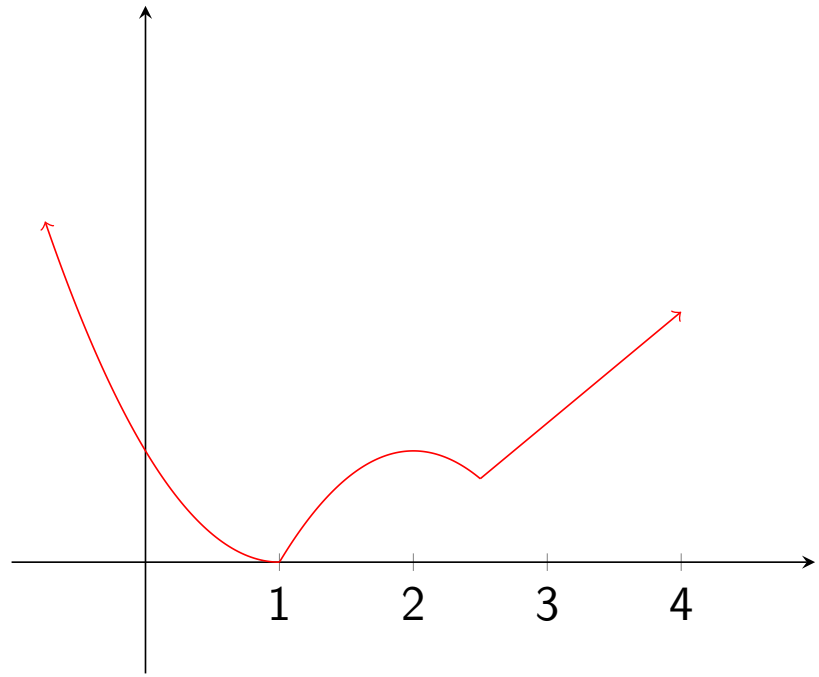
1. The graph of a function f is depicted to the right. How many critical points does f have on the interval $[0, 4]$?

(A) None

(B) 1

(C) 2

(D) 3 or more



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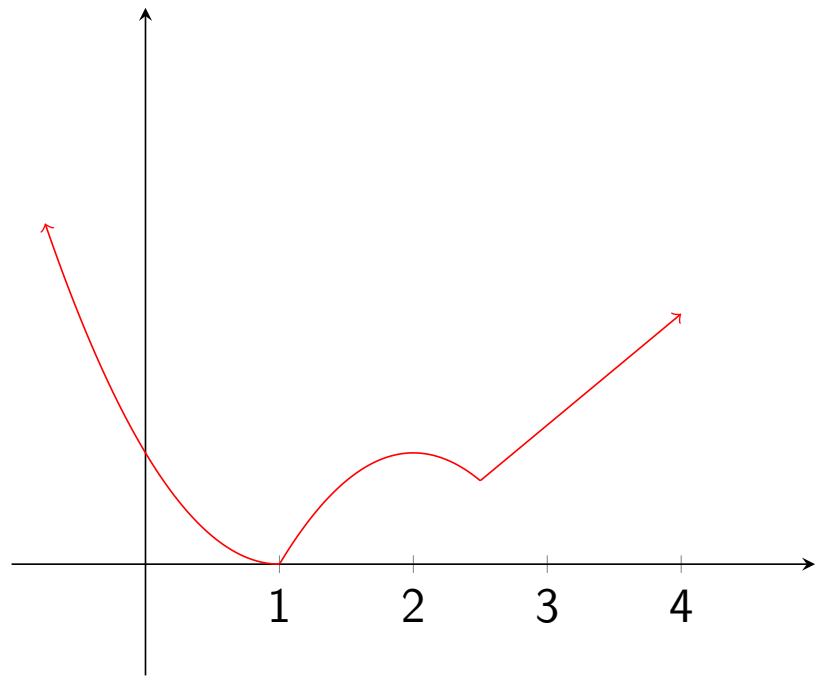


