

ΑΣΚΗΣΗ – 5

Χρησιμοποιώντας τον απλό κανόνα του Simpson να δείξετε ότι

$$\int_1^{1.6} \frac{2}{x} dx < 1 < \int_1^{1.7} \frac{2}{x} dx$$

**Solution.** Given  $f(x) = \frac{2}{x}$  and take  $h = (1.6 - 1)/2 = 0.3$ , then by using Simpson's rule (12), we have

$$S_2(f) = \frac{0.3}{3} [f(1) + 4f(1.3) + f(1.6)] = (0.1)[2 + 6.1538 + 1.25] = 0.9404.$$

Now taking  $h = (1.7 - 1)/2 = 0.35$ , then by using Simpson's rule (12), we have

$$S_2(f) = \frac{0.35}{3} [f(1) + 4f(1.35) + f(1.7)] = (0.1167)[2 + 5.9260 + 1.1764] = 1.0623.$$

Hence

$$0.9404 < 1 < 1.0623,$$

the required result. •