Proof

It is suggested that to square an integer and a half you multiply the integer by the next integer and add $\frac{1}{4}$.

Proof $\left(n+\frac{1}{2}\right)^2 = n^2 + \frac{1}{2}n + \frac{1}{2}n + \frac{1}{4}$

$= n^2 + n + \frac{1}{4}$

$= n(n+1) + \frac{1}{4}$ ✓

Identities

$$(n+1)^2 \equiv n^2 + 2n + 1$$

true for all values of n

Proof Exercise 7E

1) Proof by exhaustion

$1 \le n \le 6$ $\quad m = n+2$ is not divisible by 10

$n=1$	$n=3$
$n=2$	$n=4$
$n=3$	$n=5$
$n=4$	$n=6$
$n=5$	$n=7$
$n=6$	$n=8$

} not divisible by 10

5) a) $n^4 - n$ is divisible by 4

Counter example $n = 2$

$2^4 - 2 = 14$ not divisible by 4

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b) Perfect squares have an odd number of factors

eg 9 has 1, 3, 9

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c) $2n^2 - 6n + 1 > 0$ for all n

$n = 1$ $\quad 2(1)^2 - 6(1) + 1 = -3$ X

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d) $2n^2 - 2n - 4$ is multiple of 3

$n = 3$ $\quad 2(3)^2 - 2(3) - 4 = 8$

not a multiple of 3 X
