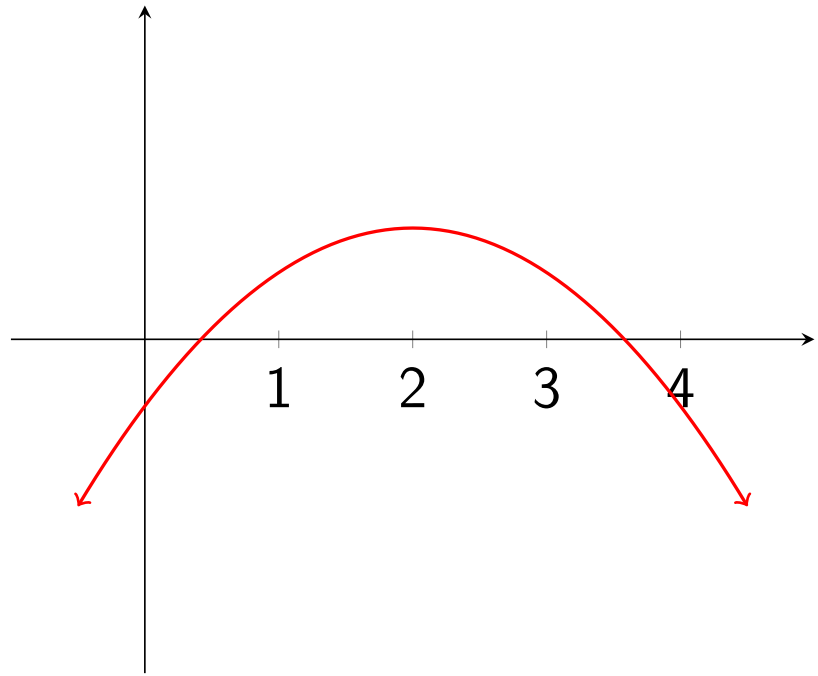
1. True or False?

The equation $e^x + \ln x = 0$ has a solution.

2. The graph of the function f is depicted to the right. For which value of a is $f'(a) = 0$?



(A) 0

(B) 1

(C) 2

(D) None of the above.

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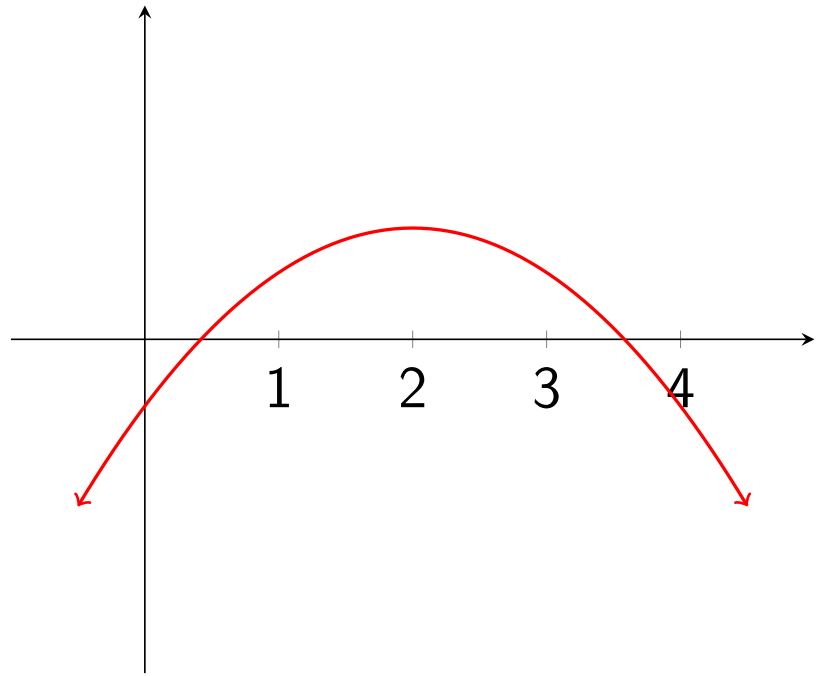


