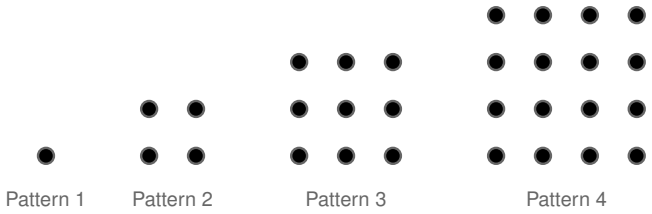
**Every question wants a sentence as well as a rule.** Say which part of the *picture* each part of the rule is.

**1** Each pattern is a square of dots.

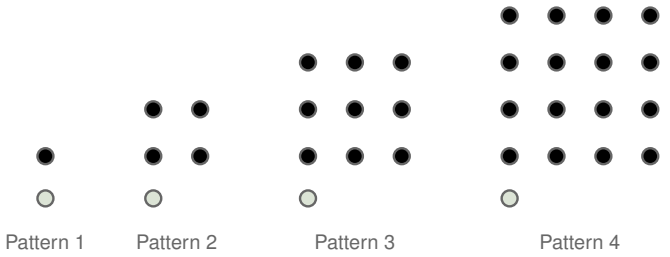



(a) Write down the $n$th term of the number of dots (1)

(b) **Explain, with reference to the patterns, why the rule works.** (2)

**(3 marks)**

**2** Each pattern is a square of dots with one extra dot underneath it.




(a) Complete: the numbers of dots are $2$, ____, ____, ____ (1)

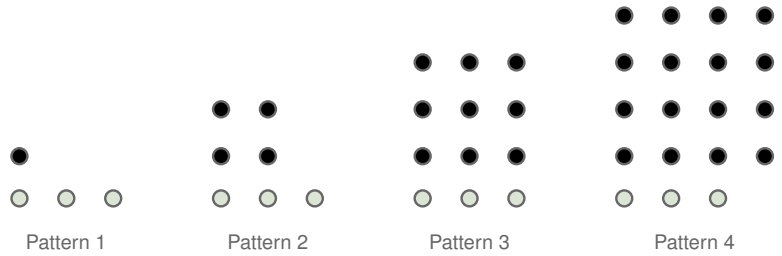
(b) Write down the $n$th term (1)

(c) **Explain, with reference to the patterns, why the rule works.** (2)

(d) How many dots are in pattern $10$? (1)

**(5 marks)**

**3** Each pattern is a square of dots with three extra dots underneath it.




(a) Write down the numbers of dots in the four patterns (1)

(b) Write down the $n$th term (1)

(c) **Explain why.** (2)

(d) Which pattern has $103$ dots? (2)

**(6 marks)**

**4** Rashid says the $n$th term of $2,\ 8,\ 18,\ 32$ is $n^2 + 1$, because the first term is one more than $1$.

(a) Show that Rashid is wrong (2)

(b) **Is the sequence quadratic? Give a reason.** (2)

(c) **Explain why its rule is not of the form $n^2 \pm a$.** (2)

**(6 marks)**