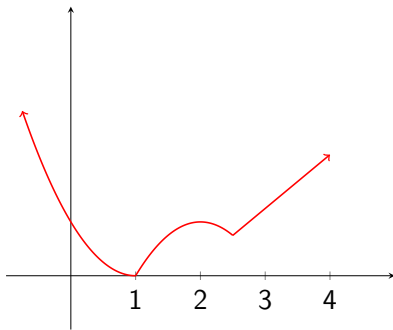


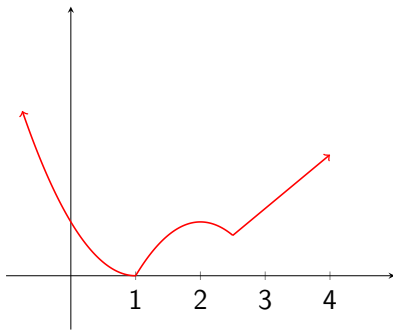
1. The graph of a function  $f$  is depicted to the right. How many critical points does  $f$  have on the interval  $[0, 4]$ ?

- (A) None
- (B) 1
- (C) 2
- (D) 3 or more



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**Follow-up.** Where are the absolute extremums of  $f$  on the interval  $[0, 4]$ ?

2. True or False?

The rectangle of maximum area that can be formed using 4 m of wire is a square.

3. What are the two positive real numbers  $x, y$  such that the product of  $x$  and  $y$  is 800 and such that  $x + 2y$  is as small possible?

(A)  $x = 40$  and  $y = 20$

(B)  $x = 20$  and  $y = 40$

(C)  $x = 800$  and  $y = 1$

(D) None of the above

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**Follow-up.** What can you say about the positive real numbers  $x, y$  such that the product of  $x$  and  $y$  is 800 and  $x + 2y$  is as *large* as possible?

4. A landscape architect wants to enclose a rectangular garden of area  $1000 \text{ m}^2$ . One side will have a brick wall costing  $\$90/\text{m}$  and the other three sides will have a metal fence costing  $\$30/\text{m}$ . What is the length of the brick wall that minimizes cost?

- (A) 10 m
- (B)  $10\sqrt{5}$  m
- (C)  $100/\sqrt{5}$  m
- (D) None of the above