

Name \_\_\_\_\_

Date \_\_\_\_\_

## Stage 7 End-of-unit test 9 — mark scheme

21 questions · 41 marks · calculators are not allowed · allow about 45 minutes

- 1 The sequence is 4, 9, 14, 19, ... What is the next term? [1]

**Answer: 24**The rule is add 5:  $19 + 5 = 24$ .

- 2 The sequence is 40, 34, 28, 22, ... What is the next term? [1]

**Answer: 16**The rule is subtract 6:  $22 - 6 = 16$ .

- 3 The sequence is 3, 8, 13, 18, ... What is the term-to-term rule? Give the number added each time. [2]

**Answer: 5** $8 - 3 = 5$ , and the gap is the same every time.

- 4 A sequence starts at 6 and the rule is “add 7”. What is the 10th term? [3]

**Answer: 69**Nine steps, not ten:  $6 + 9 \times 7 = 69$ .

- 5 How can you tell a sequence is linear? [2]

- ☐ It starts at 1
- ☐ The gap between terms is always the same
- ☐ It grows quickly
- ☐ The terms are whole numbers

**Answer: The gap between terms is always the same**

A constant difference is what linear means.

- 6 The  $n$ th term is  $4n + 3$ . What is the 1st term? [1]

**Answer: 7** $4(1) + 3 = 7$ .

- 7 The  $n$ th term is  $4n + 3$ . What is the 20th term? [2]

**Answer: 83** $4(20) + 3 = 83$ .

- 8 Find the  $n$ th term of 5, 8, 11, 14, ... [3]

**Answer:  $3n + 2$** The difference is 3, so the rule starts  $3n$ .  $3n$  gives 3, 6, 9 — always 2 less than the sequence, so the rule is  $3n + 2$ .

- 9 In the rule  $5n - 2$ , what does the 5 tell you? [2]

- ☐ The first term
- ☐ The common difference
- ☐ The number of terms
- ☐ The last term

**Answer: The common difference**

The coefficient of  $n$ .

- 10 The  $n$ th term is  $6n - 4$ . Which position gives the term 50? [2]

**Answer: 9**

$6n = 54$ , so  $n = 9$ .

- 11 Is 100 a term of the sequence with  $n$ th term  $4n + 2$ ? [2]

- ☐ Yes
- ☐ No

**Answer: No**

$4n + 2 = 100$  gives  $n = 24.5$ , which is not a whole position.

- 12 A function machine does " $\times 3$ ". What comes out when 7 goes in? [1]

**Answer: 21**

$7 \times 3 = 21$ .

- 13 A machine does " $\times 3$  then  $+ 4$ ". What comes out when 5 goes in? [2]

**Answer: 19**

$5 \times 3 = 15$ , then  $15 + 4 = 19$ .

- 14 A machine does " $\times 3$  then  $+ 4$ ". The output is 25. What was the input? [3]

**Answer: 7**

Undo in reverse:  $25 - 4 = 21$ , then  $21 \div 3 = 7$ .

- 15 In a two-step machine, in what order do you undo the steps? [2]

- ☐ The same order
- ☐ The reverse order
- ☐ Either order
- ☐ Only the first

**Answer: The reverse order**

Last on, first off.

- 16 A machine does " $+ 1$  then  $\times 2$ ". Written as a function that is ... [2]

- ☐  $y = 2x + 1$
- ☐  $y = 2(x + 1)$
- ☐  $y = x + 2$
- ☐  $y = 2x$

**Answer:  $y = 2(x + 1)$**

The bracket forces the addition first.

- 17 For  $y = 4x - 5$ , what is  $y$  when  $x = 6$ ? [1]

**Answer: 19**

$24 - 5 = 19$ .

- 18 For  $y = 4x - 5$ , what is  $x$  when  $y = 23$ ? [2]

**Answer: 7**

$4x = 28$ , so  $x = 7$ .

- 19** A taxi costs  $2n + 3$  dollars for  $n$  km. What does 12 km cost, in dollars? [2]

**Answer: 27**

$$2(12) + 3 = 27.$$

- 20** A pattern uses  $3n + 1$  sticks for  $n$  squares. How many squares can be made with 34 sticks? [3]

**Answer: 11**

$$3n + 1 = 34, \text{ so } 3n = 33 \text{ and } n = 11.$$

- 21** A plant is 8 cm tall and grows 3 cm a week. How tall after 5 weeks, in cm? [2]

**Answer: 23**

$$8 + 5 \times 3 = 23 \text{ cm.}$$

**Total: 41 marks**