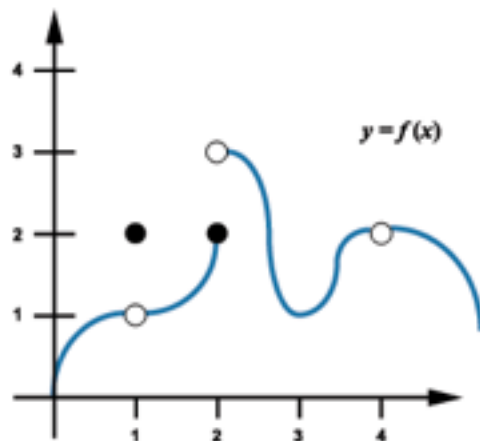


1. Using the graph below, which of the following statements must be true?

- I.  $f(x)$  is continuous at  $x = 1$
- II. the limit of  $f(x)$  as  $x$  approaches 1 equals 1
- III. the limit of  $f(x)$  as  $x$  approaches 4 equals 2

- (A) III only
- (B) I and II only
- (C) II and III only
- (D) I and III only
- (E) I, II, and III



2.  $\lim_{x \rightarrow 0} \frac{\sin(x)}{2x} =$

- (A)  $\frac{1}{2}$
- (B) 1
- (C) 2
- (D)  $\infty$
- (E) 0

3. Let  $f$  be a continuous function such that  $\int_{-1}^0 f(x) dx = -1$  and  $\int_{-3}^0 f(x) dx = -10$ . What is the value of  $\int_{-1}^{-3} f(x) dx$ ?

4. A particle moves along the  $x$ -axis so that at time  $t \geq 0$  its position is given by  $x(t) = 3t^3 - 9t^2 - 40$ . Determine the total distance traveled by the particle from  $0 \leq t \leq 4$ .

5. Given the function  $f(x) = -5x^4 + 30x^2$ , determine all intervals on which  $f$  is both increasing and concave down.