1)

x	1	1.5	2	2.5	3
$f(x)$	$\ln 2$	$1.5\ln 2.5$	$2\ln 3$	$2.5\ln 3.5$	$3\ln 4$

$$0.5\left(\frac{\ln 2}{2} + 1.5\ln 2.5 + 2\ln 3 + 2.5\ln 3.5 + \frac{3\ln 4}{2}\right)$$

$= 4.56 \text{ units}^2$ (3sf)

2)

x	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{5\pi}{6}$	π
$f(x)$	0	1.1937	2.6519	4.8105	7.5570	9.6932	0

$$\frac{\pi}{6}(1.1937 + 2.6519 + 4.8105 + 7.5570 + 9.6932)$$

$= 13.6 \text{ units}^2$ (3sf)

3)

x	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2
$f(x)$	e^4	$e^{2.25}$	e^1	$e^{0.25}$	1	$e^{0.25}$	e^1	$e^{2.25}$	e^4

$$0.5\left(\frac{e^4}{2} + e^{2.25} + e + e^{0.25} + 1 + e^{0.25} + e + e^{2.25} + \frac{e^4}{2}\right)$$

~~$= 27.6 \text{ units}^2$ (3sf)~~

$= 41.3 \text{ units}^2$ (3sf)

4/

x	0	$\pi/3$	$2\pi/3$	π
$f(x)$	2	$\sqrt{3}$	1	0

$$\frac{\pi}{3}\left(\frac{2}{2} + \sqrt{3} + 1 + \frac{0}{2}\right)$$

$$= \underline{\underline{3.91}} \text{ units}^2 \quad (3sf)$$

b/ $$\int_0^{\pi} 2\cos\left(\frac{x}{2}\right) dx$$

$$\left[4 \sin \frac{x}{2}\right]_0^{\pi}$$

$$\underline{\underline{4}} \text{ units}^2$$

c/ $$\frac{4 - "3.91"}{4} \times 100$$

$$= 2.3\% \quad (1dp)$$

5/ $y = 2 - \text{cosec } x$

Crosses x when $y = 0$

$$0 = 2 - \text{cosec } x$$

$$\text{cosec } x = 2$$

$$\sin x = \frac{1}{2}$$

$$x = \frac{\pi}{6}, \frac{5\pi}{6}$$

$$\left(\frac{\pi}{6}, 0\right) \left(\frac{5\pi}{6}, 0\right)$$

b/

x	$\frac{\pi}{6}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{5\pi}{6}$
$f(x)$	0	0.8453	1	0.8453	0

$$\frac{\pi}{6}\left(\frac{0}{2} + 0.8453 + 1 + 0.8453 + \frac{0}{2}\right)$$

$$= 1.41 \text{ units}^2 \text{ (3sf)}$$