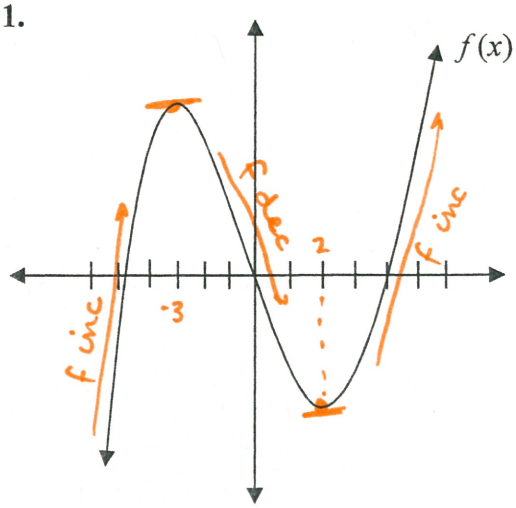
DATE: ________

Sketching the graph of $f'(x)$ from $f(x)$

1.



$f'(x) = 0$ @ $x = -3$ and $x = 2$

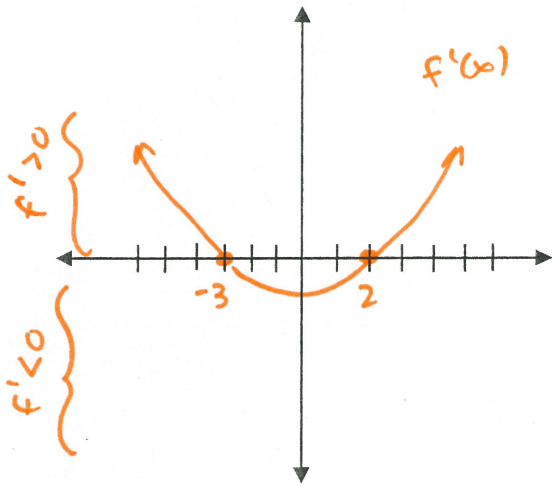
b/c $f(x)$ has horizontal tangent lines @ $x = -3$ and $x = 2$

$f'(x) > 0$ on $(-\infty, -3) \cup (2, \infty)$ b/c

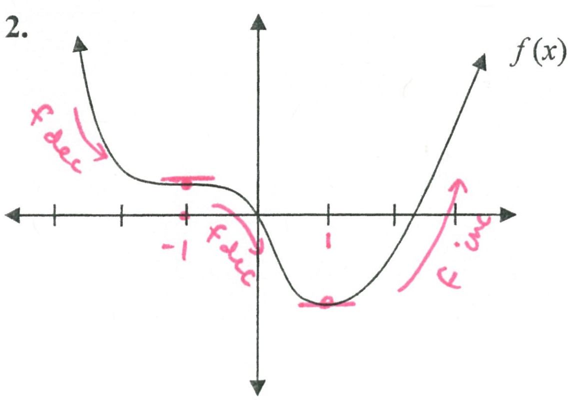
$f(x)$ increasing on $(-\infty, -3) \cup (2, \infty)$

$f'(x) < 0$ on $(-3, 2)$ b/c

$f(x)$ decreasing on $(-3, 2)$



2.



$f'(x) = 0$ @ $x = -1$ and $x = 1$

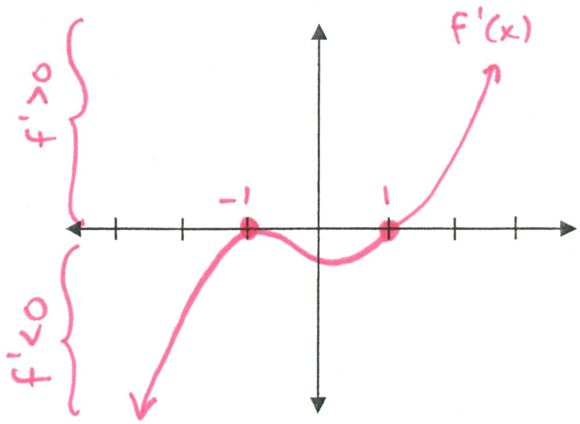
b/c $f(x)$ has horizontal tangent lines @ $x = -1$ and $x = 1$

$f'(x) > 0$ on $(1, \infty)$ b/c

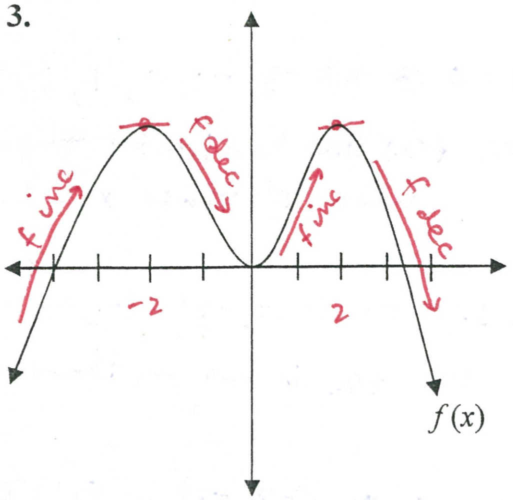
$f(x)$ increasing on $(1, \infty)$

$f'(x) < 0$ on $(-\infty, -1) \cup (-1, 1)$ b/c

$f(x)$ decreasing on those intervals



3.

