Topic: Sketching graphs

Question: If the first derivative of the function is positive, then the function is...

Answer choices:

A   ... concave down

B   ... concave up

C   ... decreasing

D   ... increasing

Solution: D

Where the first derivative of a function is positive, the function itself is increasing.

Topic: Sketching graphs

Question: If $g'(-2) = 0$ and $g''(-2) > 0$, which of the following must be true?

Answer choices:

A   The function has an inflection point at $x = -2$.

B   The function has a local minimum at $x = -2$.

C   The function has a local maximum at $x = -2$.

D   The function has an x-intercept at $x = -2$.

Solution: B

If $g'(-2) = 0$, then $x = -2$ is critical point of the function. If $g''(x) > 0$ at a critical point, there's a local minimum there.

Topic: Sketching graphs

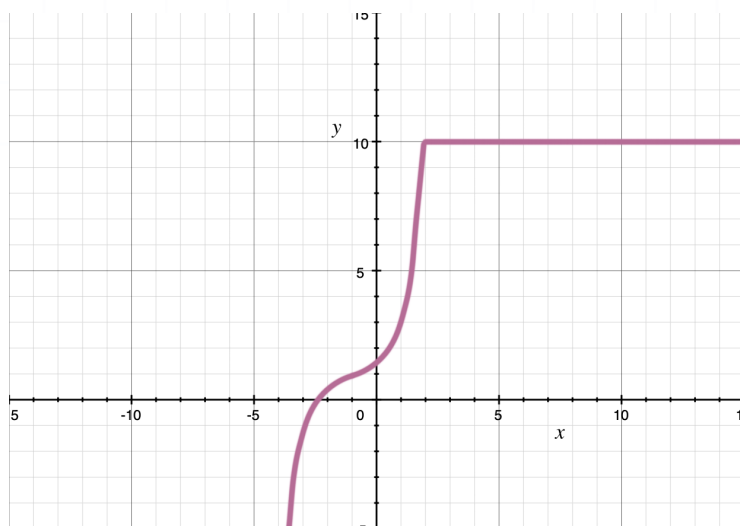**Question**: Which of the following is a graph of the function with the given properties?

$f'(x) < 0$ and $f''(x) > 0$ for $x \leq -1$
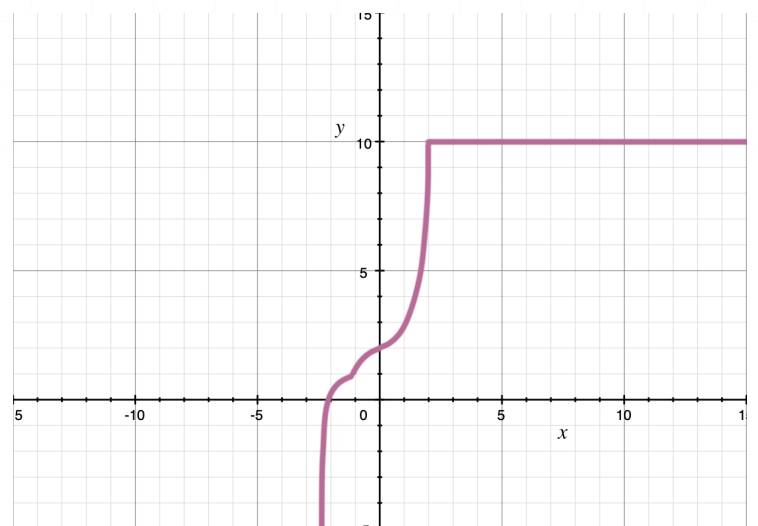
$f'(x) > 0$ and $f''(x) > 0$ for $-1 < x < 2$

