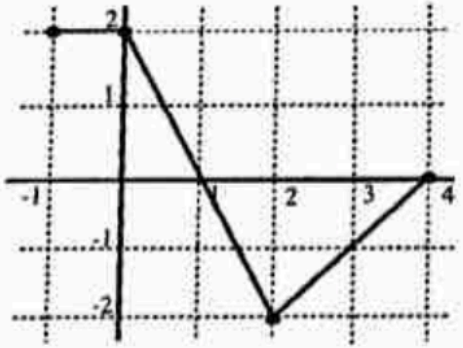
2. The graph of a piecewise-linear function f, for $-1 \le x \le 4$, is shown in the figure. If the function H is defined by

$$H(x) = \int_{-1}^{x} f(t)\,dt, \text{ for } -1 \le x \le 4, \text{ then } H(4) =$$

Graph of f

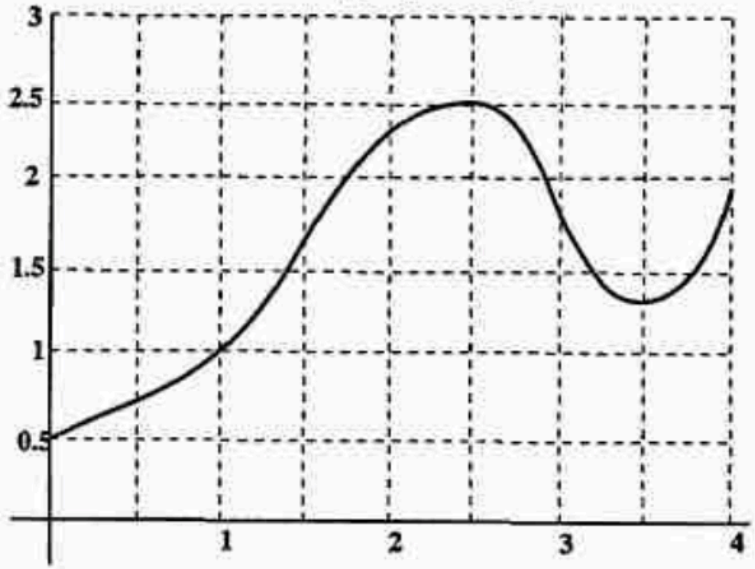


(A) -2 (B) -1 (C) 0 (D) 1 (E) 2

Ans

7. A graph of the function f is shown at the right.

graph of f



Which of the following statements are true?

I. $f(1) > f'(3)$

II. $\int_1^2 f(x)\,dx > f'(3.5)$

III. $\lim_{h\to 0} \frac{f(2+h)-f(2)}{h} > \frac{f(2.5)-f(2)}{2.5-2}$

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

Ans

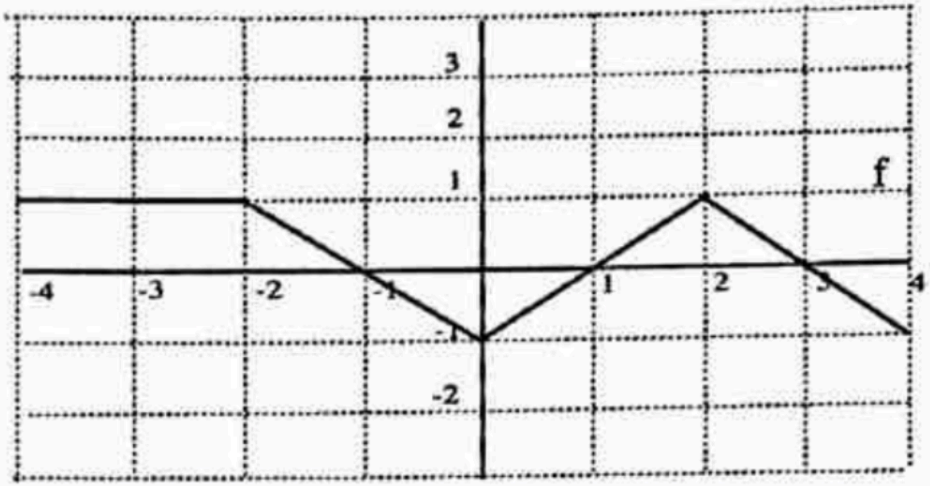
21. The graph of f is shown at the right. Which of the following statements are true?

