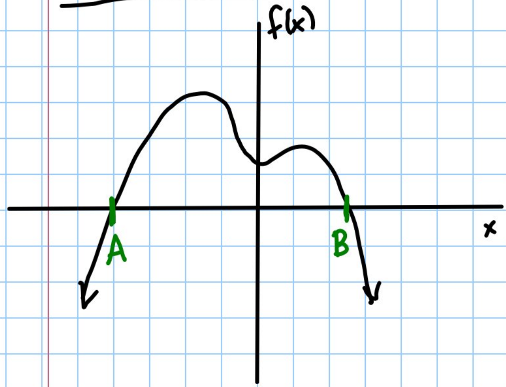
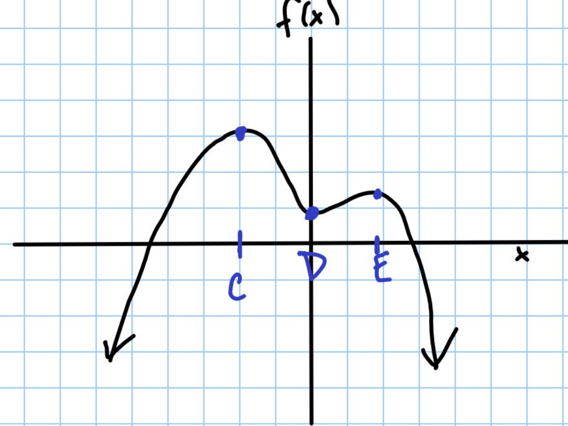
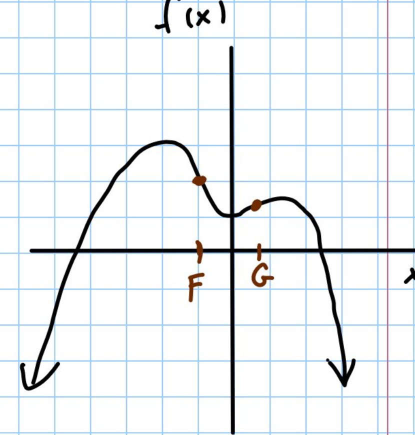
WARMUP







f: positive on (A, B)
negative on $(-\infty, A)$ and (B, ∞)

f': positive on $(-\infty, C)$ and (D, E)
negative on (C, D) and (E, ∞)

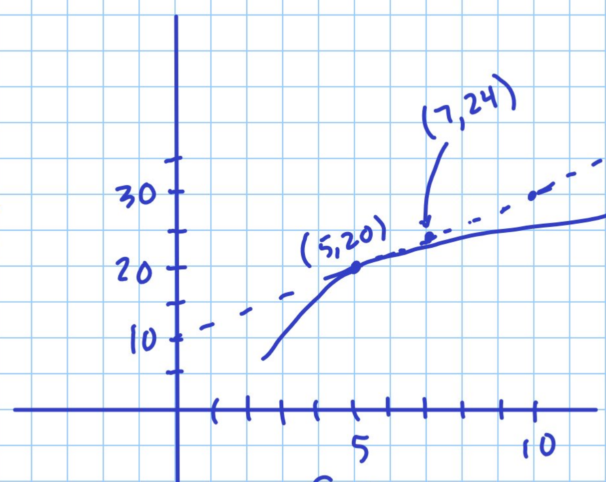
f'': positive on (F, G)
negative on $(-\infty, F)$ and (G, ∞)

16 p94

$f(5) = 20$

$f'(5) = 2$

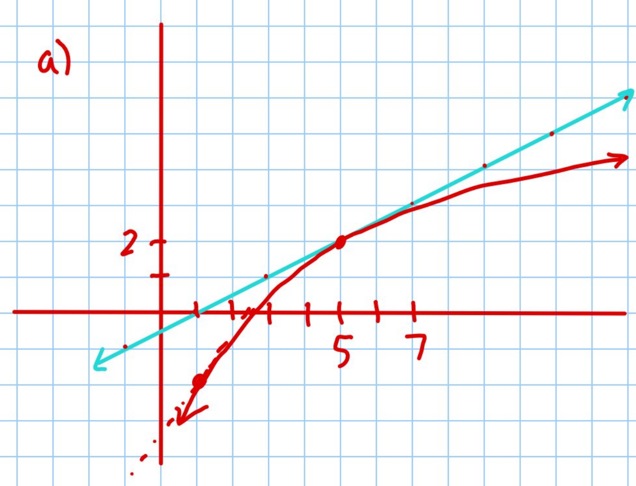
$f''(x) < 0$ for $x \geq 5$



$f(7) = 22$

20)
- f is increasing
- f is concave down
- $f(5) = 2$
- $f'(5) = \frac{1}{2}$

a)



