Class Drill: Computing Definite Integrals by Using Geometry

[1] For the integral $\displaystyle\int_{x=2}^{x=8} \left(\frac{1}{2}\right)x - 2 \ dx$

(a) Graph the integrand.

(b) Shade the region between the graph of $f(x)$ and the x axis that corresponds to the integral.
 (Shade the regions above the x axis one color and the regions below the axis a different color.)

(c) Use geometric formulas to find areas of the shaded shapes. Then find the value of the integral.

[2] For the integral $\displaystyle\int_{x=6}^{x=11} \sqrt{25 - (x - 6)^2}\, dx$

(a) Graph the integrand.

(b) Shade the region between the graph of $f(x)$ and the x axis that corresponds to the integral.
(Shade the regions above the x axis one color and the regions below the axis a different color.)

(c) Use geometric formulas to find areas of the shaded shape.

Hint:

- The equation $(x - a)^2 + (y - b)^2 = r^2$ describes a circle centered at (a, b) with radius r.
- The equation $(x - a)^2 + y^2 = r^2$ describes a circle centered on the x axis at $(a, 0)$ with radius r.
- The equation $y = \sqrt{r^2 - (x - a)^2}$ describes the upper semicircle of a circle centered on the x axis at $(a, 0)$ with radius r.