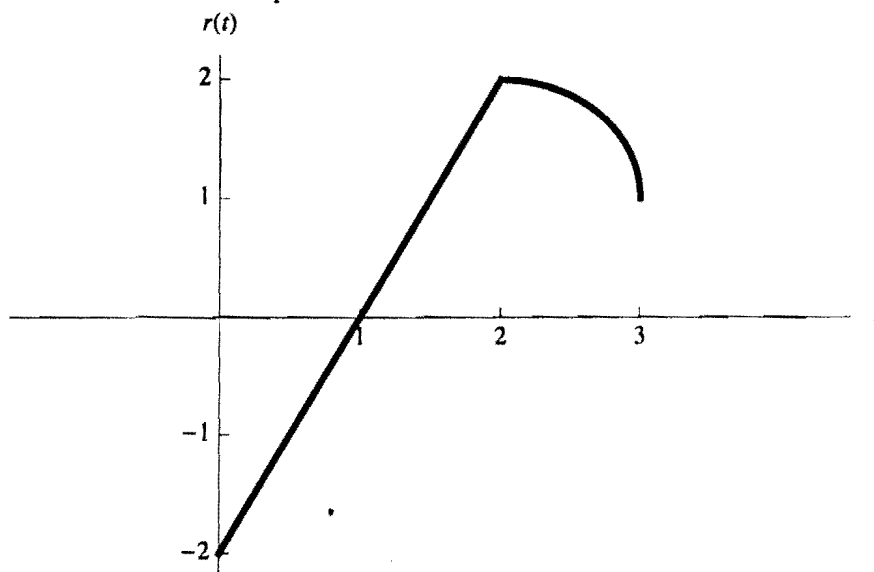


3. [12 points] Shown below is a graph of a function  $r(t)$ . The graph consists of a straight line between  $t = 0$  and  $t = 2$  and a quarter circle between  $t = 2$  and  $t = 3$ .



Calculate the following using the graph and the properties of integrals.

a. [4 points]  $-3 \int_0^3 (2 + r(t)) dt.$

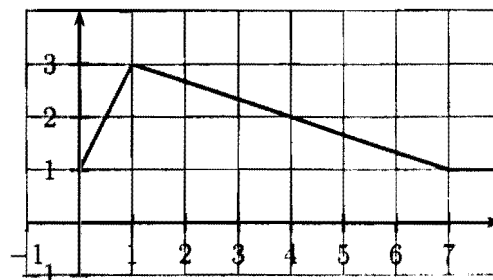
b. [4 points]  $\int_{1/2}^{3/2} r'(t) dt.$

c. [4 points] The average value of  $r$  on the interval  $[1, 3]$ .

7. (4 points each) Table 1 below displays some values of an invertible, twice-differentiable function  $f(x)$ , while Figure 2 depicts the graph of the function  $g(x)$ .

Table 1

$x$	1	2	3	4	5
$f(x)$	-5	-2	2	4	7
$f'(x)$	5	6	2	3	3
$f''(x)$	1	-1	-3	-2	0

Figure 2: Graph of  $g(x)$ 

Evaluate each of the following. Show your work.

(a)  $\int_0^7 g(x) dx$

(b)  $\int_1^3 f'(x) dx$

(c)  $\int_1^5 (3f''(x) + 4) dx$

(d)  $\int_1^4 (f'(x)g(x) + f(x)g'(x)) dx$