Question 5.

a) $y = 2\sqrt{25 - x^2}$

domain $\rightarrow -5 \leq x \leq 5$

range $\rightarrow 2 \leq y \leq 10$

b) i) $\log_{10}(2^{1000}) = \dfrac{\log_e 2^{1000}}{\log_e 10} = \dfrac{\log_e 2^{10} + \log_e 2^{10} + \log_e 2^{10}}{\log_e 10}$

$= 9.031$

ii) 199 digits

c) $30^\circ = 30^\circ \times \dfrac{\pi}{180} = \dfrac{\pi}{6}$

$\cdot\ s = r \times \dfrac{\pi}{6}$

$\dfrac{48}{\pi} = r$

$15.27 = r$

d) Trapezoidal rule $= \dfrac{4}{2}[0 + 0 + 2[1.3 + 1.7]]$

$= 2\ (2 \times (1.3 + 1.7))$

$= 2 \times 6 = 12\ m^2$

The appropriate volume of water that flows past this section is $= 0.5\ ms^{-1} \times 3600\ s = 1800\ m$

Volume of water = $1800 \frac{m}{} \times 12\ m^2 = 21600\ m^3$