(A) None

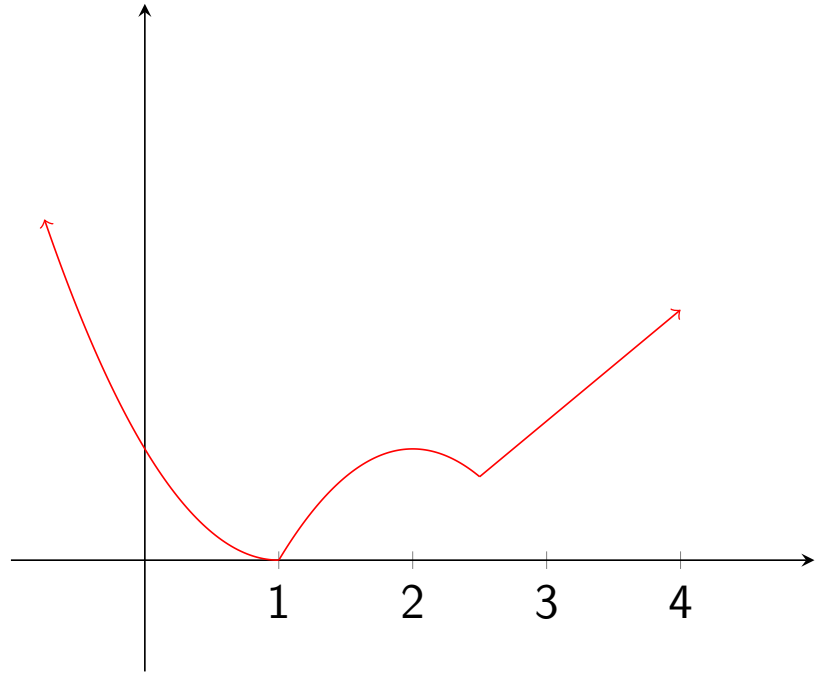
(B) 1

(C) 2

(D) 3 or more

Follow-up. Where are the absolute maximum and the absolute minimum of the function on the interval $[0, 4]$?

