Start here for Question Number: 4

~~a i/. $S_n = \frac{n}{2}[2a + (n-1)\cdot d]$~~

$S_9 = \frac{9}{2}[2(1000) + (9-1) \times 750]$

a i/. $T_n = a + (n-1)\cdot d$

$T_9 = 1000m + (9-1) \times 750m$

$= 7km$

∴ Susannah runs 7km in the 9th week.

ii/. $10km = 1000m + (n-1) \times 750m$

$\frac{10000}{1000} = 750n - 750$

$10 = 750n - 750$

$760 = 750n$

$n = \frac{760}{750}$

iii/. $S_{26} = \frac{26}{2}[2 \times 1000 + (26-1) \times 750]$

$= 13[2000 + 18750]$

$= 269750m$

∴ total distance she over 26 weeks is 269.75km

b/. $\int_0^2 e^{2x}\,dx = \left[2e^{2x}\right]_0^2$

$= \left[2e^{2(2)}\right] - \left[2e^{2(0)}\right]$

$= \left[2e^{4}\right] - \left[2 \times 1\right]$

$= \left[2e^{4}\right] - \left[2\right]$

$= 107.1963001$

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

$= \left[-e^{-(2)}\right] - \left[-e^{-(0)}\right]$

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

$= 0.8646647168$

∴ Area $= 107.1963001 - 0.8646647168$

$= 106.1963001$ units^2

c/. 12 chocolates, 4 x mint, 4 x cara, 4 x straw.

i/. $\frac{1}{6}$

ii/. p(same centre) $= \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$

$= \frac{1}{8}$

iii/. $\frac{1}{64}$.

Additional writing space on back page.

Office Use Only - Do NOT write anything, or make any marks below this line.

d. $f(x) = 1 + e^x$

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

You may ask for an extra Writing Booklet if you need more space to answer question 4.