

DIRECTIONS To receive full credit, you must provide complete legible solutions to the following problems in the space provided. Transfer all your answers to the space provided on the test paper.

1. Find the general indefinite integral. (Use C for the constant of integration.)

$$\int 5v(v^2 + 1)^2 dv$$

Ans _____

2. Find the general indefinite integral. (Use C for the constant of integration.)

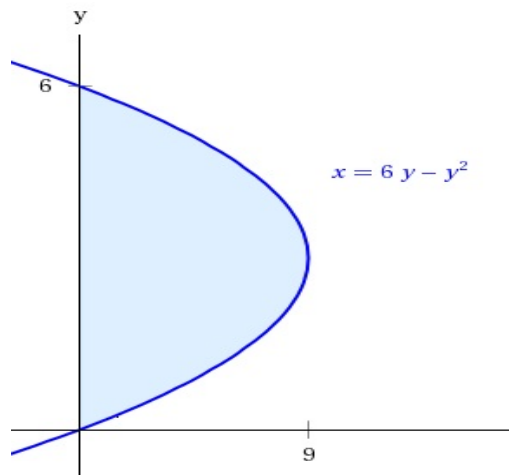
$$\int \frac{x^3 - \sqrt{x}}{x} dx$$

Ans _____

3. Set up a definite integral for the area of the region that lies to the right of the y-axis and to the left of the parabola

$$x = 6y - y^2$$

Ans _____



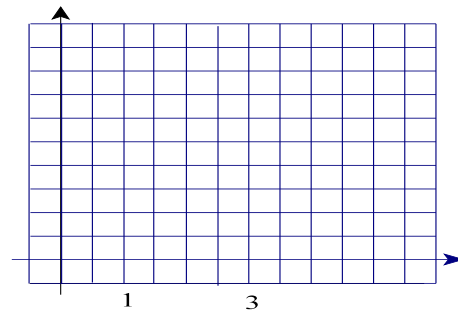
4. Consider the function $A = A(x)$ defined by

$$A(x) = \int_0^x f(t) dt, \quad f(t) = 2t + 1$$

- a. Find $A(2)$

- c. Find $A(x)$

- d. Draw both $f(t)$ and $A(x)$ on the same axis over the interval $[0,3]$



5. Suppose that a volcano is erupting and readings of the rate $r(t)$ at which solid materials are spewed into the atmosphere are given in the table. The time is measured in seconds and the units for $r(t)$ are tonnes (metric tons) per second.

t	0	1	2	3	4	5	6
r(t)	2	10	24	36	46	54	60

- a. Give upper and lower estimates for the total quantity $Q(6)$ of erupted materials after 6 seconds.

- b. Use the Midpoint Rule to estimate $Q(6)$