2. The graph of a function f is depicted to the right. On which of the following open intervals is $f'(x) > 0$?



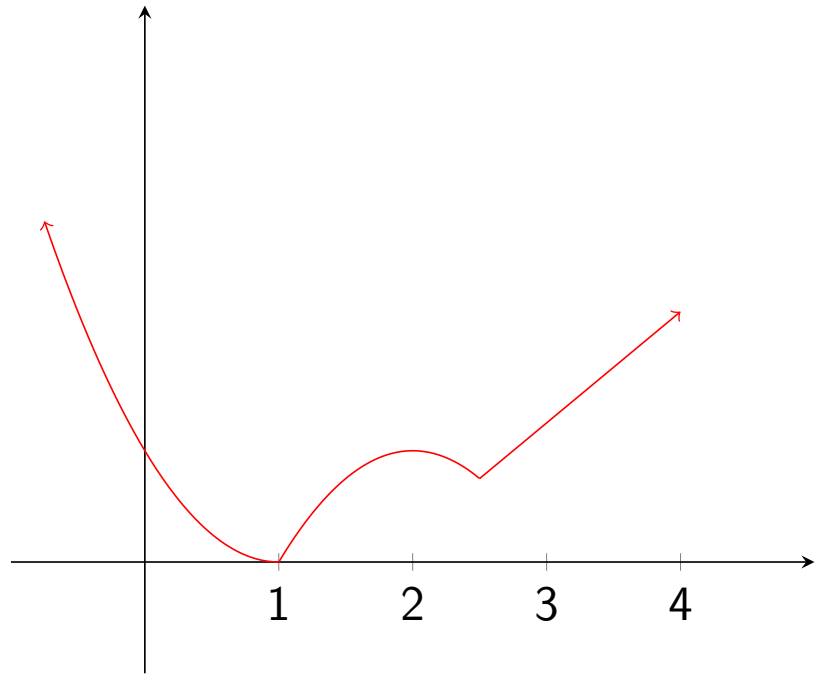
(A) $(0, 1)$

(B) $(1, 2)$

(C) $(2, 2.5)$

(D) None of the above

3. The graph of a function f is depicted to the right. On which of the following open intervals is $f''(x) > 0$?



(A) $(0, 1)$

(B) $(1, 2.5)$

(C) Neither of the above

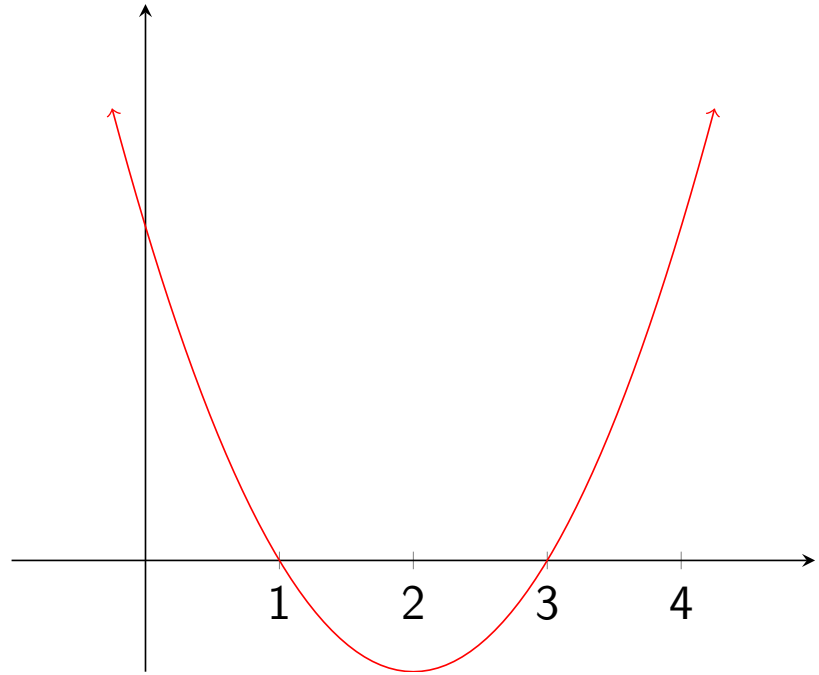
4. Suppose f is a function whose *derivative* has the graph depicted on the right. How many critical points does f have on the interval $[0, 4]$?

