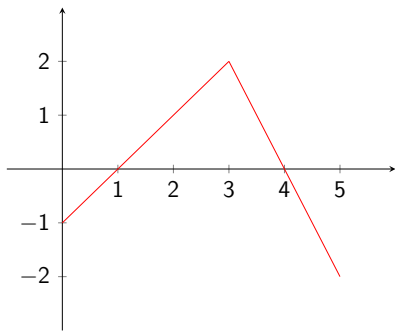


1. True or False?

$$\sum_{k=0}^4 (k^2 + (k+1)^2) = 25 + \sum_{k=1}^4 2k^2$$

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

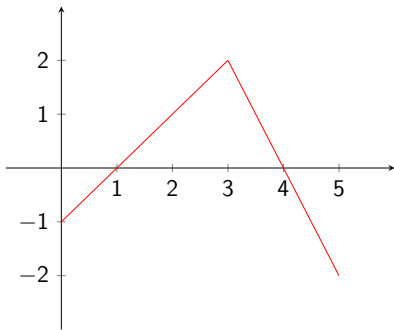
$$\int_0^5 f(x) dx?$$



- (A) 1
- (B)  $3/2$
- (C) 2
- (D) None of the above

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

$$\int_0^5 |f(x)| dx?$$



- (A)  $7/2$
- (B) 4
- (C)  $9/2$
- (D) None of the above

4. What are the two real numbers  $x, y \geq 1$  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 real numbers  $x, y \geq 1$  such that the product of  $x$  and  $y$  is 800 and  $x + 2y$  is as large as possible?

5. What is  $\int_{-2}^2 (2 - |x|) dx$ ?

(A) 2

(B) 4

(C) 8

(D) None of the above

6. True or False?

Suppose  $f$  is an odd function. Then it must be the case that

$$\int_{-3}^3 f(x) = 0.$$

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**Follow-up.** What can be said if  $f$  is even?



7. Suppose  $f$  is a function such that  $f'(x) > 0$  for all  $x$ , that  $f(0) = 0$ , that  $\int_{-1}^0 f(x) dx = -7$  and that  $\int_0^1 f(x) dx = 3$ . What can be said about the following definite integral?

$$\int_{-1}^1 |f(x)| dx$$

- (A) It equals  $-4$
- (B) It equals  $10$ .
- (C) It equals  $4$ .
- (D) There isn't enough information to say anything specific.

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