

a.) i.) because you can times  $(\sqrt{5}-2)$  to infinity but never get there, the ~~number~~<sup>sum</sup> will just get larger & larger

$$ii.) S_{\infty} = \frac{a}{1-r}$$

$$= \frac{\cancel{\sqrt{5}-2}}{1 - (\sqrt{5}-2)}$$

$$= \frac{1}{1 - (\sqrt{5}-2)} \times \frac{\sqrt{5} + 2}{\sqrt{5} + 2}$$

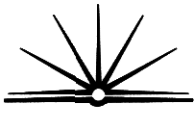
$$= \frac{\sqrt{5} + 2}{\sqrt{5} + 2 + 5 - 4}$$

$$= \frac{\sqrt{5} + 2}{\sqrt{5} + 3} \times \frac{\sqrt{5} - 3}{\sqrt{5} - 3}$$

$$= \frac{5 - 6}{5 - 9}$$

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

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



$$b.) \quad V = 25 \left(1 - \frac{t}{60}\right)^2 \quad 0 \leq t \leq 60$$

i.) when  $t = 0$

$$\begin{aligned} V &= 25 \left(1 - \frac{0}{60}\right)^2 \\ &= 25 \times 1 \\ &= 25 \end{aligned}$$

ii.)  $6.25$  is  $\frac{1}{4}$  full

$$\left(1 + \frac{t}{60}\right) \left(1 - \frac{t}{60}\right)$$

$$6.25 = 25 \left(1 - \frac{t}{60}\right)^2$$

$$\begin{aligned} 6.25 &= 25 \times \left(1 - \frac{t}{60} - \frac{t}{60} + \frac{t^2}{3600}\right) \\ 6.25 &= 25 \times \left(1 - \frac{2t}{60} + \frac{t^2}{3600}\right) \\ &= 25 \left(\frac{3600 - 120t + t^2}{3600}\right) \end{aligned}$$

$$22500 = 90000 - t^2$$

$$\begin{aligned} -67500 &= -t^2 \\ t^2 &= 67500 \\ t &= \end{aligned}$$

$$6.25 = 25 \left(1 - \frac{t}{60}\right)^2$$

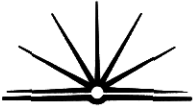
$$0.25 = \left(1 - \frac{t}{60}\right)^2$$

$$0.5 = 1 - \frac{t}{60}$$

$$-.5 = -\frac{t}{60}$$

$$\frac{t}{60} = .5 \quad t = 30$$

when  $t = 30$  seconds the water is  $\frac{1}{4}$  full



$$\text{iii.) } \frac{dV}{dt} = 50 \left(1 - \frac{t}{60}\right)^4 \times \frac{1}{60}$$

$$= \frac{50}{6} \left(1 - \frac{t}{60}\right)^4$$

when  $t = 30$

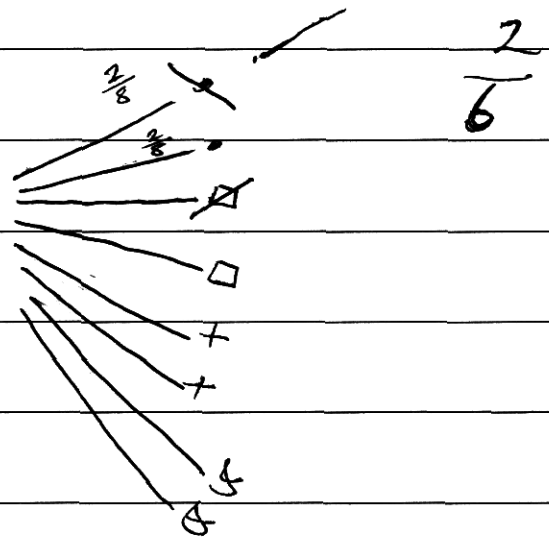
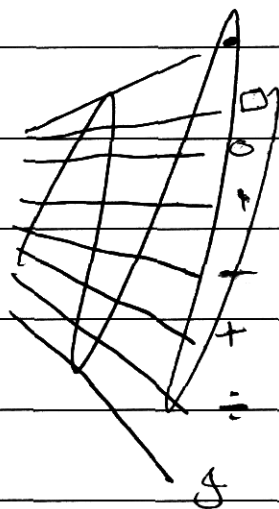
$$\frac{5}{6} \left(1 - \frac{30}{60}\right)^4$$

$$= \frac{5}{6} \times \frac{1}{2}$$

$$= \frac{5}{12}$$

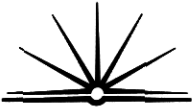
at  $\frac{5}{12}$  l per second when  
cooler ~~is~~ one quarter full

c.) 4 pairs



$$\frac{2}{8} \times \frac{1}{7} = \frac{2}{56} = \frac{1}{28}$$

$$= \frac{2}{8} \times \frac{6}{7}$$



because there is now only  
1 sock in drawer, a  $\frac{1}{7}$  chance  
he will pick same colour sock  
 $\therefore \frac{6}{7}$  he won't  $\therefore \frac{6}{7}$  won't  
have a pair

iii)  $\frac{2}{3}$

iii)  $\frac{1}{3}$