7) (b) The velocity v(km/min) of a moped is given at fixed interval of time (min) as below:

t	0.1	0.2	0.3	0.4	0.5	0.6
v	1.00	1.104987	1.219779	1.34385	1.476122	1.615146

t	0.7	0.8	0.9	1.0	1.1
v	1.758819	1.904497	2.049009	2.18874	2.31977

Estimate the distance covered during the time (use Simpson 1/3 rule)

⇒ If 's' be the distance. then,

$$S = \int_{0.1}^{1.1} v\,dt$$

t_i $i=0$ to 10	v_i $i=0$ to 10	y_i $i=0,10$	y_i $i=1,3,5,7,9$	y_i $i=2,4,6,8$
$t_0 = 0.1$	1.000000	1.000000	—	—
$t_1 = 0.2$	1.104987	—	1.104987	—
$t_2 = 0.3$	1.219779	—	—	1.219779
$t_3 = 0.4$	1.34385	—	1.34385	—
$t_4 = 0.5$	1.476122	—	—	1.476122
$t_5 = 0.6$	1.615146	—	1.615146	—
$t_6 = 0.7$	1.758819	—	—	1.758819
$t_7 = 0.8$	1.904497	—	1.904497	—
$t_8 = 0.9$	2.049009	—	—	2.049009
$t_9 = 1.0$	2.188740	—	2.188740	—
$t_{10} = 1.1$	2.319770	2.319770	—	—

$\Sigma v_i = 3.319770 (= Y_1)$ $\Sigma v_i = 8.15722 (= Y_1)$ $\Sigma v_i = 6.503729 (= Y_2)$

∴ By Simpson's 1/3rd rule,

$$S = \frac{h}{3}\left[v_0 + v_{10} + 4(v_1+v_3+v_5+v_7+v_9) + 2(v_2+v_4+v_6+v_8)\right]$$

$$= \frac{h}{3}\left[Y_1 + 4Y_2 + 2Y_3\right] = \frac{0.1}{3}\left[3.31977 + 32.62888 + 13.007458\right]$$

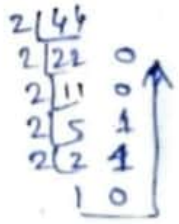
$$= 1.63187$$

}

7) (e) Assuming a 16-bit Computer representation of signed integers, represent (-44) in 2's Complement representation

⇒ 16 bit representation of 44 is,

$44 \equiv 00000000\ 00101100$



1's complement of 44 is,

$11111111\ 11010011$

so, the 2's Complement representation is,

$(-44) \equiv 1111\ 1111\ \ 11010011 + 1$

$= 11111111\ 11010100$