

$$1. \Delta x = \frac{12 - (-12)}{6} = 4$$

Left Sum:

$$\sum_{i=0}^5 f(-12+4i) \cdot 4$$

$$= f(-12) \cdot 4 + f(-8) \cdot 4 + f(-4) \cdot 4$$

$$+ f(0) \cdot 4 + f(4) \cdot 4 + f(8) \cdot 4$$

$$\approx 210.0638$$

Right Sum:

$$\sum_{i=1}^6 f(-12+4i) \cdot 4$$

$$= f(-8) \cdot 4 + f(-4) \cdot 4 + f(0) \cdot 4$$

$$+ f(4) \cdot 4 + f(8) \cdot 4 + f(12) \cdot 4$$

$$\approx 210.0638$$

Midpoint Sum: $\sum_{i=0}^5 f(-10+4i) \cdot 4$

$$= f(-10) \cdot 4 + f(-6) \cdot 4 + f(-2) \cdot 4$$

$$+ f(2) \cdot 4 + f(6) \cdot 4 + f(10) \cdot 4$$

$$\approx 230.8617$$

Exact: $\frac{1}{2} \pi \cdot 12^2 = 72\pi \approx 226.1947$

L30 P3

2.

$$\frac{1}{3} + \frac{2}{7} + \frac{3}{11} + \frac{4}{15} + \frac{5}{19} + \frac{6}{23}$$

$$= \sum_{i=1}^6 \frac{i}{4i-1}$$