1. Use the figure to find the values of

(a) $\int_{0}^{2} f(x) \, dx$

1, notice that the area under the curve consists of a square of area, 1 and two triangles, whose areas cancel out because they are identical and one is above and the other below the x-axis.

(b) $\int_{3}^{7} f(x) \, dx$

$2\pi$, the area under the curve is $\frac{1}{2}$ of the circle of area $\pi(2^2)$.

(c) $\int_{2}^{7} f(x) \, dx$

$2\pi - \frac{1}{2}$, the semi-circle is above the x-axis but the triangle of area $\frac{1}{2}$ is below the x-axis

(d) $\int_{5}^{8} f(x) \, dx$

$\pi - \frac{3}{2}$, the quarter circle has area $\pi$ the area below the x-axis has area $\frac{3}{2}$. 