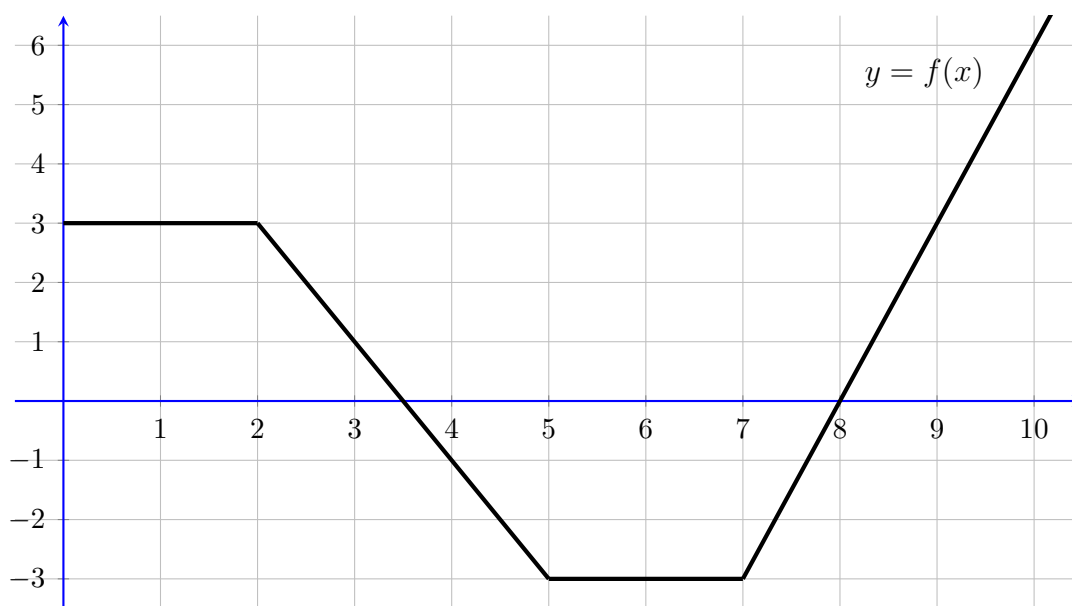


Instructions Each problem is worth 1 point for a total of 13 possible points. Calculators are not allowed.

Part I

The graph of a function f is sketched below. Use this sketch for problems 1-2.



1. $\int_0^2 f(x) dx =$

(a) -2

(b) 1

(c) 6

(d) $\frac{13}{2}$

(e) $\frac{17}{2}$

Answer. (c). 6.