$f(x) = 10$ for $x \geq 2$
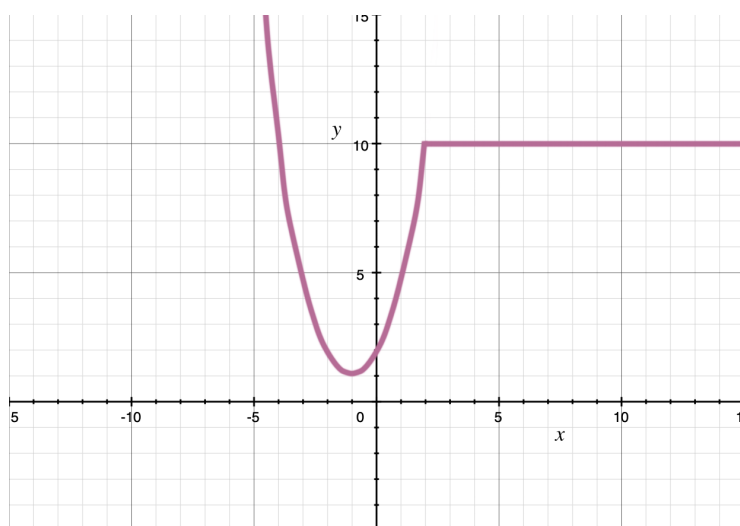
Answer choices:

