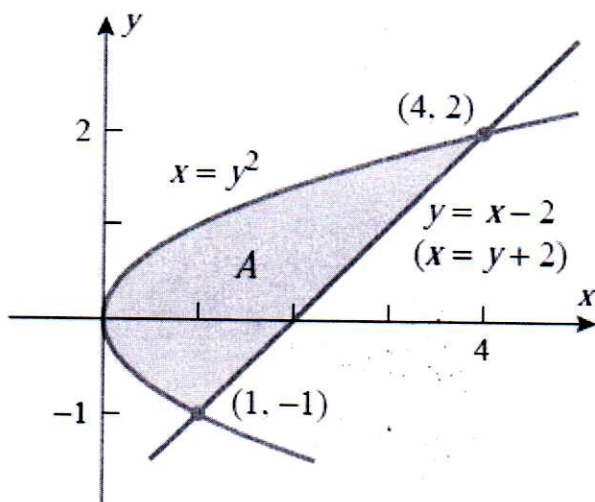
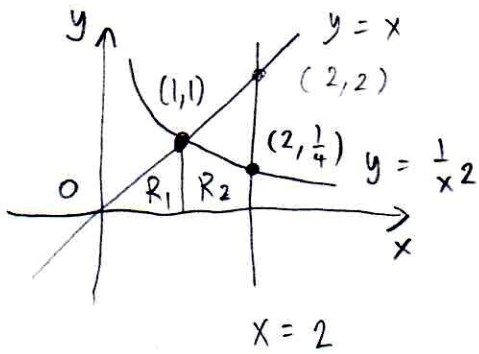


Homework Due Monday, November 3, 2014. Late homework will NOT be accepted.

1. Find the area of the region in the first quadrant bounded by the line $y = x$, the line $x = 2$, the curve $y = \frac{1}{x^2}$ and the x -axis.
2. Find the area between the graphs $y = 2^x$ and $y = x$ from $x = 0$ to $x = 1$.
3. Find area of the shaded region below.



①

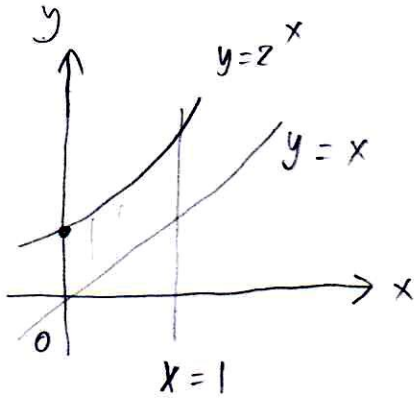


$$y = \frac{1}{x^2} \text{ and } y = x \text{ Set them equal}$$

$$\Rightarrow \frac{1}{x^2} = x \Rightarrow x^3 = 1 \Rightarrow x = 1$$

$$\begin{aligned} \text{Area} &= \text{Area } R_1 + \text{Area } R_2 \\ &= \int_0^1 x \, dx + \int_1^2 \frac{1}{x^2} \, dx \\ &= \left. \frac{1}{2} x^2 \right|_0^1 + \left. (-x^{-1}) \right|_1^2 \\ &= \left(\frac{1}{2} - 0 \right) + \left(-\frac{1}{2} + 1 \right) = 1 \end{aligned}$$

②



$$\begin{aligned} \text{Area} &= \int_0^1 (2^x - x) \, dx \\ &= \left. \frac{2^x}{\ln 2} \right|_0^1 - \left. \frac{1}{2} x^2 \right|_0^1 \\ &= \left(\frac{2}{\ln 2} - \frac{1}{\ln 2} \right) - \left(\frac{1}{2} - 0 \right) = \frac{1}{\ln 2} - \frac{1}{2} \end{aligned}$$

③

$$\begin{aligned} \text{Area} &= \int_{-1}^2 [(y+2) - y^2] \, dy \\ &= \left. \frac{1}{2} y^2 + 2y - \frac{1}{3} y^3 \right|_{-1}^2 \\ &= \left(\frac{1}{2}(4) + 2(2) - \frac{1}{3}(8) \right) - \left(\frac{1}{2}(1) + 2(-1) - \frac{1}{3}(-1) \right) \\ &= \left(2 + 4 - \frac{8}{3} \right) - \left(\frac{1}{2} - 2 + \frac{1}{3} \right) \\ &= \frac{9}{2} \end{aligned}$$