CURVE SKETCHING: SKETCHING f FROM f'

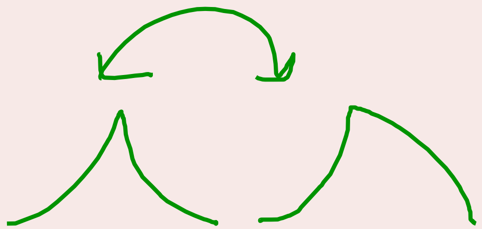
Honors Calculus

Keeper 22

WHAT DOES THE FIRST DERIVATIVE TELL YOU ABOUT F(X)?

F'(x)	+ above x-axis	- below x-axis	0	F(x) defined by undefined at f'(x) critical value
F(x)	Increasing	Decreasing		

IF 'A' IS A CRITICAL VALUE, WHAT CAN WE TELL ABOUT F(X)?

F'(x)	+ 0 − a max	− 0 + a
F(x)	max or undef. 	min or undef. 

WHAT DOES THE 2ND DERIVATIVE TELL US ABOUT F(X)?

F''(x)	+	−
F(x)	concave up	concave down

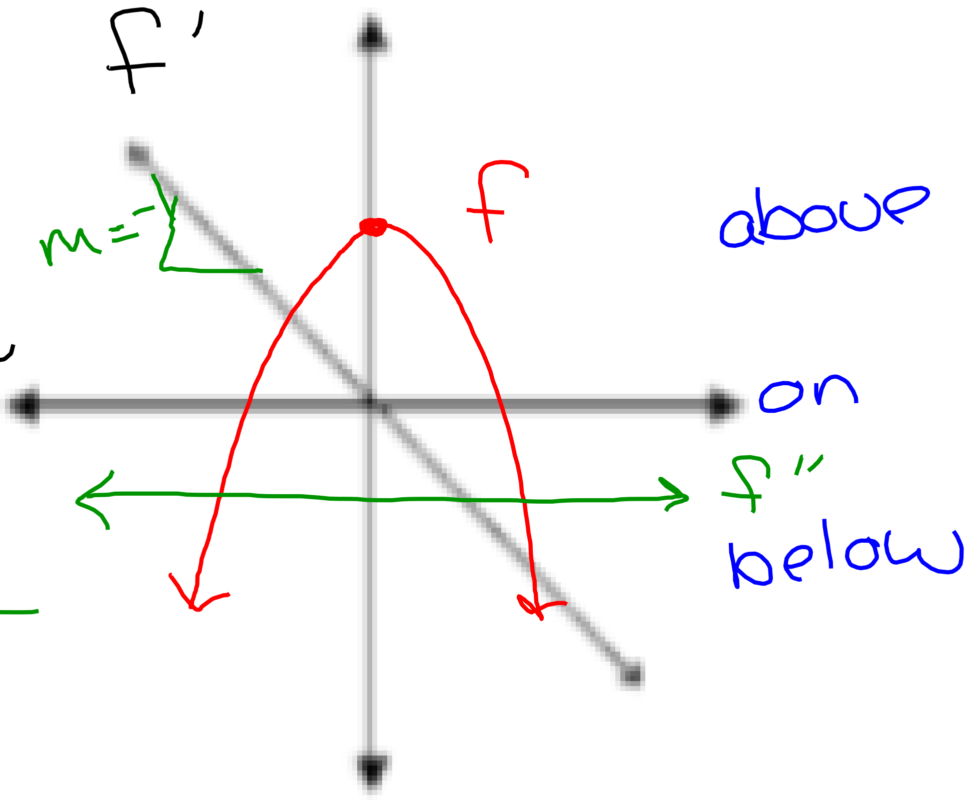
1. FROM f' SKETCH f AND f''

