Example 12

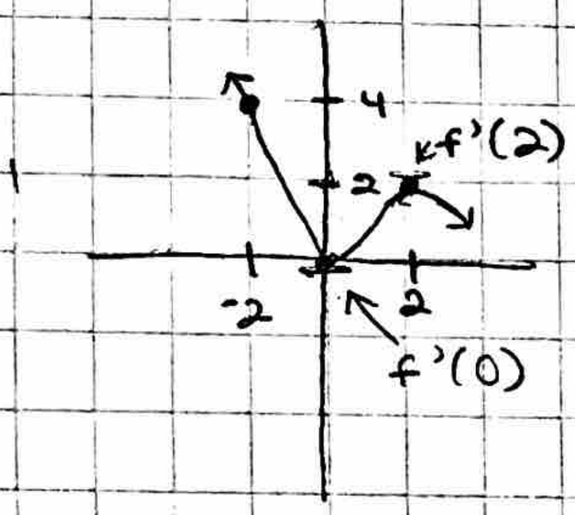
Graph Sketch

Sketch a possible graph of a function f that satisfies the following

Condition 1

- $f(-2) = 4$
- $f(0) = 0$
- $f(2) = 2$
- $f'(0) = f'(2) = 0$

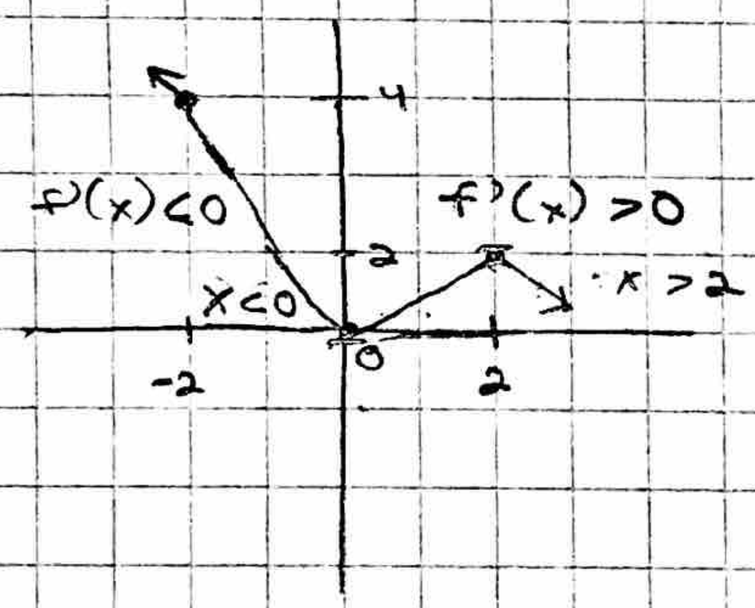
① Set f



Condition 2

$f'(x) > 0$ for $0 < x < 2$

$f'(x) < 0$ for $x < 0$ and $x > 2$



② Get Increasing/ Decreasing Information

Where $f'(x) > 0$ for $0 < x < 2$, f is increasing on $(0, 2)$

Where $f'(x) < 0$ for $x < 0$ and $x > 2$, f is decreasing on $(-\infty, 0) \cup (2, \infty)$

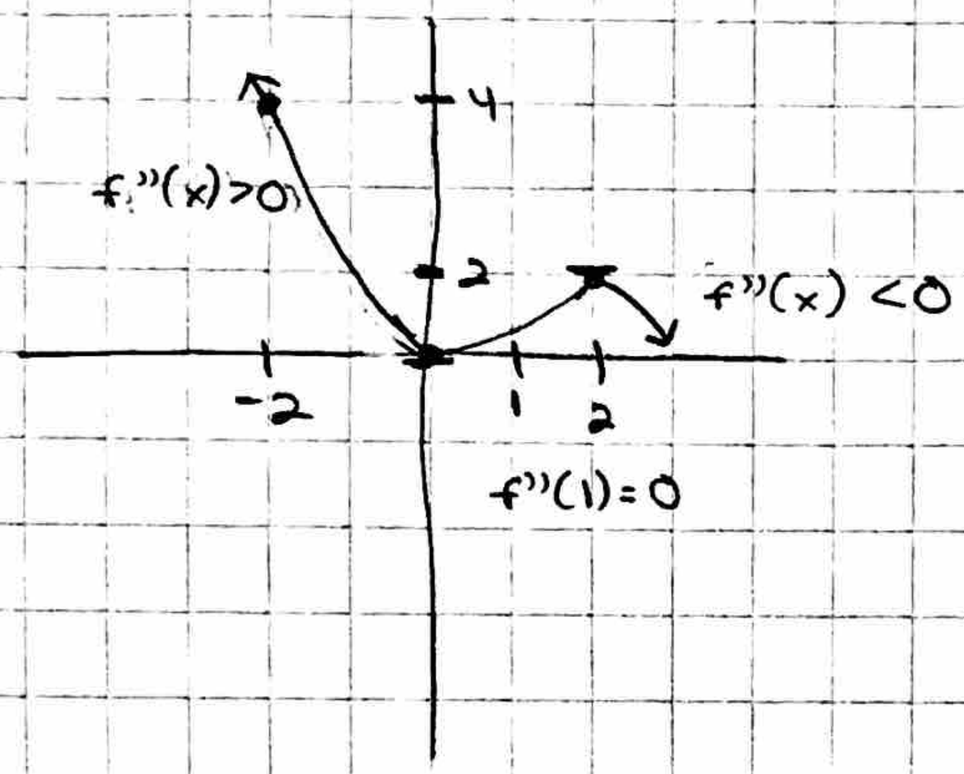
Condition 3

$f''(x) > 0$ for $x < 1$

$f''(x) < 0$ for $x > 1$

$f''(1) = 0$

③ Determine Concavity



Where $f''(x) > 0$ for $x < 1$, f concaves upward

Where $f''(x) < 0$ for $x > 1$, f concaves downward

Where $f''(1) = 0$, $x = 1$ is an inflection point