I. $f(2) > f'(1)$

II. $\int_0^1 f(x)\,dx > f'(3.5)$

III. $\int_{-1}^{1} f(x)\,dx > \int_{-1}^{2} f(x)\,dx$

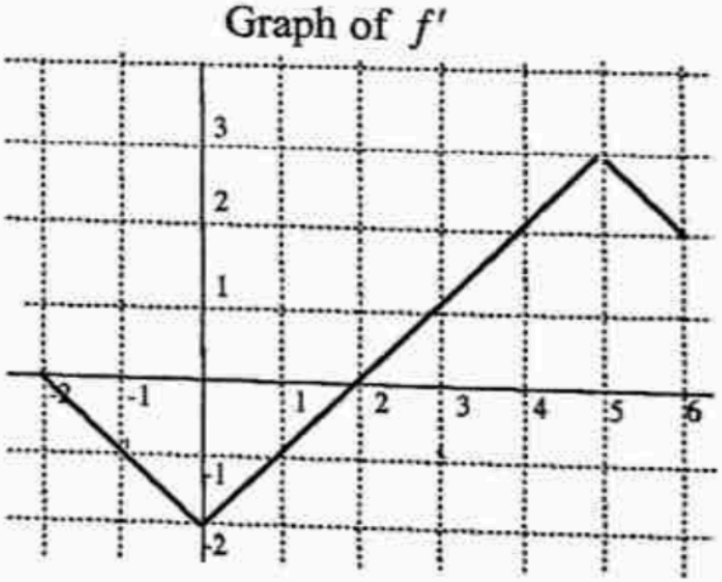
the graph of f



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

Ans

8. Let f be a function defined on the closed interal $-2 \leq x \leq 6$ with $f(0) = 3$. The graph of f', the derivative of the function f, is shown on the right. The graph consists of three line segments. Which of the following statements must be true?



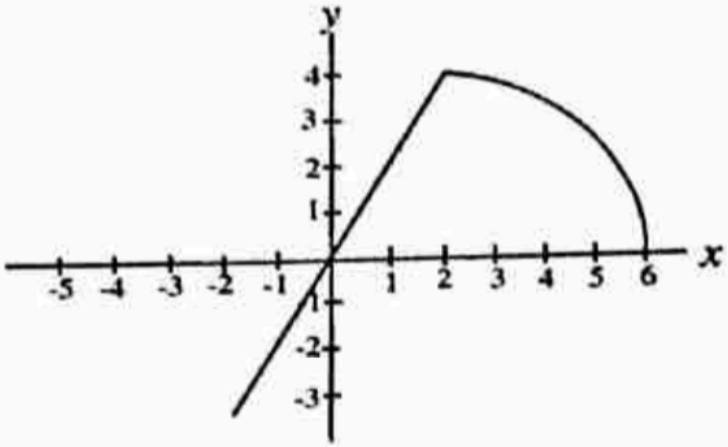
I $f(4) = 3$

II The graph of f has a positive slope and is concave up on the interval $(0, 5)$.

III The graph of f has points of inflection at $x = 0$ and $x = 5$.

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

14. The graph of $y = f'(x)$, the derivative of a function f, is a line and a quarter-circle shown in the diagram. If $f(2) = 3$, then $f(6) =$

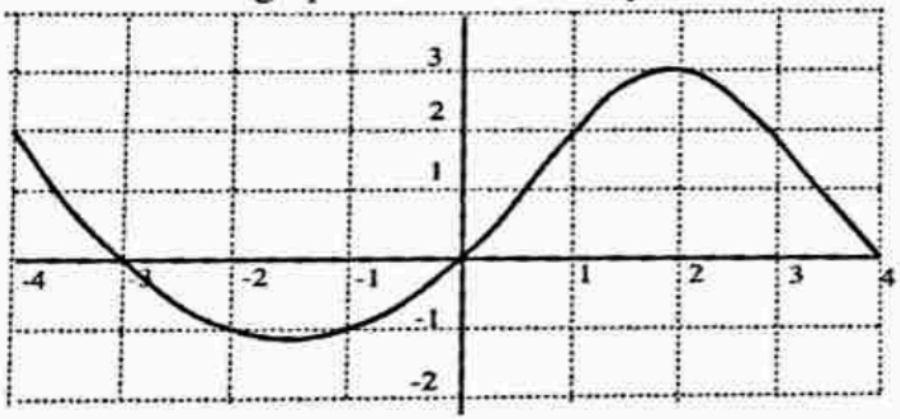


Graph of f'

(A) 4 (B) 7 (C) $3+4\pi$ (D) $7+4\pi$ (E) 11

11. The graph of a function f whose domain is the interval $[-4, 4]$ is shown in the figure. If the graph of f has horizontal tangents at $x = -1.5$ and 2, which of the following statements are true?

the graph of the function f



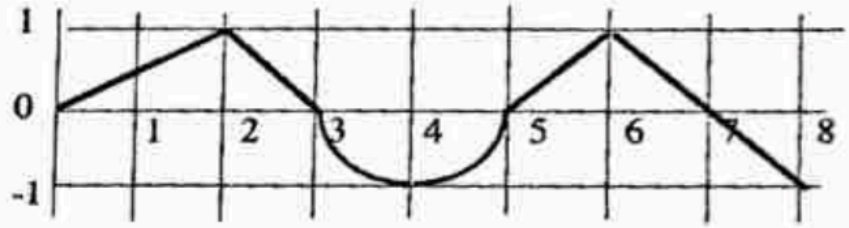
I. The average rate of change of f over the interval from $x = -2$ to $x = 3$ is $\frac{1}{5}$.

