

Start here for

Question Number:

4

 $n = 26$

$$(a) (i) T_n = a + (n-1)d$$

$$T_9 = 1 + (8 \times .750)$$

$$= 7 \text{ km}$$

$$(ii) T_n = 1 + (n-1) \cdot 750 = 10$$

$$= (n-1) \times .750 = 9$$

\therefore in the 13th week

$$T_{13} = 1 + (12 \times .750) = 10 \text{ km}$$

$$(iii) S_{26} = \frac{n}{2} [2a + (n-1)d] \quad a=1 \quad n=26 \quad d=.750$$

$$= 13 [2 + (25 \times .750)]$$

$$\therefore = 269.75 \text{ km}$$

$$(b) \int_0^2 e^{2x} dx - \int_0^1 e^{-x}$$

$$= \left[\frac{e^{2x}}{2} \right]_0^2 - \left[\frac{e^{-x}}{-1} \right]_0^1$$

$$= \left(\frac{e^4}{2} - \frac{1}{2} \right) - \left(\frac{e^{-1}}{-1} - 1 \right)$$

$$= \frac{e^4}{2} - \frac{1}{2} - \frac{e^{-1}}{-1} + 1$$

$$= \frac{e^4}{2} - \frac{e^{-1}}{-1} + \frac{1}{2}$$

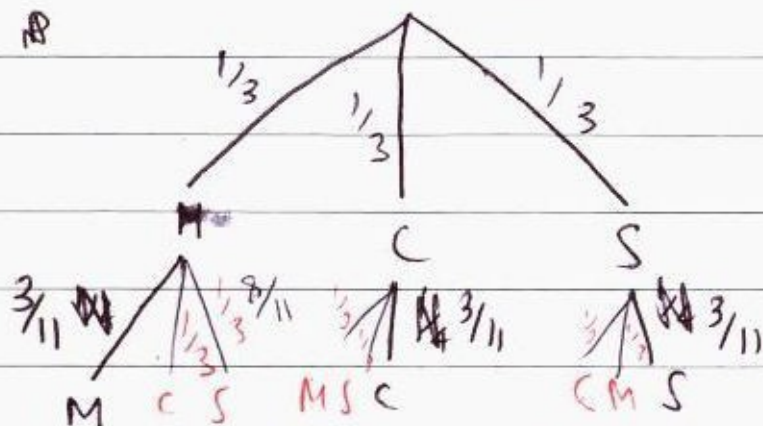
12

(c)

4M

AC

AS

(i) ~~A~~

$$P(MM) = \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$$

$$(ii) P(\text{same centre}) = \frac{1}{9} + \frac{1}{9} + \frac{1}{9} = \frac{3}{9} = \frac{1}{3}$$

$$(iii) P(\text{different centres}) = \frac{8}{27} + \frac{8}{27} + \frac{8}{27} = \frac{24}{27} = \frac{8}{9}$$

(d) $f(x) = 1 + e^x$ show $f(x) \times f(-x) = f(x) + f(-x)$

$$(1 + e^x) \times (1 + e^{-x}) = 1 + e^{-x} + e^x + e^2$$

$$(1 + e^x) + (1 + e^{-x}) = 2 + e^x + e^{-x}$$

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