f ↗ max ↘

f' + + on − −

above 0 below

f'' − − − −



2. FROM f' SKETCH f AND f''

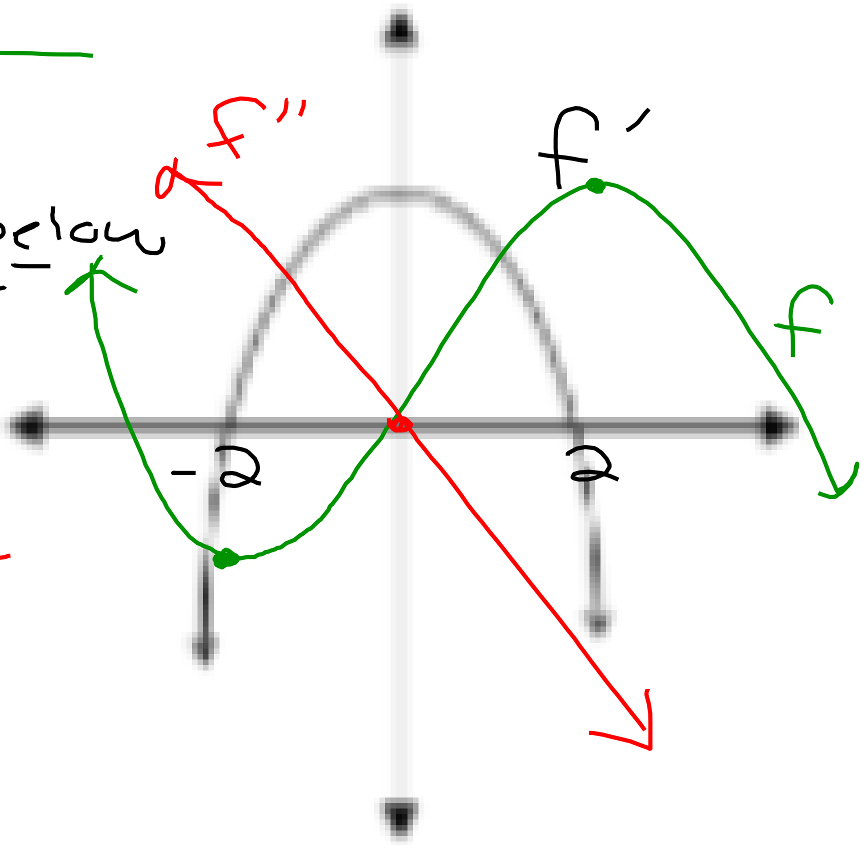
f ↘ min ↗ max ↘

-2   2

f' below – 0 + + 0 – – below

-2   2

f'' + + 0 – – –



3. FROM f' SKETCH f AND f''