II. The slope of the tangent line at the point where $x = 2$ is 0.

III. The left-sum approximation of $\int_{-1}^{3} f(t)\,dt$ with 4 equal subdivisions is 4.

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

16. Let the function F be defined on the interval $[0, 8]$ by $F(x) = \int_0^x f(t)\,dt$, where the graph of f is shown below. The graph of f consists of four line segments and a semicircle.



graph of $y = f(t)$

In which of the following intervals does F have a zero?

I. $4 < x < 5$ II. $5 < x < 6$ III. $6 < x < 7$

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

10. The region shaded in the figure at the right is rotated about the x-axis. Using the Trapezoid Rule with 5 equal subdivisions, the approximate volume of the resulting solid is

(A) 23

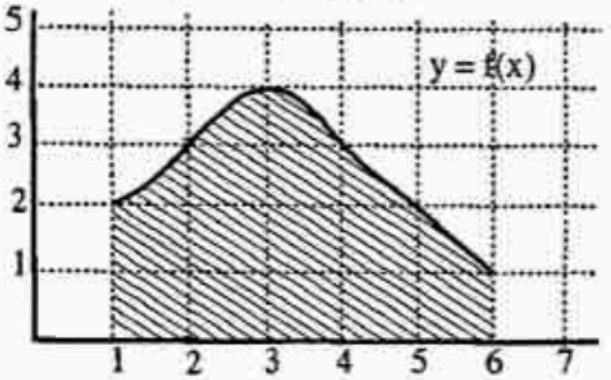
(B) 47

(C) 127

(D) 254

(E) 400

graph of $y = f(x)$



Ans

26.

t (sec)	0	3	5	9
v(t) (ft/sec)	10	14	20	22

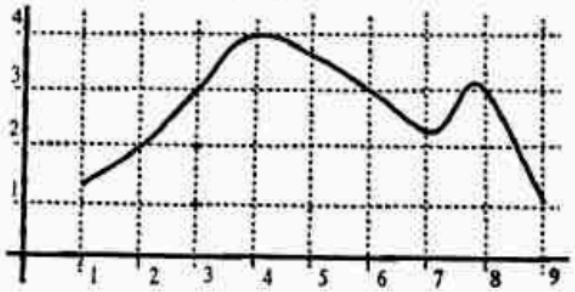
A car has a positive velocity as it travels slowly along a straight road. During the time interval $0 \le t \le 9$ seconds, the car's velocity is measured in feet per second for selected values of t and recorded in the table above. Using the data in the table, calculate a trapezoidal sum with three subintervals to approximate the distance traveled by the car over the interval $0 \le t \le 9$ seconds.

(A) 77 ft (B) 150 ft (C) 154 ft (D) 172 ft (E) 308 ft

Ans

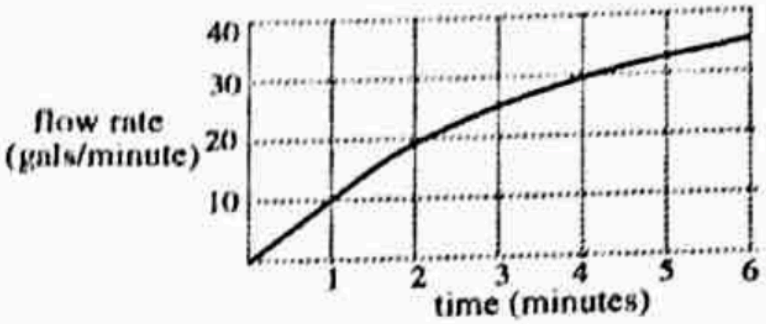
4. The graph of f over the interval $[1, 9]$ is shown in the figure. Using the data in the figure, find a midpoint approximation with 4 equal subdivisions for $\int_1^9 f(x)\,dx$.

the graph of f



(A) 20 (B) 21 (C) 22 (D) 23 (E) 24

9. Water flows into a tank at a rate shown in the figure. Of the following, which best approximates the total number of gallons in the tank after 6 minutes?



(A) 75 (B) 95 (C) 115 (D) 135 (E) 155