6) $\int_1^3 3x^2\,dx = \lim_{n\to\infty} \sum_{i=1}^{n} F(x_i)\Delta x = \lim_{n\to\infty} \frac{2}{n}\sum 3\left(1+\frac{2i}{n}\right)^2$

$= \lim_{n\to\infty} \frac{2}{n} \sum_{i=1}^{n} 3\left(1+\frac{4i}{n}+\frac{4i^2}{n^2}\right) = \lim_{n\to\infty} \frac{2}{n^3}\sum 3n^2+12in+12i^2$

$\frac{2}{n^3}\left(3n^2\cdot n + 12n\cdot\frac{n(n+1)}{2} + 12\frac{n(n+1)(2n+1)}{6}\right)$

$3n^3 \quad 6n^3 \quad 4n^3$

$2(3+6+4)=26$