f: ↘ min ↗ ↗ max ↘

$-3 \quad 0 \quad 3$

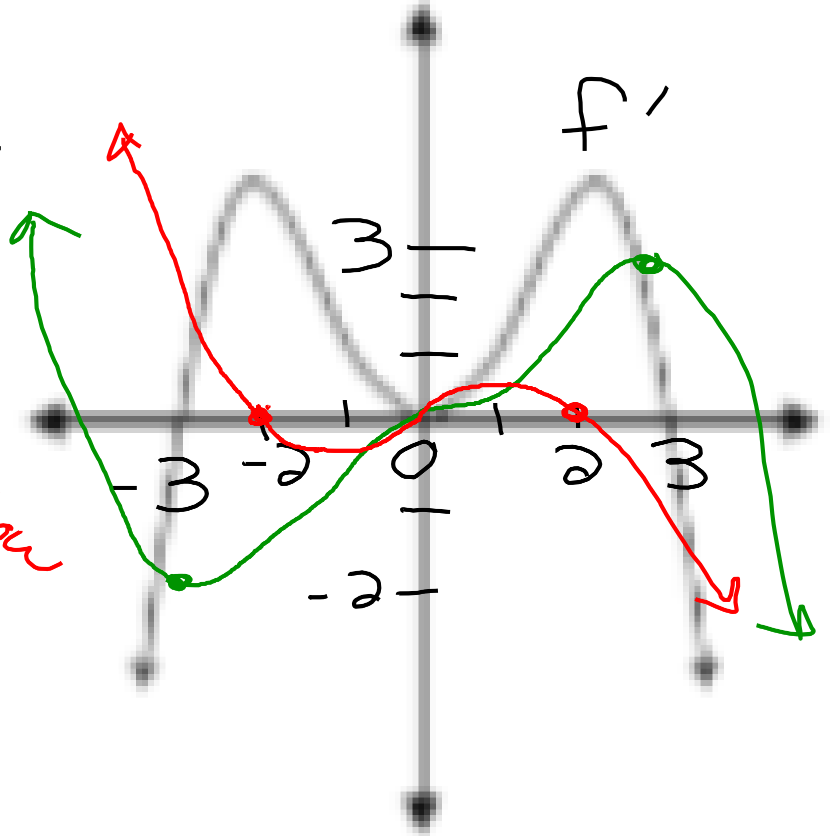
f': $- \quad + \quad + \quad -$

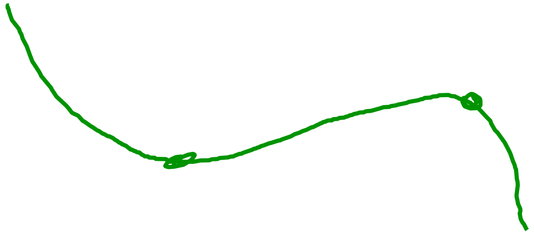
$-3 \quad 0 \quad 3$

f'': $+ \quad 0 \quad - \quad 0 \quad + \quad 0 \quad -$