A

B

C

D

Solution: C
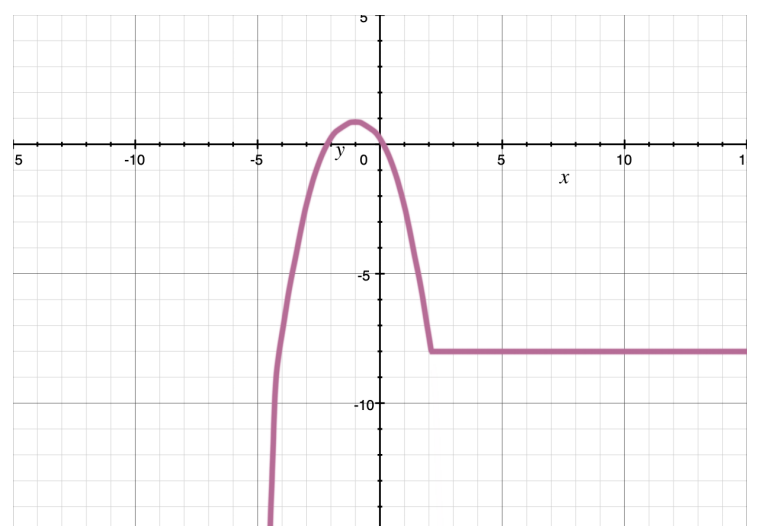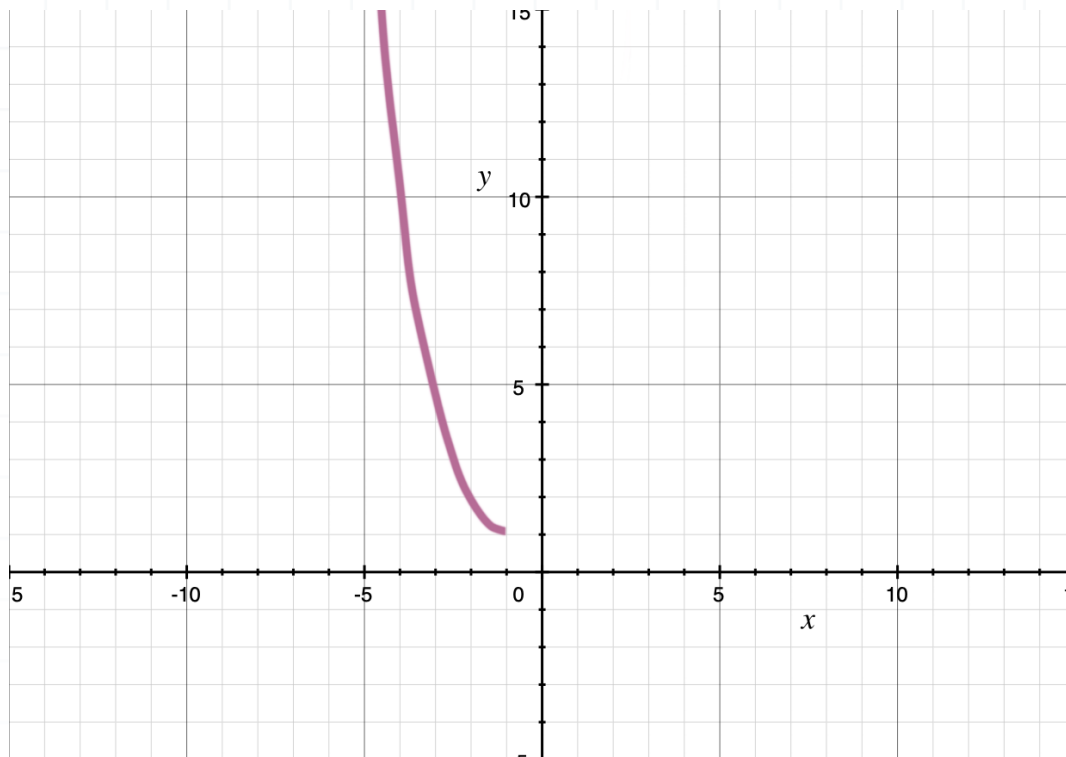
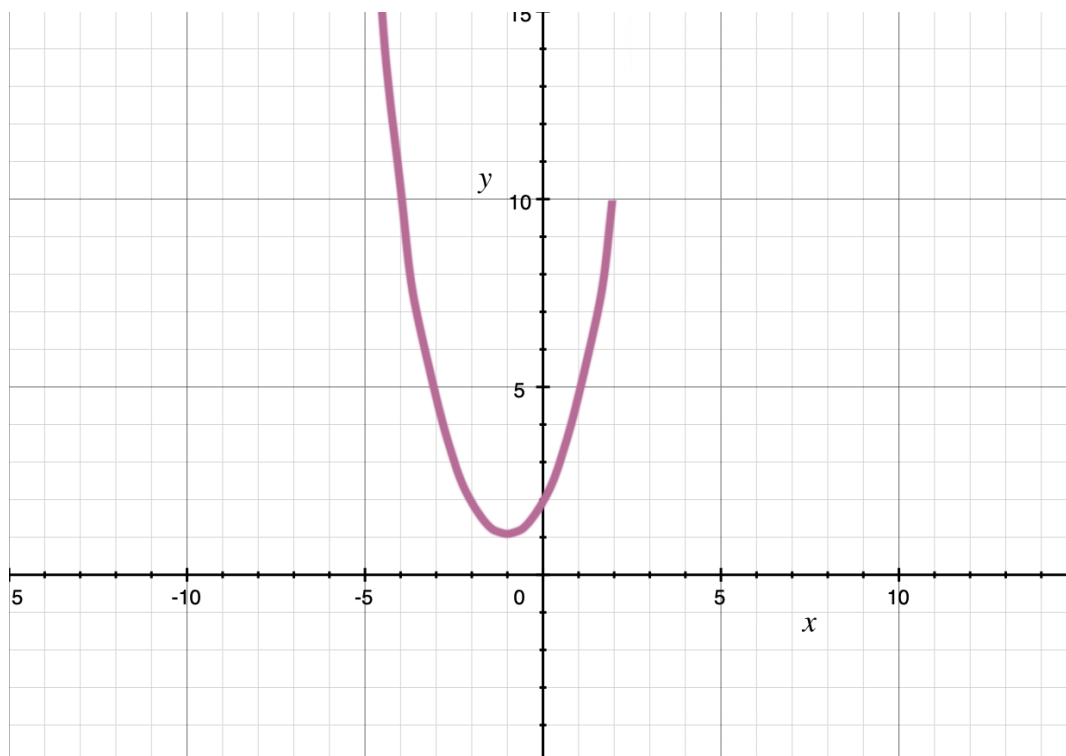For $x \leq -1$, the function is decreasing since $f'(x) < 0$, and concave up since $f''(x) > 0$.

For $-1 < x < 2$, the function is increasing since $f'(x) > 0$, and concave up since $f''(x) > 0$.

For $x \geq 2$, the function's value is $f(x) = 10$.