1. Find the general antiderivative.

a) $\int \frac{3\sqrt{x} - x}{x^2}\, dx$    b) $\int 2x^2 e^{x^3 - 1}\, dx$    c) $\int \frac{1}{x(\ln x)^2}\, dx$

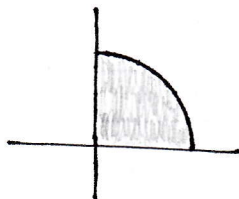d) $\int (4x^3 + 6x^2 + 8x - \pi)\, dx$    e) $\int (x^2 - 2)(x^2 + 3)\, dx$

f) $\int \frac{1}{5x + 8}\, dx$    g) $\int \frac{x^2}{(x^3 + 2)^4}\, dx$    h) $\int \frac{\ln x}{x}\, dx$

i) $\int \frac{e}{x}\, dx$    j) $\int \frac{e^{2x} + x}{e^{2x} + x^2 + 10}\, dx$    k) $\int \frac{x + 1}{\sqrt{x - 1}}\, dx$
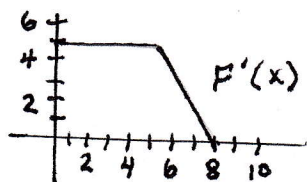
2. Write a definite integral to represent the area between $f(x)$ and the x-axis:

a) $f(x) = \begin{cases} 6 - x, & \text{if } x \le 3 \\ x, & \text{if } x > 3 \end{cases}$    over the interval $[0, 5]$

b) $f(x) = 9 - x^2$

3. If $F(0) = 1$, what is $F(2)$, and $F(8)$?

4. Given the velocity function $v(t) = at$, use 4 right hand rectangles to estimate the distance traveled on the interval $[0, 2]$.  $a > 0$

5. Given $f(x) > 0$, $f'(x) < 0$ on $[a, b]$ we compute a left endpoint Riemann sum, $S$.
    a) $S < \int_a^b f(x)\, dx$
    b) $S = \int_a^b f(x)\, dx$
    c) $S > \int_a^b f(x)\, dx$
    d) Not enough information to determine.