$-2 \quad 0 \quad 2$

above below above below



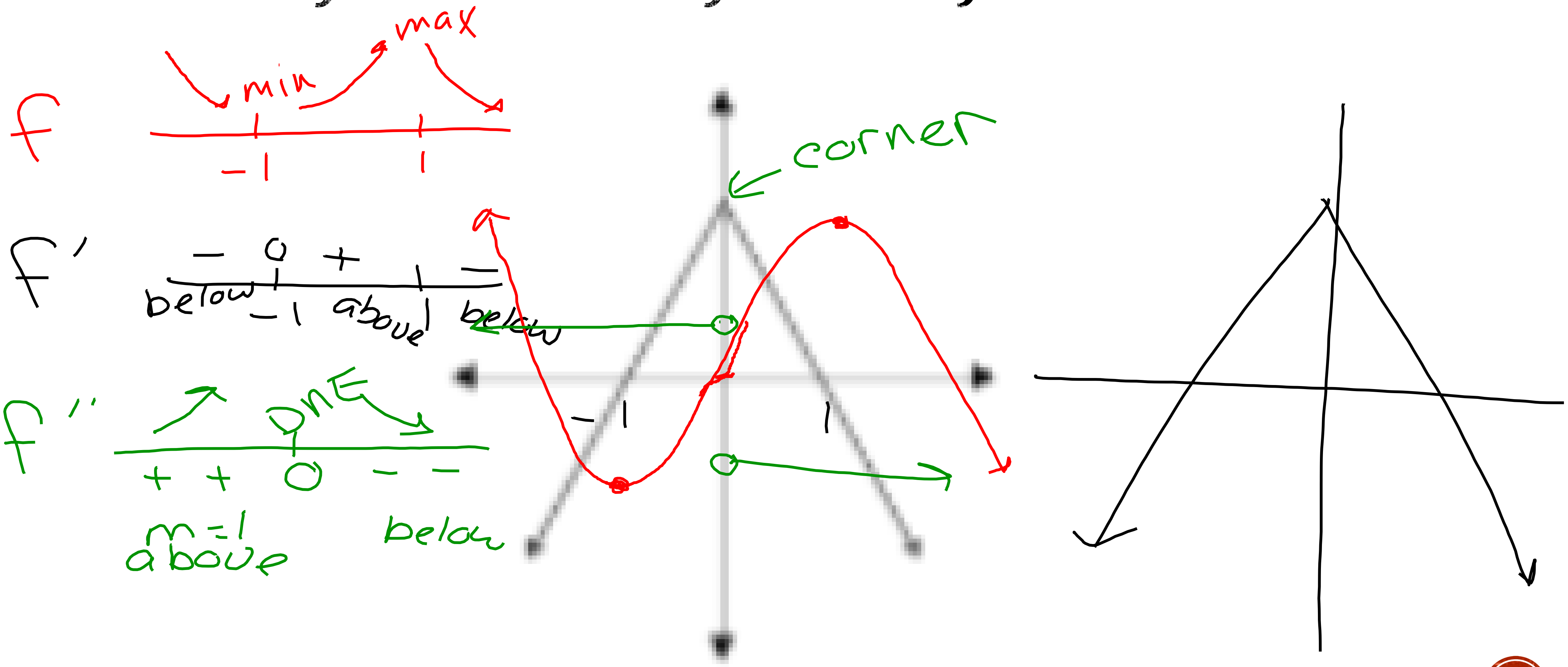


above

on

below

4. FROM f' SKETCH f AND f''



1. DRAW A POSSIBLE GRAPH OF $f(x)$ GIVEN THE INFORMATION BELOW.

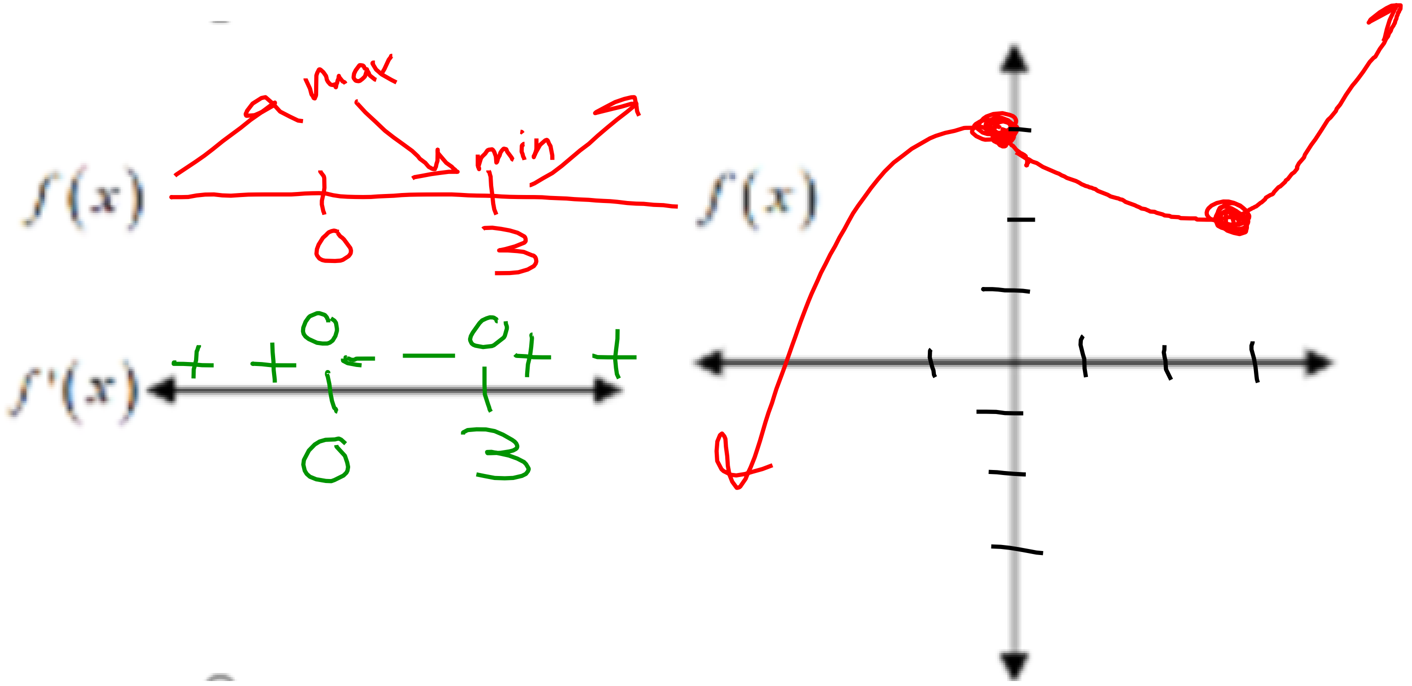
