3.2) Sums of squares and cubes

Worked example

Evaluate:

$$\sum_{r=1}^{100} r^2$$

$$\sum_{r=20}^{50} r^2$$

Your turn

Evaluate:

$$\sum_{r=21}^{100} r^2$$

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Worked example

Evaluate:

$$\sum_{r=1}^{100} r^3$$

$$\sum_{r=20}^{50} r^3$$

Your turn

Evaluate:

$$\sum_{r=21}^{100} r^3$$

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Worked example

Show that

$$\sum_{r=2n+1}^{4n} r^2 = \frac{1}{3}n(4n+1)(14n+1)$$

Your turn

Show that

$$\sum_{r=n+1}^{2n} r^2 = \frac{1}{6}n(2n+1)(7n+1)$$

Shown

Worked example

Show that

$$\sum_{r=1}^{n}(r+2)(r+3)=\frac{1}{3}n(n^2+9n+26)$$

Your turn

Show that

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

Shown

Worked example

Show that

$$\sum_{r=1}^{n} r(r+1)(r+5) = \frac{1}{4}n(n+1)(n+2)(n+7)$$

and hence evaluate

$$\sum_{r=10}^{40} r(r+1)(r+5)$$

Your turn

Show that

$$\sum_{r=1}^{n} r(r+3)(2r-1) = \frac{1}{6}n(n+1)(3n^2+13n-4)$$

and hence evaluate

$$\sum_{r=11}^{40} r(r+3)(2r-1)$$

Shown

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Worked example

Find the value of n that satisfies

$$\sum_{r=1}^{n}(r^2 - r) = \sum_{r=1}^{n} 5$$

Your turn

Find the value of n that satisfies

$$\sum_{r=1}^{n}(r^3 - r^2) = \sum_{r=1}^{n} 7r$$

$n = 4$