Growing visual patterns

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. For the square train, find stage 4. [2 marks]



Stage 1 Stage 2 Stage 3

Stage 3 has 10; add 3.

Answer: 13 matchsticks.

2. For the square train, find stage 10. [2 marks]



Stage 1 Stage 2 Stage 3

$3 \times 10 + 1 = 31$.

Answer: 31 matchsticks.

3. A pattern follows $5n+2$. Find stages 1 and 4. [2 marks]

$5\times1+2=7$.

$5\times4+2=22$.

Answer: 7 and 22.

4. Counts are 6,10,14,18 at stages 1,2,3,4 and keep rising by 4. Give a rule and stage 7. [3 marks]

$4n$ gives 4 at stage 1, so add 2.

$4\times7+2=30$.

Answer: $4n+2$; 30 pieces.

5. Which rule matches 3,5,7,9 at stages 1,2,3,4: $2n+1$ or $3n$? Explain. [2 marks]

At stage 2, $2n+1$ gives 5 but $3n$ gives 6.

Answer: $2n+1$.

6. Jai says the square train uses $4n$ sticks. Explain why this works at stage 1 but fails at stage 2. [3 marks]



Stage 1 Stage 2 Stage 3

Two separate squares need 8 sticks.

Joining them shares one stick, leaving 7.

Answer: Both give 4 at stage 1. Stage 2 uses 7, not 8, because one side is shared.