8.2) Proving divisibility results

Worked example

Prove by induction that for all positive integers n:
$3^{2n} - 1$ is divisible by 8

Your turn

Prove by induction that for all positive integers n:
$3^{2n} + 11$ is divisible by 4

Proof

Worked example

Prove by induction that for all positive integers n:
$5^n + 9^n + 2$ is divisible by 4

Your turn

Prove by induction that for all positive integers n:
$7^n + 4^n + 1$ is divisible by 6

Proof

Worked example

Prove by induction that for all positive integers n:
$8^n - 3^n$ is divisible by 5

Your turn

Prove by induction that for all positive integers n:
$13^n - 6^n$ is divisible by 7

Proof

Worked example

Prove by induction that for all positive integers n:
$2^{6n} + 3^{2n-2}$ is divisible by 5

Your turn

Prove by induction that for all positive integers n:
$11^{n+1} + 12^{2n-1}$ is divisible by 133

Proof

Worked example

Prove by induction that for all positive integers n:
$n^3 + 6n^2 + 8n$ is divisible by 3

Your turn

Prove by induction that for all positive integers n:
$n^3 - 7n + 9$ is divisible by 3

Proof