$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

44. $\lim_{n\to\infty} \sum_{i=1}^{n} \left(1+\frac{2i}{n}\right)^3 \left(\frac{2}{n}\right)$

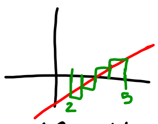
$= \lim_{n\to\infty} \frac{2}{n} \sum_{i=1}^{n} \left(1^3 + 3(1)^2\left(\frac{2i}{n}\right)^1 + 3(1)^1\left(\frac{2i}{n}\right)^2 + \left(\frac{2i}{n}\right)^3\right)$

$= \lim_{n\to\infty} \frac{2}{n}\left[\sum_{i=1}^{n} 1 + \frac{6}{n}\sum_{i=1}^{n} i + \frac{12}{n^2}\sum_{i=1}^{n} i^2 + \frac{8}{n^3}\sum_{i=1}^{n} i^3\right]$

$= \lim_{n\to\infty}\left[\frac{2}{\cancel{n}}\cdot\cancel{n} + \frac{2}{n}\cdot\frac{6}{n}\cdot\frac{n(n+1)}{2} + \frac{2}{n}\cdot\frac{12}{n^2}\cdot\frac{n(n+1)(2n+1)}{6} + \frac{2}{n}\cdot\frac{8}{n^3}\cdot\left[\frac{n^2(n+1)^2}{4}\right]\right]$

$= 2 + 6 + 8 + 4 = \boxed{20}$

48. $f(x) = 3x-4$
$y = 3x-4$, $[2,5]$



Right-hand endpoint of i^{th} interval

Area $= \lim_{\substack{n\to\infty \\ \|\Delta x\|\to 0}} \sum_{i=1}^{n} f(c_i)\Delta x_i$, $x_i \le c_i \le x_{i+1}$, $a + \frac{b-a}{n} i$

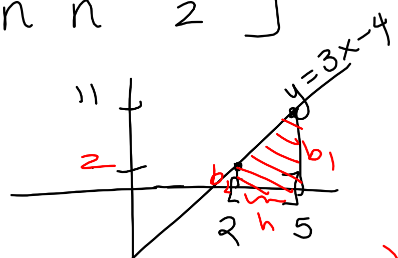
$\Delta x = \frac{b-a}{n} = \frac{5-2}{n} = \frac{3}{n}$

Area $= \lim_{n\to\infty} \sum_{i=1}^{n} \frac{3}{n}\left[3\left(2+\frac{3}{n}i\right) - 4\right]$

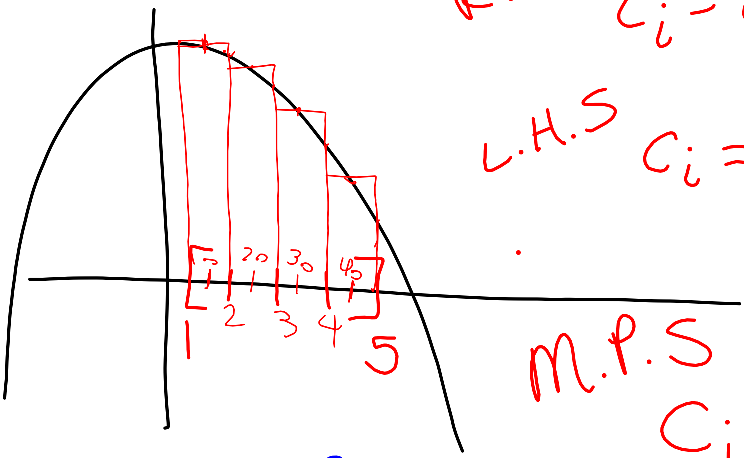
$= \lim_{n\to\infty} \frac{3}{n} \sum_{i=1}^{n} \left(2 + \frac{9i}{n}\right)$

$= \lim_{n\to\infty} \left[\frac{3}{n}\cdot 2n + \frac{3}{n}\cdot\frac{9}{n}\cdot\frac{n(n+1)}{2}\right]$

$= 6 + \frac{27}{2} = \frac{39}{2}$



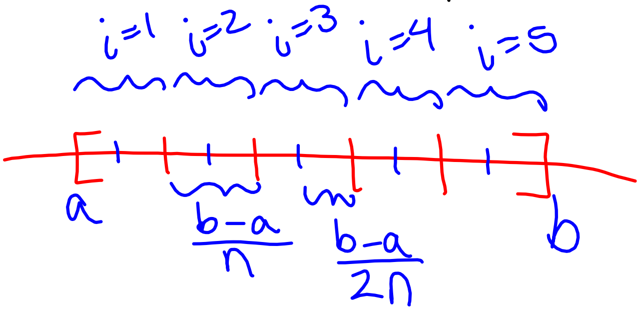
$\frac{39}{2} = \frac{1}{2}(11+2)\cdot 3$



R.H.S. $c_i = a + \frac{b-a}{n} i$

L.H.S $c_i = a + \frac{b-a}{n}(i-1)$

M.P.S $c_i = a + \frac{b-a}{2n}(2i-1)$



$c_1 = a + \frac{b-a}{2n} \cdot 1$

$c_2 = a + \frac{b-a}{2n} \cdot 3$

$c_3 = a + \frac{b-a}{2n} \cdot 5$