5. $\sum_{i=1}^{n}\left(1+\frac{i}{n}\right)^2\left(\frac{1}{n}\right) = \sum_{i=1}^{n}\left(1+\frac{2i}{n}+\frac{i^2}{n^2}\right)\left(\frac{1}{n}\right) = \sum_{i=1}^{n}\frac{1}{n} + \sum_{i=1}^{n}\frac{2i}{n^2} + \sum_{i=1}^{n}\frac{i^2}{n^3}$

$= \frac{1}{n}\sum_{i=1}^{n} 1 + \frac{2}{n^2}\sum_{i=1}^{n} i + \frac{1}{n^3}\sum_{i=1}^{n} i^2 \leftarrow$

$= \frac{1}{n}\cdot n \cdot 1 + \frac{2}{n^2}\cdot\frac{n(n+1)}{2} + \frac{1}{n^3}\cdot\frac{n(n+1)(2n+1)}{6}$

$= 1 + \frac{n(n+1)}{n^2} + \frac{n(n+1)(2n+1)}{6n^3}$

$= 1 + \frac{n^2+n}{n^2} + \frac{(n^2+n)(2n+1)}{6n^3}$

$= 1 + \frac{n^2}{n^2} + \frac{n}{n^2} + \frac{2n^3+n^2+2n^2+n}{6n^3}$

$= 1 + 1 + \frac{1}{n} + \frac{2n^3}{6n^3} + \frac{3n^2}{6n^3} + \frac{n}{6n^3}$

$= 2 + \frac{1}{n} + \frac{1}{3} + \frac{1}{2n} + \frac{1}{6n^2}$

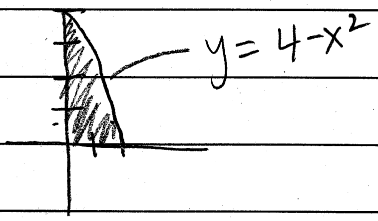
Use summation formulas

$\sum_{i=1}^{n} c = cn$

$\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$

$\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$

$\lim_{n\to\infty}\sum_{i=1}^{n}\left(1+\frac{i}{n}\right)^2\left(\frac{1}{n}\right) = \lim_{n\to\infty}\left(2+\frac{1}{n}+\frac{1}{3}+\frac{1}{2n}+\frac{1}{6n^2}\right) = 2+\frac{1}{3} = \frac{7}{3}$

6. 

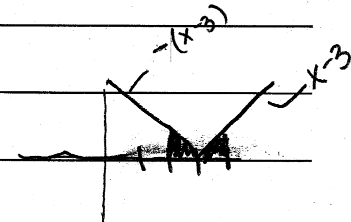
$\int_0^2 (4-x^2)\,dx = 4x - \frac{x^3}{3}\Big]_0^2$

$= 4(2) - \frac{2^3}{3} - \left(4(0) - \frac{0^3}{3}\right)$

$= 8 - \frac{8}{3}$

$= \frac{24}{3} - \frac{8}{3} = \frac{16}{3}$

10. $\int_2^4 |x-3|\,dx = \int_2^3 -(x-3)\,dx + \int_3^4 (x-3)\,dx$



$= -\frac{x^2}{2} + 3x\Big]_2^3 + \frac{x^2}{2} - 3x\Big]_3^4 = -\frac{(3)^2}{2} + 3(3) - \left(\frac{-2^2}{2} + 3(2)\right) + \frac{4^2}{2} - 3(4) - \left(\frac{3^2}{2} - 3(3)\right)$

$= \frac{-9}{2} + 9 + \frac{4}{2} - 6 + \frac{16}{2} - 12 - \frac{9}{2} + 9 = \frac{-18}{2} + 18 + 2 - 18 + 8 = 1$