(A) 0

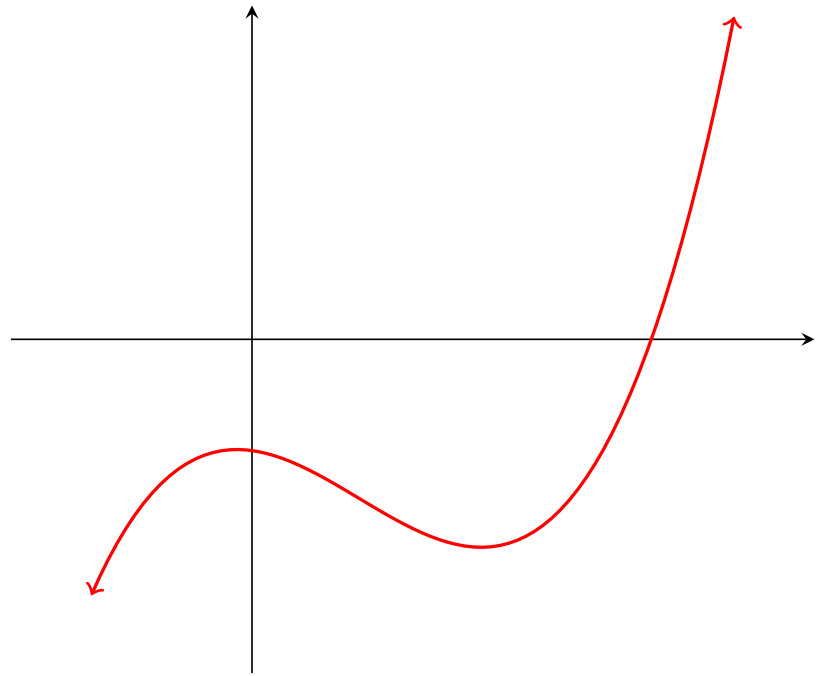
(B) 1

(C) 2

(D) None of the above.

Follow-up. Sketch a graph of f'.

3. The graph of the function f is depicted to the right. For *how many* values of a is $f'(a) = 0$?



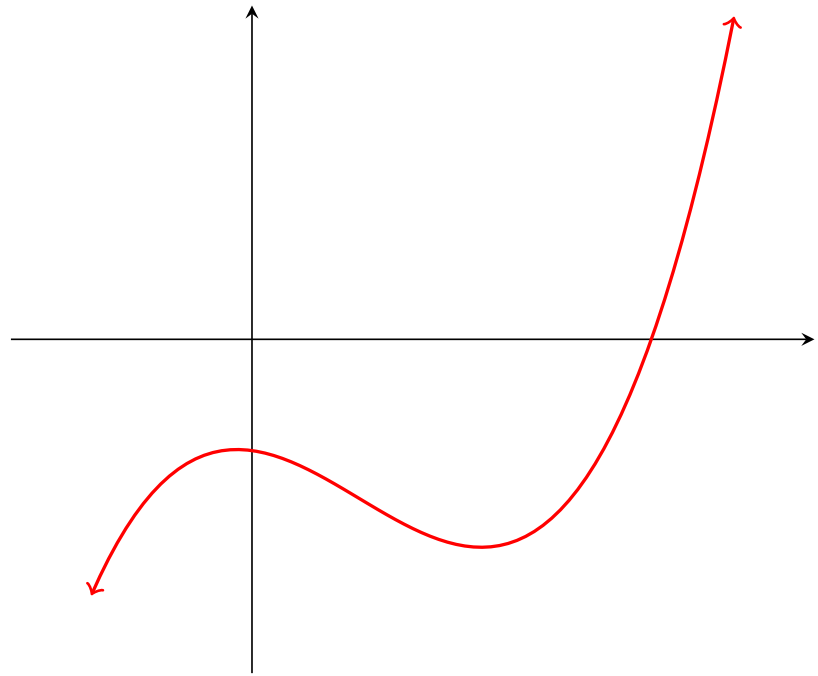
(A) 0

(B) 1

(C) 2

(D) None of the above.

3. The graph of the function f is depicted to the right. For *how many* values of a is $f'(a) = 0$?



(A) 0

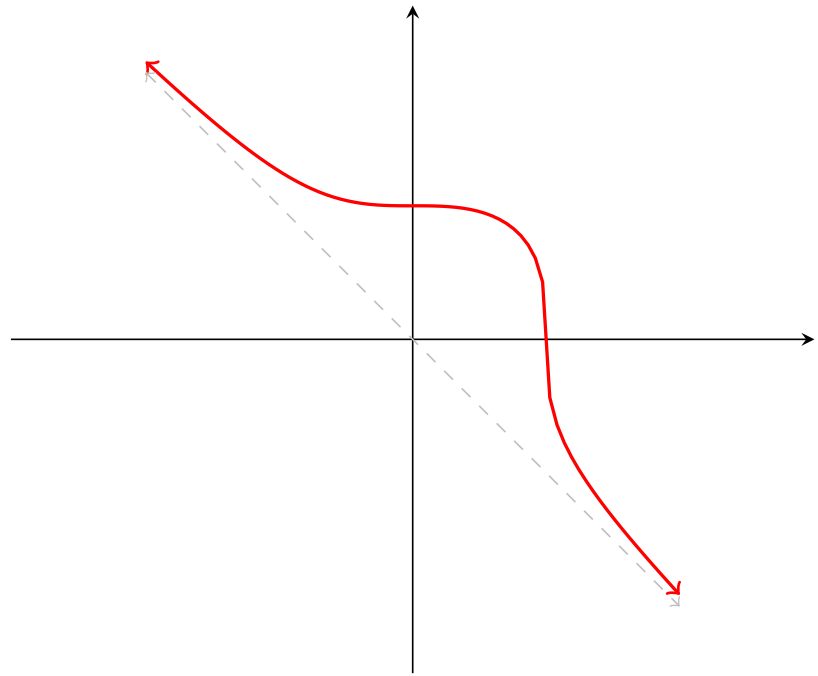
(B) 1

(C) 2

(D) None of the above.

