

1. At how many points on the graph of  $f(x) = x^2 + 3x - 7$  is the tangent line horizontal?

(A) None.

(B) 1.

(C) 2.

(D) 3 or more.

2. True or False?

Let  $f(x) = \cos(x)$ . Then  $f^{(36)}(x) = \cos(x)$ .

**Note.**  $f^{(36)}$  means “take the derivative of  $f$  36 times.”

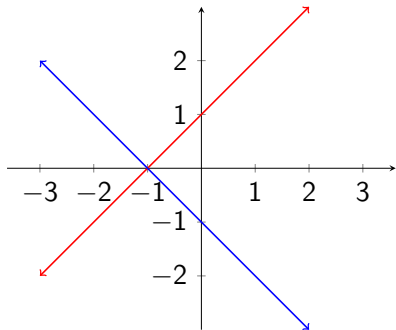
3. True or False?

The tangent line to the graph of the function

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

at  $x = 0$  is horizontal.

4. The graphs of functions  $f$  and  $g$  are depicted to the right in red and blue, respectively. What is  $(fg)'(0)$ ?



- (A)  $-1$
- (B)  $0$
- (C)  $1$
- (D) None of the above.

5. True or False?

The line  $y = 4x - 4$  is tangent to the graph of  $f(x) = x^2$ .

6. If  $f$  and  $g$  are functions such that

$$f(0) = 5 \quad f'(0) = 2 \quad g(0) = 3 \quad g'(0) = 2$$

then which of the following is  $(fg)'(0)$ ?

(A) 4

(B) 6

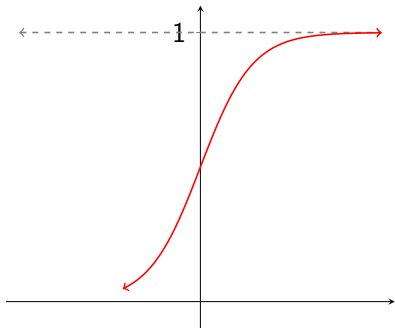
(C) 8

(D) None of the above

7. The graph of the function  $f$  is depicted to the right. What is

$$\lim_{x \rightarrow \infty} \frac{d}{dx} (f(x))^2?$$

- (A)  $-1$
- (B)  $0$
- (C)  $1$
- (D) None of the above.



8. If  $f$  and  $g$  are functions such that

$$f(0) = 5 \quad f'(0) = 2 \quad g(0) = 3 \quad g'(0) = 2$$

then which of the following is  $(f/g)'(0)$ ?

(A)  $-1$

(B)  $-4/9$

(C)  $5/3$

(D) None of the above



9. True or False?

If  $f$  is differentiable and even, then  $f'$  is odd.