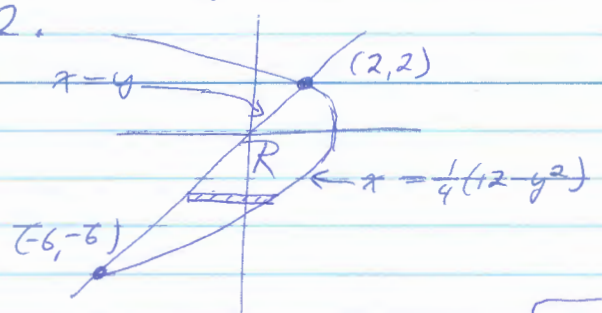
Section 6.1 Solutions

4. $A = \int_0^3 [(2y - y^2) - (y^2 - 4y)]\,dy = \int_0^3 [6y - 2y^2]\,dy$

$= \left[3y^2 - \frac{2}{3}y^3\right]_0^3 = \boxed{9}$

12. $4x + y^2 = 12$ becomes $x = \frac{1}{4}(12 - y^2)$, which is a parabola. Letting $x = \boxed{y = \frac{1}{4}(12 - y^2)} = x$, we obtain the equation $y^2 + 4y - 12 = 0$, or $(y-2)(y+6) = 0$, so the curves intersect when $y = -6, 2$.

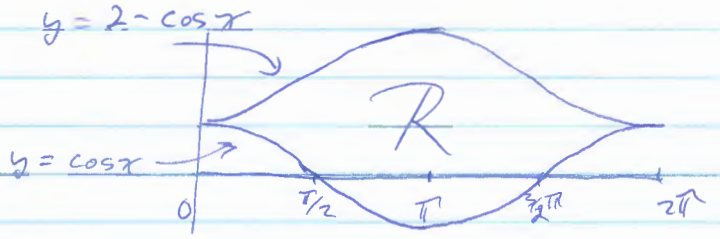


$\therefore A = \int_{-6}^{2} \left[\frac{1}{4}(12 - y^2) - y\right] dy$

$= \int_{-6}^{2} \left[3 - \frac{1}{4}y^2 - y\right] dy$

$= \left[3y - \frac{1}{12}y^3 - \frac{1}{2}y^2\right]_{-6}^{2} = \left(6 - \frac{2}{3} - 2\right) - (-18 + 18 - 18) = \boxed{\frac{64}{3}}$

16. $A = \int_0^{2\pi} [(2 - \cos x) - \cos x]\,dx$



$= \int_0^{2\pi} [2 - 2\cos x]\,dx$

$= 2[x - \sin x]_0^{2\pi} = \boxed{4\pi}$