# SUMMATION OF SERIES

You may use the following which are given in the formula book:

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

$$\sum_{r=1}^{n} r^3 = \frac{1}{4}n^2(n+1)^2$$

| $f(r)$ | $a$ | $b$ | $\sum_{r=a}^{b} f(r)$ |
|---|---|---|---|
| $3r$ | 5 | 18 | |
| $4r+2$ | 1 | | 1056 |
| $\square r - 7$ | 1 | 10 | 260 |
| $2r^2 - 4r + 1$ | 1 | 8 | |
| $3r^2 + 5r$ | 1 | $2n$ | In factorised form |
| $r^3 - 4r$ | 1 | 4 | |
| $r^3 - 4r$ | 5 | 20 | |
| $r^3 - 4r + \square$ | 5 | 20 | 43280 |
| $r(r+1)(r+2)$ | 1 | $n$ | In factorised form |
| $\square r^2 + \square r + \square$ | 1 | 10 | 1140 |
| | 1 | 14 | 2996 |
| | 1 | 18 | 6228 |

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$$\sum_{r=1}^{n} r^3 = \frac{1}{4}n^2(n+1)^2$$

| $f(r)$ | $a$ | $b$ | $\sum_{r=a}^{b} f(r)$ |
|---|---|---|---|
| $3r$ | 5 | 18 | 483 |
| $4r+2$ | 1 | 22 | 1056 |
| $\boxed{6}r-7$ | 1 | 10 | 260 |
| $2r^2-4r+1$ | 1 | 8 | 272 |
| $3r^2+5r$ | 1 | $2n$ | In factorised form $2n(2n+1)(2n+3)$ |
| $r^3-4r$ | 1 | 4 | 60 |
| $r^3-4r$ | 5 | 20 | 43200 |
| $r^3-4r+\boxed{5}$ | 5 | 20 | 43280 |
| $r(r+1)(r+2)$ | 1 | $n$ | In factorised form $\frac{n(n+1)(n+2)(n+3)}{4}$ |
| $\boxed{3}r^2+\boxed{-1}r+\boxed{4}$ | 1 | 10 | 1140 |
| | 1 | 14 | 2996 |
| | 1 | 18 | 6228 |