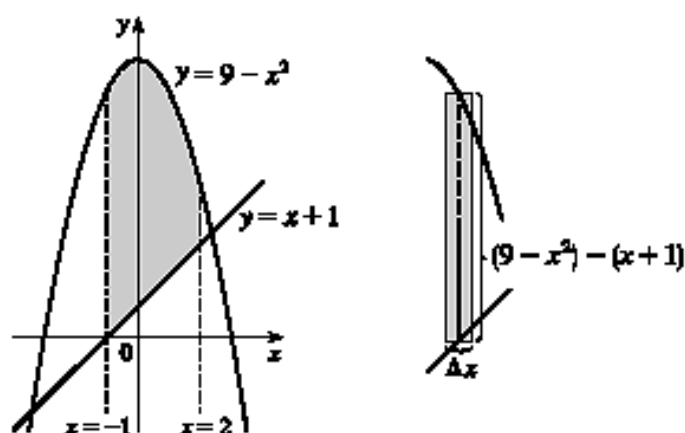
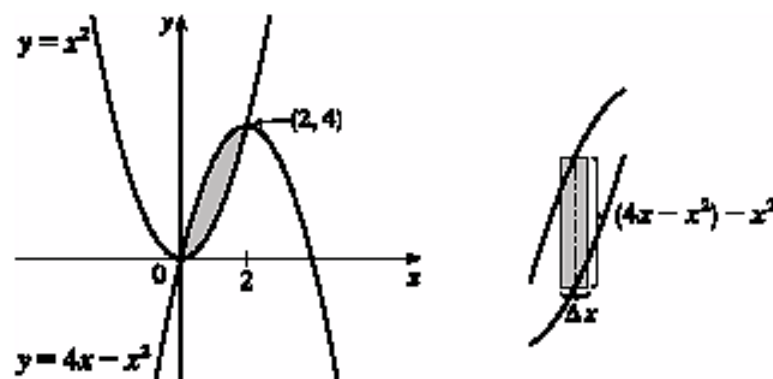


$$\begin{aligned}
 5. \quad A &= \int_{-1}^2 [(9 - x^2) - (x + 1)] dx \\
 &= \int_{-1}^2 (8 - x - x^2) dx \\
 &= \left[8x - \frac{x^2}{2} - \frac{x^3}{3} \right]_{-1}^2 \\
 &= \left(16 - 2 - \frac{8}{3} \right) - \left(-8 - \frac{1}{2} + \frac{1}{3} \right) \\
 &= 22 - 3 + \frac{1}{2} = \frac{39}{2}
 \end{aligned}$$



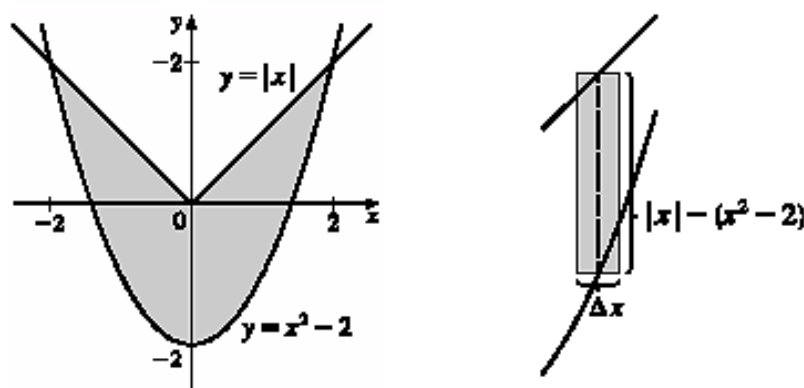
$$10. \quad x^2 = 4x - x^2 \Leftrightarrow 2x^2 - 4x = 0 \Leftrightarrow 2x(x - 2) = 0 \Leftrightarrow x = 0 \text{ or } 2, \text{ so}$$

$$A = \int_0^2 [(4x - x^2) - x^2] dx = \int_0^2 (4x - 2x^2) dx = \left[2x^2 - \frac{2}{3}x^3 \right]_0^2 = 8 - \frac{16}{3} = \frac{8}{3}$$



$$16. \quad \text{For } x > 0, x = x^2 - 2 \Rightarrow 0 = x^2 - x - 2 \Rightarrow 0 = (x - 2)(x + 1) \Rightarrow x = 2. \text{ By symmetry,}$$

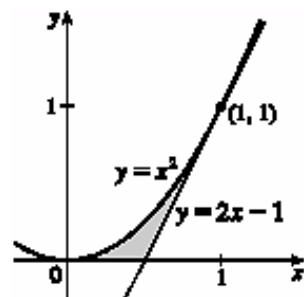
$$\begin{aligned}
 \int_{-2}^2 [|x| - (x^2 - 2)] dx &= 2 \int_0^2 [x - (x^2 - 2)] dx = 2 \int_0^2 (x - x^2 + 2) dx = 2 \left[\frac{1}{2}x^2 - \frac{1}{3}x^3 + 2x \right]_0^2 \\
 &= 2 \left(2 - \frac{8}{3} + 4 \right) = \frac{20}{3}
 \end{aligned}$$



25. If x = distance from left end of pool and $w = w(x)$ = width at x , then Simpson's Rule with $n = 8$ and $\Delta x = 2$ gives

$$\text{Area} = \int_0^{16} w \, dx \approx \frac{2}{3}[0 + 4(6.2) + 2(7.2) + 4(6.8) + 2(5.6) + 4(5.0) + 2(4.8) + 4(4.8) + 0] = \frac{2}{3}(126.4) \approx 84 \text{ m}^2.$$

32.



We start by finding the equation of the tangent line to $y = x^2$ at the point $(1, 1)$:

$y' = 2x$, so the slope of the tangent is $2(1) = 2$, and its equation is

$y - 1 = 2(x - 1)$, or $y = 2x - 1$. We would need two integrals to integrate with respect to x , but only one to integrate with respect to y .

$$A = \int_0^1 \left[\frac{1}{2}(y + 1) - \sqrt{y} \right] dy = \left[\frac{1}{4}y^2 + \frac{1}{2}y - \frac{2}{3}y^{3/2} \right]_0^1 = \frac{1}{4} + \frac{1}{2} - \frac{2}{3} = \frac{1}{12}.$$