

a) as  $n \rightarrow \infty$   $(\sqrt{5}-2) \rightarrow 0$ .



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

i) when  $t = 0$ .

$$V = 25 (1)^2 \\ = 25 \text{ Litres.}$$

$$ii) V = 25 \left(1 - \frac{t}{60}\right)^2 = 6\frac{1}{4} \text{ Litres.}$$

$$5 \left(1 - \frac{t}{60}\right) = 2\frac{1}{2}$$

$$1 - \frac{t}{60} = \frac{\frac{1}{2}}{2}$$

$$120 - 2t = 60$$

$$60 - 2t = 0$$

$$60 = 2t$$

$$t = 30$$

after 30 seconds the cooler was  
at  $\frac{1}{4}$  full.

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

$$V' = 50 \left(1 - \frac{t}{60}\right) \times -\frac{1}{60}$$

$$= \frac{-5}{6} \left(1 - \frac{t}{60}\right)$$

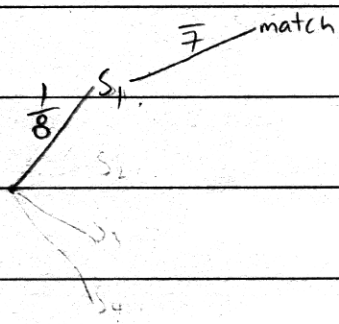
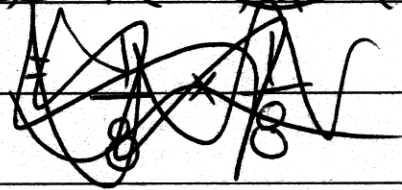
when  $t = 30$

$$V' = \frac{-5}{6} \times \frac{1}{2} = \frac{-5}{12} \text{ Litres/sec}$$

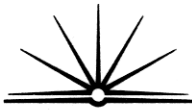


c) i) the probability of Chris having a matching pair after the 2nd is drawn;

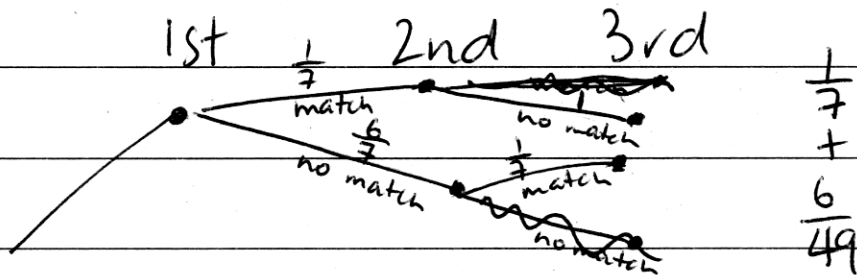
~~$P(\text{matching}) = P(\text{sock}) \times P(\text{match})$~~



ii)



$$\text{iii) } P(\text{pair in 1st 3}) = P(1+2) + P(1+3) + P(2+3)$$



$$P(\text{pair in 1st 3}) = \frac{1}{7} + \frac{6}{49}$$
$$= \frac{13}{49}$$