8.1) Proof by mathematical induction

Worked example	Your turn
Prove by induction that for all positive integers n: $$\sum_{r=1}^{n} r(3r-1) = n^2(n+1)$$	Prove by induction that for all positive integers n: $$\sum_{r=1}^{n} (2r-1) = n^2$$ Proof

Worked example	Your turn
Prove by induction that for all positive integers n: $$\sum_{r=1}^{n} r^3 = \frac{1}{4}n^2(n+1)^2$$	Prove by induction that for all positive integers n: $$\sum_{r=1}^{n} r^2 = \frac{1}{6}n(n+1)(2n+1)$$ Proof

Worked example

Prove by induction that for all positive integers n:
$$\sum_{r=1}^{n} r2^r = 2(1 + (n-1)2^n)$$

Your turn

Prove by induction that for all positive integers n:
$$\sum_{r=1}^{n} \left(\frac{1}{2}\right)^r = 1 - \frac{1}{2^n}$$

Proof