

b) Simpson's $\frac{1}{3}$ rule $= 7$ 2.54

$$= \frac{h}{3} (y_0 + y_n + 2 \sum y_{2k} + 4 \sum y_{2k+1})$$

Q $\int_1^{10} \log x \, dx$

x	1	2	3	4	5	6	7	8	9	10
y	0	0.693	1.0986	1.3863	1.6094					
y ₀	0	y ₁	y ₂	y ₃	y ₄	y ₅	y ₆	y ₇	y ₈	y ₉
		1.7917	1.9459	2.0794	2.1972	2.3026				
h	1									

a) $\int_1^{10} \log x \, dx = \frac{1}{3} (1) [0 + 2.3026 + 2(0.693 + 1.0986 + 1.3863 + 1.6094 + 1.7917 + 1.9459 + 2.0794 + 2.1972 + 2.3026)]$

$$= \frac{1}{3} [2.3026 + 2(12.8018)]$$

$$= \frac{1}{3} [2.3026 + 25.6036]$$

$$= \frac{1}{3} [27.9062]$$

$$= 9.3021$$

b) $\int_1^{10} \log x \, dx = \frac{1}{3} (1) [0 + 2.3026 + 2(y_2 + y_4 + y_6 + y_8) + 4(y_1 + y_3 + y_5 + y_7)]$

$$= \frac{1}{3} [2.3026 + 2(5.9498) + 4(6.8511)]$$

$$= \frac{1}{3} [2.3026 + 11.8996 + 27.4044]$$

$$= \frac{1}{3} [41.6066]$$

$$= 13.8689$$

c) $= \frac{3}{8} (1) [0 + 2.3026 + 2(y_3 + y_6) + 3(y_1 + y_2 + y_4 + y_5 + y_7 + y_8)]$

$$= \frac{3}{8} [2.3026 + 2(2.0794 + 2.3026) + 3(1.7917 + 1.9459 + 2.1972 + 2.3026 + 2.5000 + 2.6989 + 2.8904)]$$

$$= \frac{3}{8} [2.3026 + 9.1640 + 3(15.9285)]$$

$$= \frac{3}{8} [2.3026 + 9.1640 + 47.7855]$$

$$= \frac{3}{8} [59.2521]$$

$$= 22.2196$$

$$\text{Accurate} = [x \log x - x]_0^{10} = (10 \log 10 - 10) - (0 - 1) = 23.026 - 9 = 14.026$$

c) Simpson $\frac{3}{8}$ rule \Rightarrow 2 3

$$\frac{3h}{8} (y_0 + y_n + 2 \sum y_{2k} + 3 \sum y_{2k+1})$$

x	1	1.5	2	2.5	3	3.5	4
f	2	2.4	2.7	2.8	3	2.6	2.1
y_0	4π	5.76π	7.29π	7.84π	9π	6.76π	4.41π
y_n							

Volume of solid = $\int y \cdot dx$ c.c $\{ \pi x^2 dx$
 $h = 0.5$

$$= 0.5 [4\pi + 4.41\pi + 2(5.76\pi + \dots + 6.76\pi)]$$

$$= 0.5 [8.41\pi + 272.58]$$

$$= 64.2007$$

$$= \frac{0.5}{3} [(4\pi + 4.41\pi + 2(7.29\pi + 9\pi)) + 4(5.76\pi + 7.84\pi + 6.76\pi)]$$

$$= \frac{0.5}{3} [8.41\pi + 16.29\pi + \dots]$$

$$= 64.13$$

$$= \frac{3(0.5)}{8} [4\pi + 4.41\pi + 2(y_3) + 3(y_1 + y_2 + y_4 + y_5)]$$

$$= 65.1278$$