a. $f(x)$ is continuous

b. $f(3) = 2$ $(3,2)$

pos. c. $f'(x) > 0, (-\infty, 0), (3, \infty)$

neg. d. $f'(x) < 0, (0,3)$

e. $f'(x) = 0$ at $x = 0, x = 3$



2. DRAW A POSSIBLE GRAPH OF $f(x)$ GIVEN THE INFORMATION BELOW.

a. $f(x)$ is continuous

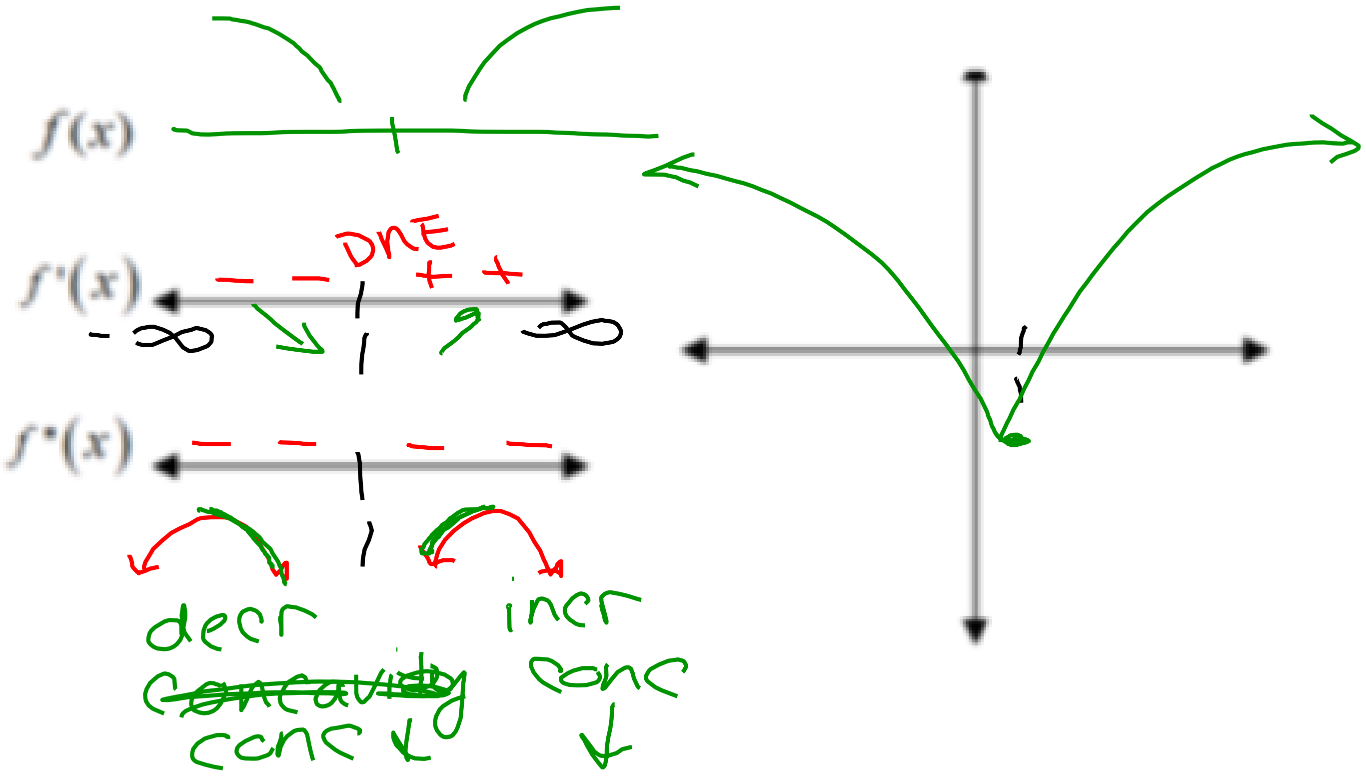
neg b. $f'(x) < 0\ (-\infty, 1)$

pos c. $f'(x) > 0\ (1, \infty)$

d. $f'(x)$ is undefined at $x = 1$

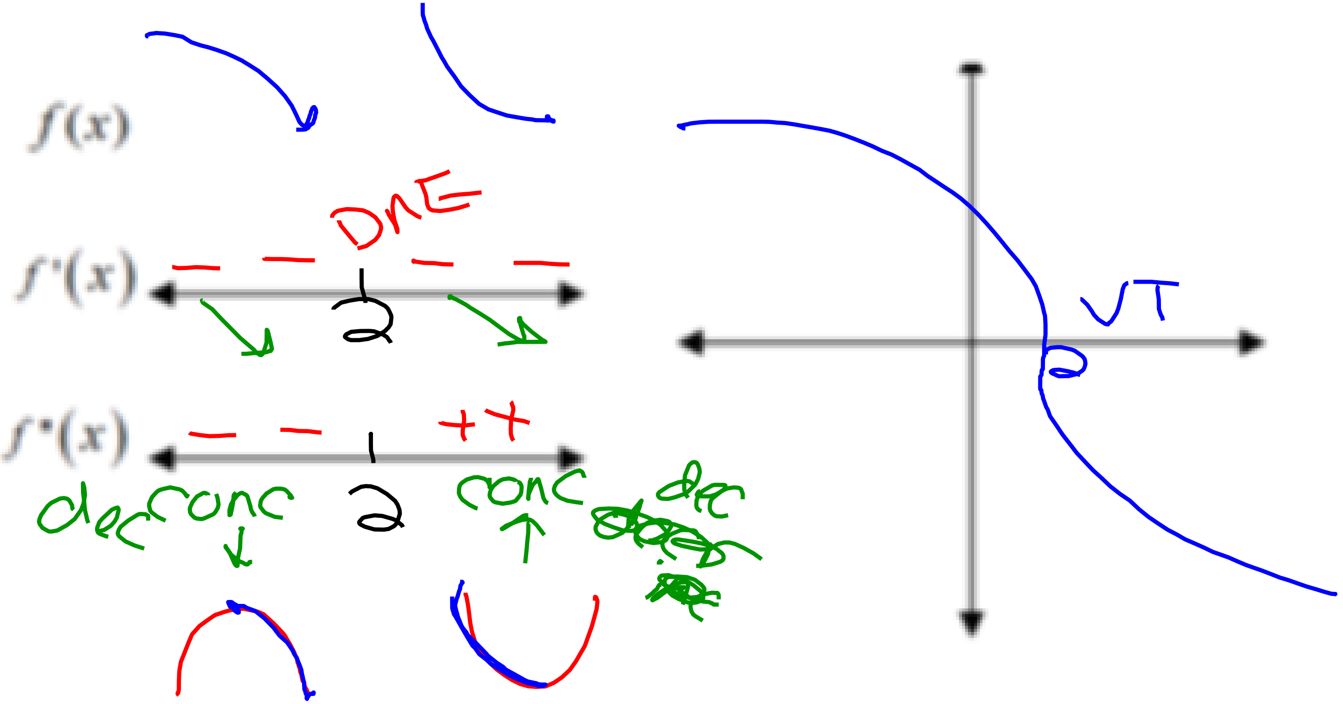
e. $f''(x) < 0$ at $(-\infty, 1)U(1, \infty)$