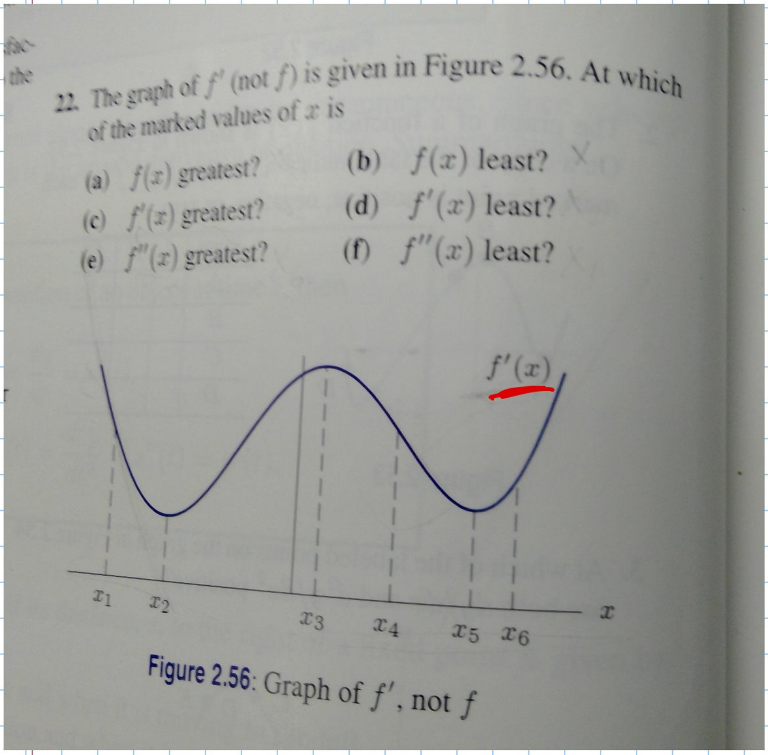
b) 1

c) between 1 and 5

d) $\lim_{x \to -\infty} f(x) = -\infty$

e) Yes

f) No



22. The graph of f' (not f) is given in Figure 2.56. At which of the marked values of x is

(a) $f(x)$ greatest? (b) $f(x)$ least?

(c) $f'(x)$ greatest? (d) $f'(x)$ least?

(e) $f''(x)$ greatest? (f) $f''(x)$ least?

Figure 2.56: Graph of f', not f

a) x_6

b) x_1

c) x_3

d) x_2

e) x_6

f) x_1

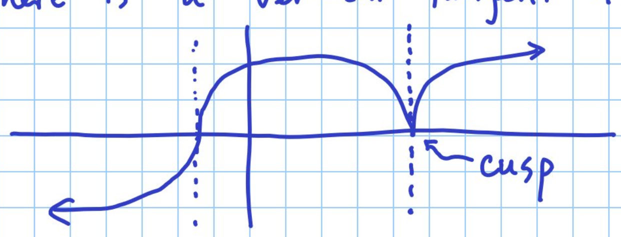
Section 2.7 Differentiability

The function f is <u>differentiable</u> at x if

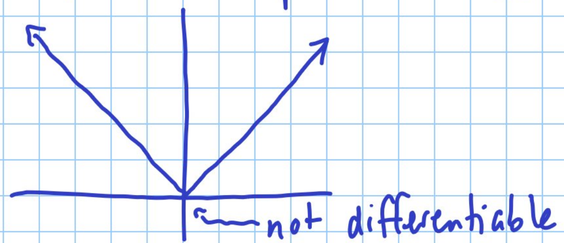
$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h} \quad \text{exists.}$$

Graphically, a function f is <u>not differentiable</u> at $x = a$ if:

- there is a vertical tangent at $x = a$.



- there is a sharp corner at $x=a$.



- it is not continuous at $x=a$.

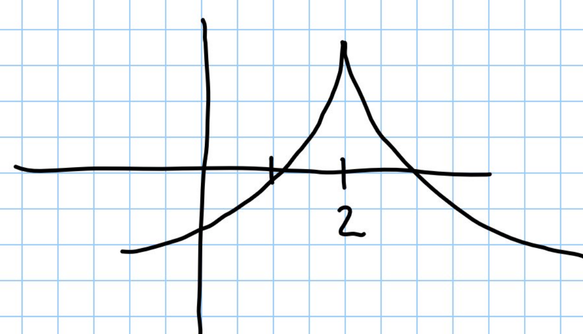
Theorem 2.1 If a function is differentiable at $x=a$, then it is continuous at $x=a$.

p98 1, 2, 4, 5, 10

10) a) $f''(x)>0 \quad x<2$

$f''(x)>0 \quad x>2$

$f'(2)$ undefined



b) $f''(x)>0 \quad x<2$

$f''(x)<0 \quad x>2$

$f'(2)$ undefined