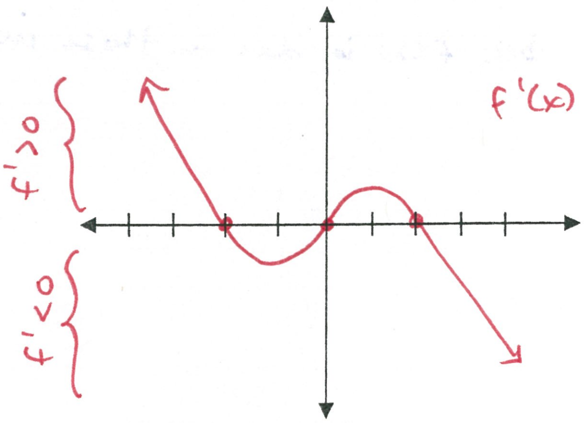


$f'(x) = 0$ @ $x = -2$, $x = 0$, $x = 2$

b/c $f(x)$ has horizontal tangent lines @ $x = -2$, $x = 0$ and $x = 2$

$f'(x) > 0$ on $(-\infty, -2) \cup (0, 2)$

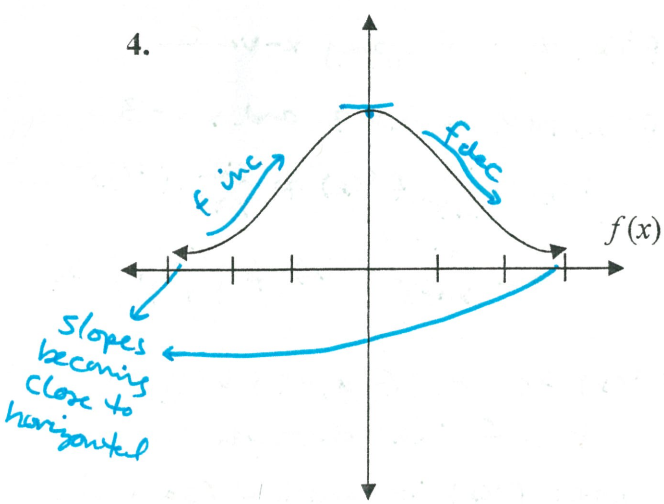
b/c $f(x)$ increasing on those intervals



$f'(x) < 0$ on $(-2, 0) \cup (2, \infty)$

b/c $f(x)$ decreasing on those intervals

4.



$f'(x) = 0$ @ $x = 0$ b/c

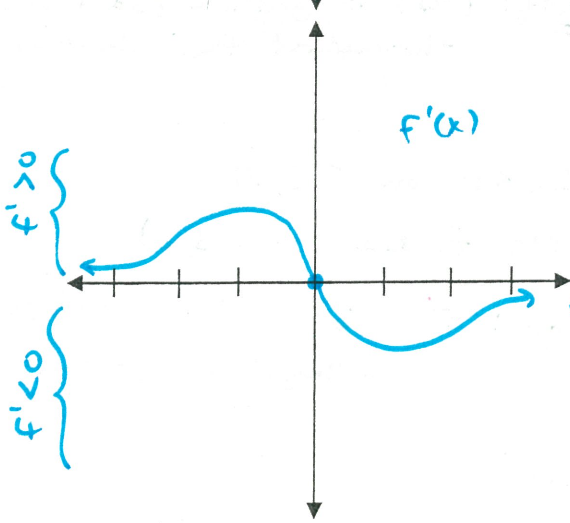
$f(x)$ has horizontal tangent line @ $x = 0$

$f'(x) > 0$ on $(-\infty, 0)$ b/c

$f(x)$ inc on $(-\infty, 0)$

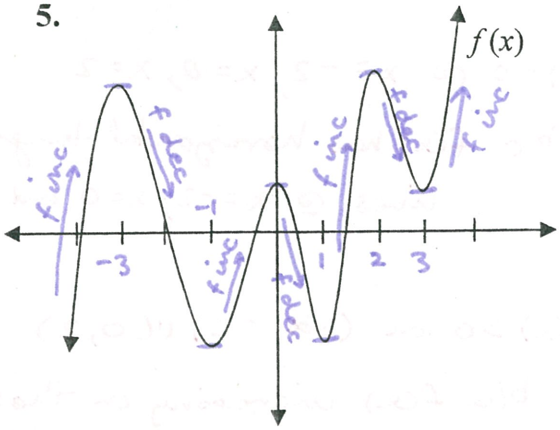
$f'(x) < 0$ on $(0, \infty)$ b/c

$f(x)$ dec on $(0, \infty)$



← $f'(x)$ approaches zero as $x \to \pm\infty$

5.