(A) None

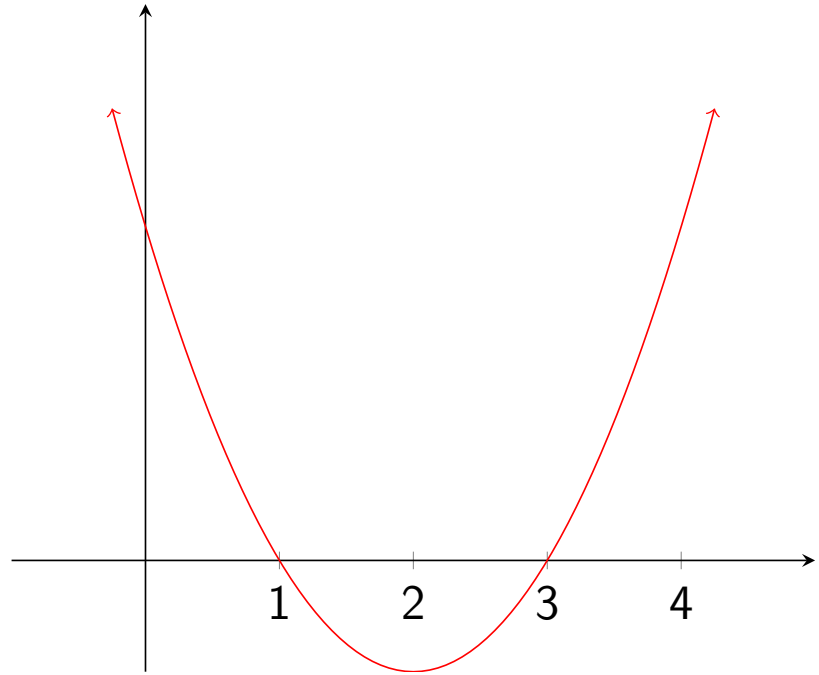
(B) 1

(C) 2

(D) 3 or more



4. Suppose f is a function whose *derivative* has the graph depicted on the right. How many critical points does f have on the interval $[0, 4]$?



(A) None

(B) 1

(C) 2

(D) 3 or more

Follow-up. Sketch a graph of f.

5. True or False?

There exists a function f that is defined on the closed interval $[0, 4]$ and which has an absolute maximum, but does not have an absolute minimum.

6. True or False?

If f is a function such that $f'(x) > 0$ for all real numbers x, then it must be the case that

$$\lim_{x \to \infty} f(x) = \infty.$$

7. Let f be the function defined by

$$f(x) = \sin(x) + \cos(x).$$

How many critical points does f have on the interval $[0, \pi/2]$?

(A) 0

(B) 1

(C) 2

(D) 3 or more

7. Let f be the function defined by

$$f(x) = \sin(x) + \cos(x).$$

How many critical points does f have on the interval $[0, \pi/2]$?

(A) 0

(B) 1

(C) 2

(D) 3 or more

Follow-up. Where are the absolute maximum and the absolute minimum of f on the interval $[0, \pi/2]$?

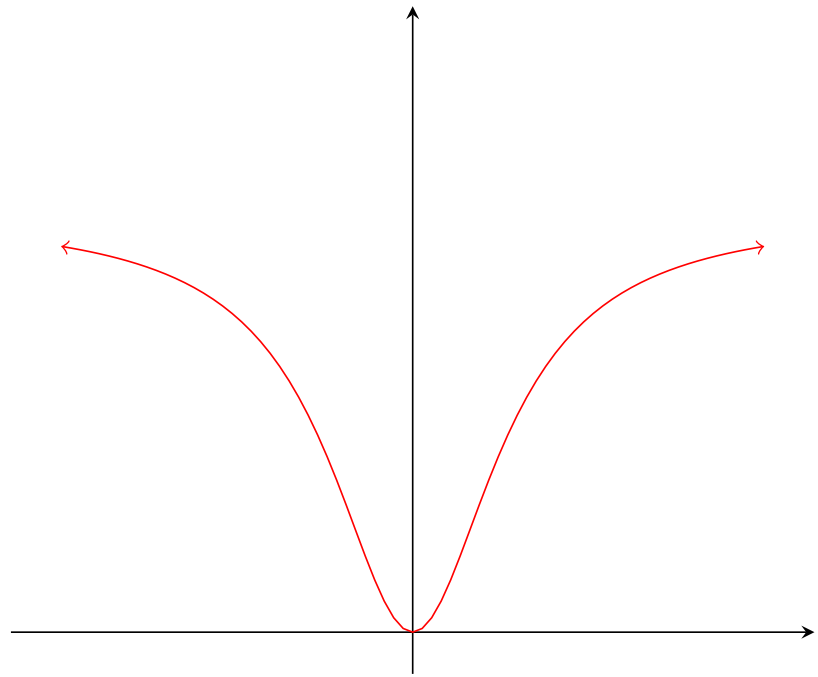
8. True or False?

The function

$$f(x) = x^2 + \ln(x)$$

has a vertical asymptote at $x = 0$.

9. The graph of a function f is depicted to the right. Which of the following could be a formula for the function?



(A) $f(x) = \dfrac{x^2}{x^2+1}$

(B) $f(x) = \dfrac{1}{x^2+1}$

(C) $f(x) = \dfrac{1}{x^2-1}$