

Start here for  
Question Number: **4**

$$(a) (i) a = 1 \quad \text{So } T = a + (n-1)d$$

$$d = 750 \quad T_9 = 1 + (8) \cdot 0.75$$

$$n = 9 \quad = 7.$$

$$\boxed{= 7 \text{ km}}$$

$$S_{10} = 2 + (9) \cdot 0.75$$

(ii)  $\boxed{\text{Week 13.}}$

$$(iii) S_{26} = 2a + (n-1)d$$

$$= 2 + (25) \cdot 0.75$$

$$T_{26} = a + (n-1)d$$

$$T_{13} = a + (n-1) \cdot 0.75$$

$$= 1 + 12(0.75)$$

$$130 \text{ km} + 111.125$$

$$\boxed{= 241.125 \text{ km.}}$$

(b) ~~xy~~  $A = \int_a^b x dx.$

$$y = e^{2x}.$$

$$\int_0^2 e^{2x} dx - \int_0^2 e^{-x} dx$$

$$\int_0^2 e^{2x} = \left[ \frac{1}{2} e^{2x} \right]_0^2$$

$$= 2e^4 - 1$$

$$\int_0^2 e^{-x} = \left[ -e^{-x} \right]_0^2$$

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

$$= 2e^4 - 1 + e^{-2} - 1.$$

$$\boxed{= 2e^4 + e^{-2} - 2 \text{ units}^2.}$$

(c) 4 mint, 4 caramel, 4 strawberry

$$\sum_{i=1}^4 \frac{4}{12} \quad (i) \quad \frac{4}{12} = \frac{1}{3} \quad \frac{4}{12}$$

$$(ii) \quad \frac{4}{12} \times \frac{4}{12} \times \frac{4}{12} = \frac{1}{27}$$

$$(iii) \quad \frac{3}{12} \times \frac{3}{12} = \frac{1}{16}$$

$$(d) \quad f(x) = 1 + e^x$$

$$f(x) \times f(-x) = f(x) + f(-x)$$

$$\begin{aligned} f(x) \times f(-x) &= f(x) + f(-x) \\ &= (1 + e^x) \times (-1 + e^{-x}) &= (1 + e^x - 1 + e^{-x}) \\ &= -1 + e^{-x} - e^x + e^{2x} &= 0 + 2e^{2x} \\ &= -1 + e^{2x} \end{aligned}$$

$$\therefore -1 + e^{2x} = 2e^{2x}$$

$$\frac{dy}{dx} = 2e^{2x}$$

$$\begin{aligned} \int 2e^{2x} \\ &= \frac{2e^{2x}}{2} + C \\ &= e^{2x} + C \end{aligned}$$

$$\therefore -1 + e^{2x} = e^{2x} + C$$

$$\therefore C = -1$$

$$\therefore f(x) \times f(-x) = f(x) + f(-x)$$

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