Page 224, #44 (mod)

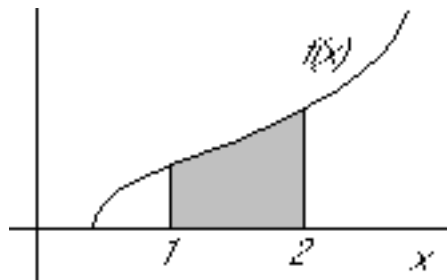## 1 p224, #44(mod), §1 Asked
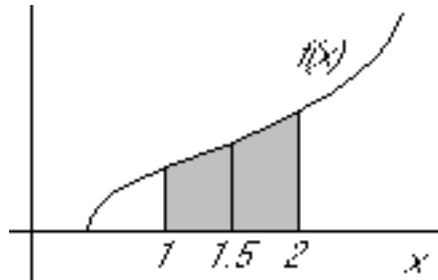
Asked:

$$\int_1^2 x\sqrt[3]{x^5 + 2x^2 - 1}\ \mathrm{d}x$$

2 p224, #44 (mod), §2 Solution

Divide into n=2 intervals and use the trapezium rule:

If

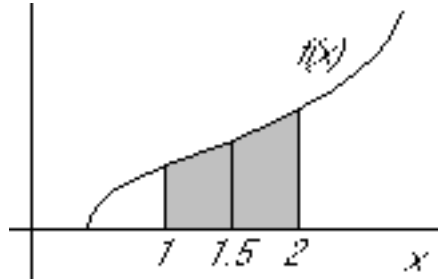$$f(x) = x\sqrt[3]{x^5 + 2x^2 - 1}$$

then the trapezium rule gives

$$\int_1^{1.5} f\ \mathrm{d}x = 0.5\frac{f(1) + f(1.5)}{2} = 0.5\frac{1.259921 + 3.345421}{2} = 1.151336$$

$$\int_{1.5}^2 f\ \mathrm{d}x = 0.5\frac{f(1.5) + f(2)}{2} = 0.5\frac{3.345421 + 6.782423}{2} = 2.531961$$

$$\int_1^2 f \ \mathrm{d}x = 1.151336 + 2.531961 = 3.683297$$

Exact is 3.571639.

Now divide into n=2 *half* intervals and use the Simpson rule:

$$\int_1^2 f \ \mathrm{d}x = 1\frac{f(1) + 4f(1.5) + f(2)}{6}$$

$$= 1\frac{1.259921 + 4 * 3.345421 + 6.782423}{6} = 3.570671$$

Closer to the exact value 3.571639.