Section 10.3 – Practice Problems

1. State the area of the shaded region.
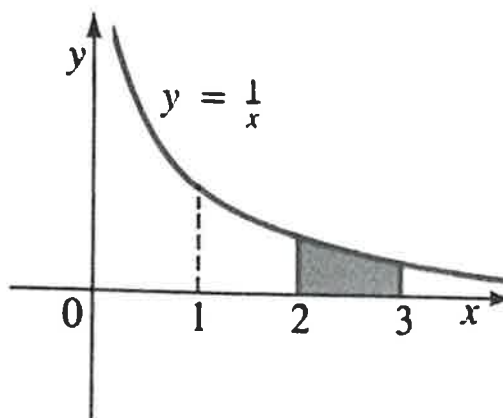
a)

$A_{(x)} = \ln 3 - \ln 2$

$= \ln \frac{3}{2}$

$= \ln 1.5$

$\doteq 0.4055$

b)

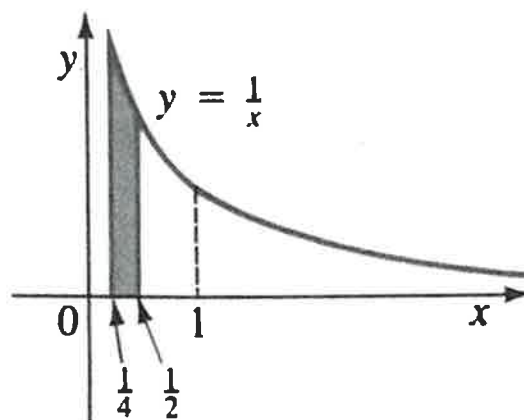$A_{(x)} = \ln \frac{1}{2} - \ln \frac{1}{4}$

$= \ln \frac{\frac{1}{2}}{\frac{1}{4}}$

$= \ln 2$

$\doteq 0.69315$

c)

$$A(x) = \ln 2 - \ln \tfrac{2}{3}$$

$$= \ln \frac{2}{2/3}$$

$$= \ln 3$$

$$\boxed{= 1.099}$$

$y = \frac{1}{x}$

d)

$$A(x) = \ln 3 - \ln \tfrac{3}{2}$$

$$= \ln \frac{3}{3/2}$$
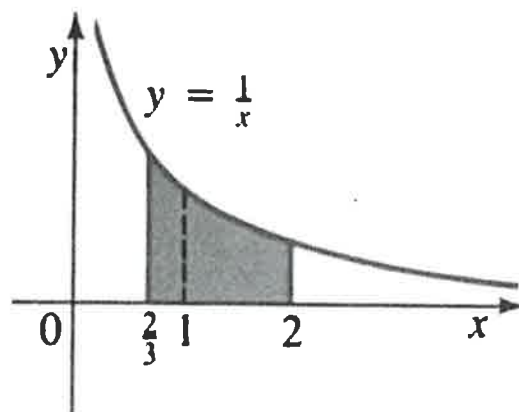
$$= \ln 2$$

= But area is double above/below

$$2\ln 2$$

$$= \boxed{1.3863}$$

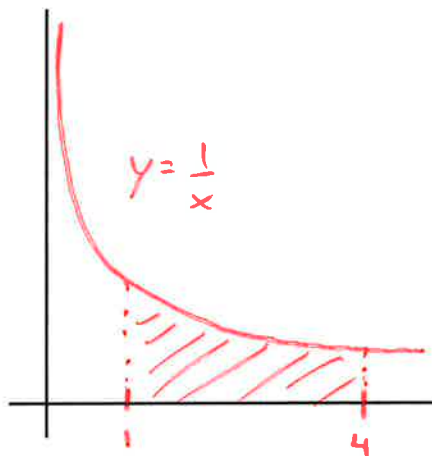$y = \frac{1}{x}$

$y = -\frac{1}{x}$
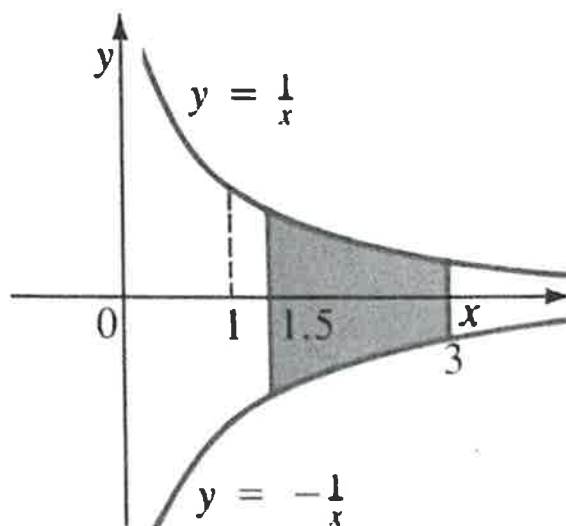
2. Sketch an area represented by each of the following

a) $\ln 4$

$$\ln 4 = \ln \frac{4}{1} = \ln 4 - \ln 1$$

$y = \frac{1}{x}$
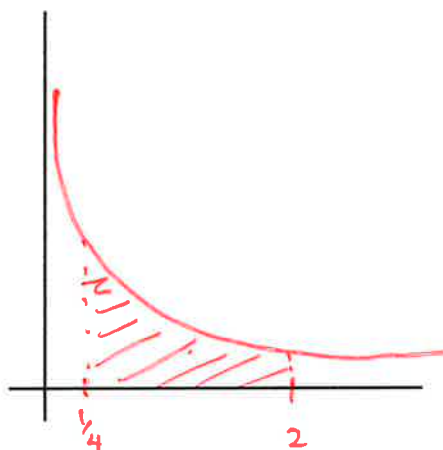
b) $\ln 2 + \ln 4$

$= \ln (2 \cdot 4)$

$= \ln 8$

$= \ln 8$

$= \ln 2 - \ln \frac{1}{4}$ (only one example of many)
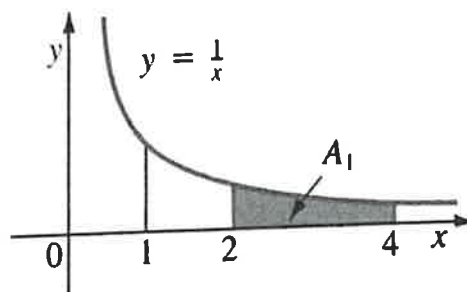
3. Prove that $A_1 = A_2$ if A_1 and A_2 are the areas in the diagrams below

$A_1 = \ln 4 - \ln 2$

$= \ln \frac{4}{2}$

$= \ln 2$

$A_2 = \ln 1 - \ln \frac{1}{2}$

$= \ln \frac{1}{\frac{1}{2}}$

$= \ln 2$

therefore
$A_1 = A_2$

$y = \frac{1}{x}$

A_1

$y = \frac{1}{x}$

A_2