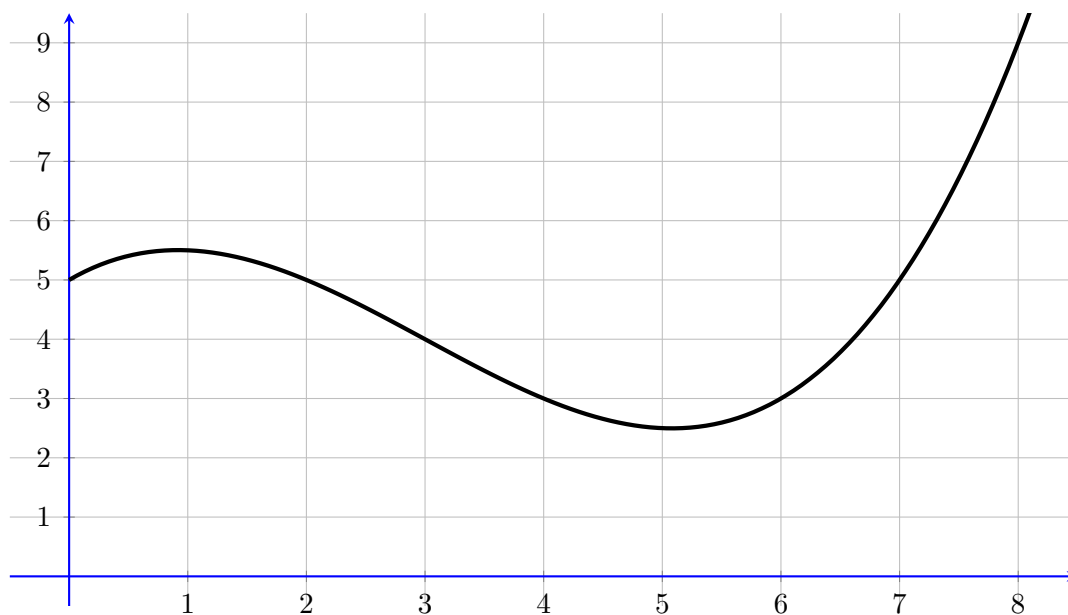
2. $\int_2^8 f(x) dx =$

- (a) $-\frac{7}{2}$ (b) -2 (c) 6 (d) $\frac{9}{2}$ (e) $\frac{13}{2}$

Answer. None of the above. The answer is -7.5

Part II

The graph of a function g is sketched below. Use this sketch for problems 3-4.



3. The Riemann sum for $g(x)$ with $0 \leq x \leq 8$ using $n = 4$ and righthand endpoints is

- (a) 12 (b) 16 (c) 24 (d) 32 (e) 94

Answer. None of the above. The answer is $10 + 6 + 6 + 18 = 40$.

4. $\int_0^4 g(x) dx =$

- (a) $\frac{41}{4}$ (b) 12 (c) 16 (d) $\frac{56}{3}$ (e) 24

Answer. (d). The answer must be larger than 16 and less than 24.

Part III

A table of values for a decreasing function f is listed below

x	2	4	10	14
$f(x)$	41	40	25	5

Use this table of values for problems 5-6.

5. Which is the best over-estimate for $\int_2^{14} f(x)dx$?

- (a) 212 (b) 232 (c) 250 (d) 348 (e) 422

Answer. (e) $2(41) + 6(40) + 4(25) = 422$.

6. Which of the numbers below could possibly be $\int_2^{14} f(x)dx$?

- (a) 212 (b) 232 (c) 250 (d) 348 (e) 422

Answer. (d). The answer must be less than 422 and greater than 250

Part IV

7. $\sum_{i=1}^6 (3i + 1) =$

- (a) 22 (b) 69 (c) 91 (d) 122 (e) 155

Answer. (b)

8. $\lim_{n \rightarrow \infty} \sum_{i=1}^n \left(\frac{2i}{n}\right)^2 \left(\frac{2}{n}\right) =$

- (a) 0 (b) $\frac{8}{6}$ (c) $\frac{8}{3}$ (d) 8 (e) ∞

Answer. (c)

9. $\int_0^1 x^2 dx =$

- (a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) 1 (d) 2 (e) 3

Answer. (a)

10. If $\int_2^3 f(x) = 8$, $\int_3^5 f(x) = 3$, $\int_2^5 g(x) = -3$, then $\int_2^5 f(x) + 3g(x) =$

- (a) 2 (b) 4 (c) 6 (d) 7 (e) 8

Answer. (a)

11. $\int_{-1}^3 |x| dx$

- (a) 2 (b) 2.5 (c) $\sqrt{5}$ (d) 3.5 (e) 5

Answer. (e)

12. $\int_{-3}^3 \sqrt{9 - x^2} dx$

- (a) $\frac{4\pi}{9}$ (b) $\frac{9\pi}{4}$ (c) $\frac{9\pi}{2}$ (d) 4π (e) 9

Answer. (c)

13. Which one of the following statements is false?

- (a) $\int_0^1 x + x^2 dx = \int_0^1 x dx + \int_0^1 x^2 dx$
- (b) $\int_{-8}^8 7x^5 + 3x^3 + 5x^2 - 5x dx = 10 \int_0^8 x^2 dx$
- (c) $\int_0^1 x^2 dx = \left(\int_0^1 x dx \right)^2$
- (d) $\int_0^1 x^2 dx \leq \int_0^1 x dx$
- (e) $\int_1^2 x dx \leq \int_1^2 x^2 dx$

Answer. (c)