$f'(x) = 0$ @ $x = -3, -1, 0, 1, 2, 3$

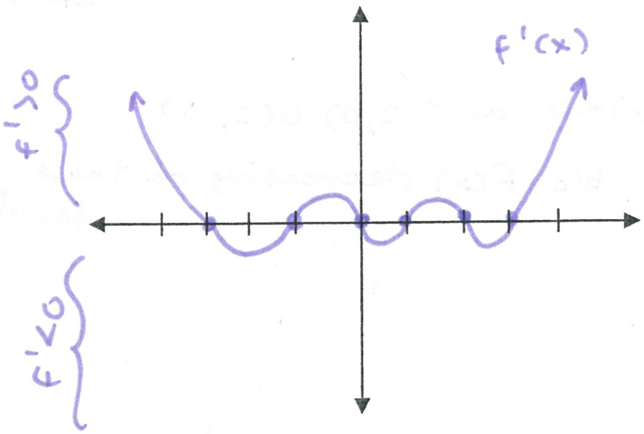
b/c $f(x)$ has horizontal tangent lines at those x-values.

$f'(x) > 0$ on $(-\infty, -3) \cup (-1, 0) \cup (1, 2) \cup (3, \infty)$

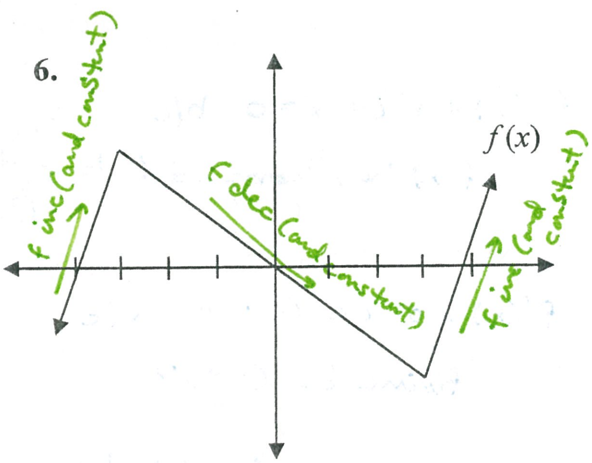
b/c $f(x)$ is inc on those intervals

$f'(x) < 0$ on $(-3, -1) \cup (0, 1) \cup (2, 3)$

b/c $f(x)$ is dec on those intervals



6.



$f'(x) \neq 0$ for any x-value

$f'(x)$ DNE @ $x = 3$ and $x = -3$

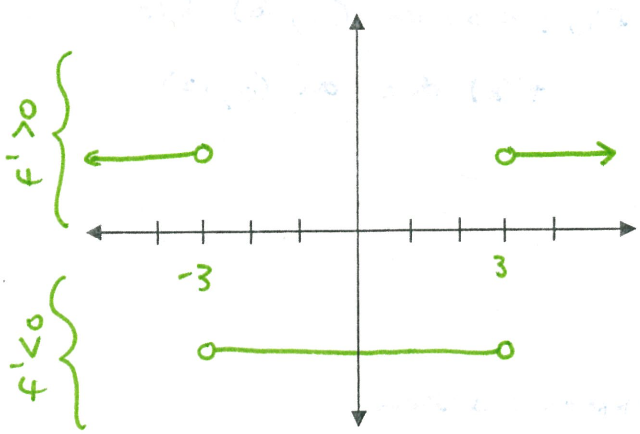
b/c $\lim_{x \to 3^-} f'(x) \neq \lim_{x \to 3^+} f'(x)$

and $\lim_{x \to -3^-} f'(x) \neq \lim_{x \to -3^+} f'(x)$

$f'(x) > 0$ on $(-\infty, -3) \cup (3, \infty)$

b/c f inc on those intervals

note: $f'(x)$ is constant (same slope throughout the interval) on those intervals



$f'(x) < 0$ on $(-3, 3)$

b/c f dec on $(-3, 3)$

note: $f'(x)$ is constant on $(-3, 3)$

(same negative slope on $(-3, 3)$)