neg



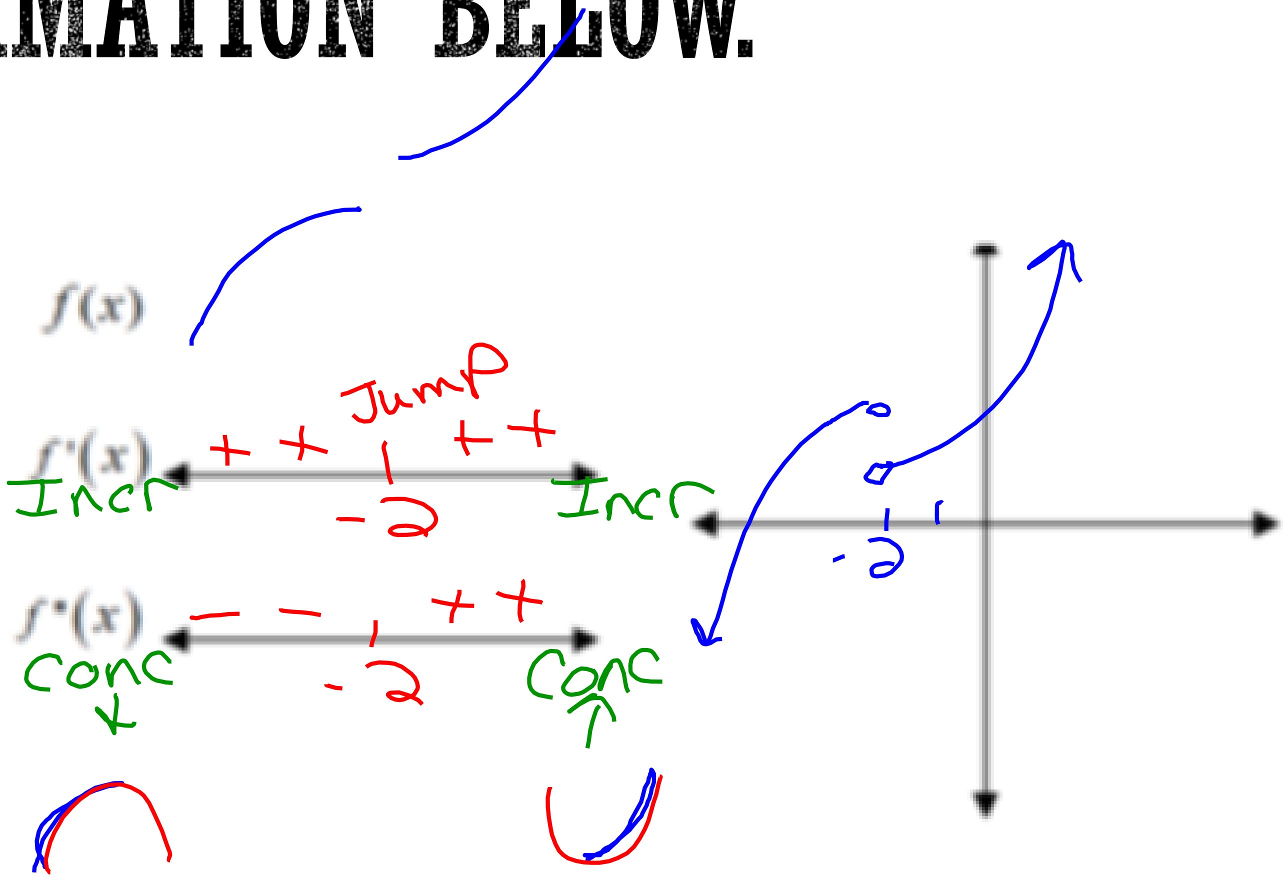
3. DRAW A POSSIBLE GRAPH OF $f(x)$ GIVEN THE INFORMATION BELOW.

a. $f(x)$ is continuous
b. $f'(x) < 0, (-\infty, 2), (2, \infty)$
c. $f'(x)$ is undefined at $x = 2$
neg d. $f''(x) < 0$, when $x < 2$
pos e. $f''(x) > 0$ at $x = 0, x > 2$



4. DRAW A POSSIBLE GRAPH OF $f(x)$ GIVEN THE INFORMATION BELOW.

a. $f(x)$ has a jump at $x = -2$
b. $f'(x) > 0$; $(-\infty, -2), (-2, \infty)$
c. $f''(x) < 0$; $(-\infty, -2)$
d. $f''(x) > 0$; $(-2, \infty)$



5. DRAW A POSSIBLE GRAPH OF $f(x)$ GIVEN THE INFORMATION BELOW.

a. $f(x)$ is continuous [-4, 3]
b. $f'(x) < 0$ on $(-4, -2)$
c. $f'(x) > 0$ on $(-2, 1)$ U $(1, 3)$
d. $f'(x) = undef.$ at $x = -2$
e. $f(-2)$= -3 $f(1)$= 3   (-2,-3) (1,3)
f. $f'(x) = 0$ at $x = 1$
g. $f''(x) < 0$; $(-4, -2)$ U $(-2, 1)$
h. $f''(x) > 0$; $(1, 3)$