Follow-up. Sketch a graph of f'.

4. The graph of the function f is depicted to the right in red, and the line $y = -x$ is depicted in gray. What is $\lim_{x \to \infty} f'(x)$?



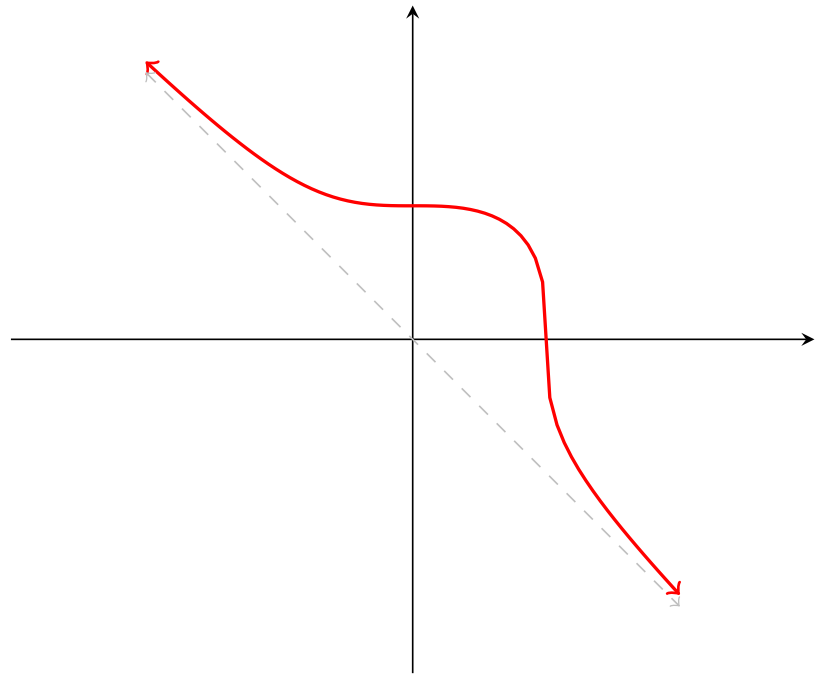
(A) 0

(B) 1

(C) 2

(D) None of the above.

4. The graph of the function f is depicted to the right in red, and the line $y = -x$ is depicted in gray. What is $\lim_{x \to \infty} f'(x)$?



(A) 0

(B) 1

(C) 2

(D) None of the above.

Follow-up. Sketch a graph of f'.

5. What is the slope of the tangent line to the graph of the function $f(x) = 2x + 7$ at $a = 0$?

(A) 0

(B) 1

(C) 2

(D) None of the above.

6. What is the slope of the tangent line to the graph of the function $f(x) = x^3 + x$ at $a = 0$?

(A) 0

(B) 1

(C) 2

(D) None of the above.

7. What is the slope of the tangent line to the graph of the function $f(x) = \dfrac{1}{x^2+1}$ at $a = 0$?

(A) 0

(B) 1

(C) 2

(D) None of the above.

8. How many values of c make the function f that is defined by the following formula continuous?

$$f(x) = \begin{cases} \dfrac{x}{|x|} & \text{if } x \neq 0 \\ c & \text{if } x = 0 \end{cases}$$

(A) None.

(B) 1.

(C) 2.

(D) More than 2.

9. For which function f and which value a is the following limit equal to $f'(a)$?

$$\lim_{h \to 0} \frac{5^{2+h} - 25}{h}$$

(A) $f(x) = 5^x$ and $a = 25$

(B) $f(x) = 5^{2x}$ and $a = 1$

(C) $f(x) = 5^x$ and $a = 2$

(D) None of the above.

10. True or False?

Let $f(x) = x^2$. The slope of the tangent line at $x = 2$ is smaller than the slope of the secant line passing through $(2, f(2))$ and $(3, f(3))$.

11. True or False?

If f is the function whose graph is depicted in red to the right, then $f'(1)$ is smaller than the slope of the secant line passing through $(1, f(1))$ and $(1 + h, f(1 + h))$ for any $h > 0$.