7a) Lim sum occurs because the series may go on forever and needs a limit to complete certain equations.

Lim sum = $\frac{a(r^n-1)}{r-1}$ or $\frac{1-ar^n}{1-a}$

=

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

$V=25\left(1-\frac{0}{60}\right)^2$

$V=25(1)^2$

$\therefore V=25$ Litres.

ii) $25 \times \frac{1}{4} = 6.25$ Litres.

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

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

$\frac{6.25}{25} = 1^2 - \frac{t}{60}^2$

$\frac{6.25}{25} - 1 = -\frac{t}{60}^2$

$60 \times \frac{6.25}{25} - 1 = -t^2$

$14 = -t^2$

$\sqrt{14} = t^2$

$\pm\sqrt{14} = t$

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7c). 1,1,2,2,3,3,4,4

the chances of getting for example 2 is $\frac{1}{8}$

the chances of then getting another 2 is $\frac{1}{7}$

$= \frac{7}{56} + \frac{8}{56}$

$\frac{15}{56}$

∴ the odds of getting a matching pair is $\frac{1}{7}$ and the odds of not getting a pair is $\frac{6}{7}$.