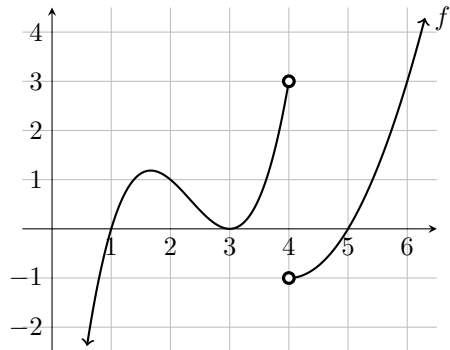


Name: \_\_\_\_\_

Score: \_\_\_\_\_

1. Let  $f(x)$  be a continuous function. The graph of its derivative,  $f'(x)$ , is shown below.



- (a) (2 points) What are the critical points of  $f$ ? Explain.
- (b) (1 point) Where does  $f$  have local minima? Explain.
- (c) (1 point) Where does  $f$  have local maxima? Explain.
- (d) (2 point) Where does  $f$  have inflection points? Explain.
- (e) (1 point) Is  $f(1)$  larger than, smaller than, or equal to  $f(3)$ ? Explain.

2. (3 points) Suppose that we know that  $f(x)$  is continuous and differentiable everywhere. Also suppose that  $f(x)$  has two roots. Prove that  $f'(x)$  must have at least one root.

[Hint: Use the Mean Value Theorem.]

