

Curve Sketching Homework

Directions: Use the following information about the continuous function f to sketch a possible graph for f .

1.

- (a) $f(0) = 0$
- (b) $f(x) < 0$ for all $x > 0$
- (c) $f'(x) < 0$ for all $x > 0$
- (d) $f''(x) > 0$ for all $x > 0$

2.

- (a) $f(x) > 0$ for all $x > 0$
- (b) $f(x) < 0$ for all $x < 0$
- (c) $f(0) = 0$
- (d) $f'(x) > 0$ for all x
- (e) $f''(x) > 0$ for all $x < 0$
- (f) $f''(x) < 0$ for all $x > 0$

3.

- (a) $f(0) = 0$
- (b) $f(x) < 0$ for all $x > 0$
- (c) $f''(x) > 0$ for all $x > 0$
- (d) $\lim_{x \rightarrow \infty} f(x) = -\infty$

4.

- (a) $f(x) > 0$ for all x
- (b) $f''(x) > 0$ for all x
- (c) $f'''(x) = 0$ for all x

5.

$f'(x) > 0$ if $1 < x < 3$; $f'(x) < 0$ if $x > 3$ or $x < 1$;
 $f''(x) > 0$ if $x < 0$ or $3 > x > 1$; $f''(x) < 0$ if $0 < x < 1$ or $x > 3$;
 $f(3) = 0$; $f(1) = -2$; $f(0) = -1$, and $f(-1) = 0$

6.

x	$x < -4$	$x = -4$	$-4 < x < 4$	$x = 4$	$x > 4$
$f'(x)$	Positive	fails to exist	negative	0	negative
$f''(x)$	Positive	fails to exist	positive	0	negative

7.

$f'(x) < 0$ if $x < d$; $f'(x) > 0$ if $x > d$; $f''(x) > 0$ if $x < d$; $f''(x) < 0$ if $x > d$

8.

$f'(e) = 0$; $f'(x) > 0$ if $x < e$; $f'(x) < 0$ if $x > e$; $f''(x) < 0$ if $x < e$

9.

$f'(h)$ doesn't exist; $f''(x) < 0$ if $x < h$; $f''(x) > 0$ if $x > h$

10.

$f'(p) = 1$; $f'(x) > 0$ if $x < p$; $f''(x) < 0$ if $x > p$