Number Patterns and Sequences-Answers

Key Stage 3: 2003 Paper 1 Level 3-5

1.

Tier & Question					Chains	
3-5	4-6	5-7	6-8			
7	1				Correct response	Additional guidance
a	a			1m	Gives both correct values correctly positioned, ie 20 and 320	
b	b			1m	Gives both correct values correctly positioned, ie 5 and $2\frac{1}{2}$ or equivalent	✓ *For* $2\frac{1}{2}$, $\frac{5}{2}$

Key Stage 3: 2003 Paper 1 Level 4-6

2.

Tier & Question					Chains	
3-5	4-6	5-7	6-8			
7	1				Correct response	Additional guidance
a	a			1m	Gives both correct values correctly positioned, ie 20 and 320	
b	b			1m	Gives both correct values correctly positioned, ie 5 and $2\frac{1}{2}$ or equivalent	✓ *For* $2\frac{1}{2}$, $\frac{5}{2}$

Key Stage 3: 2005 Paper 2 Level 3-5

3.

Tier & Question				Shapes on a grid		
3-5	4-6	5-7	6-8			
10	3				Correct response	Additional guidance
a	a			1m	20	
b	b			1m	60	! *Follow through* Accept follow through as their (a) × 3, provided their (a) was not 5
c	c			1m U1	4	! *Operation repeated* eg • × 4 Condone × *More than one number given* eg • 2 × 2

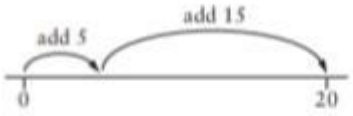
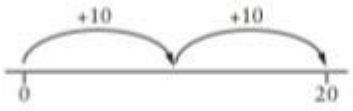
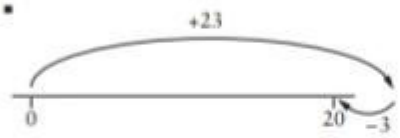
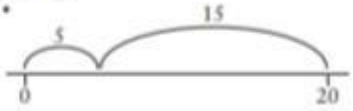
Key Stage 3: 2005 Paper 2 Level 4-6

4.

Tier & Question				Shapes on a grid		
3-5	4-6	5-7	6-8			
10	3				Correct response	Additional guidance
a	a			1m	20	
b	b			1m	60	! *Follow through* Accept follow through as their (a) × 3, provided their (a) was not 5
c	c			1m U1	4	! *Operation repeated* eg • × 4 Condone × *More than one number given* eg • 2 × 2

Key Stage 3: 2006 Paper 1 Level 3-5

5.

Tier & Question					Step sizes	
3-5	4-6	5-7	6-8			
2					**Correct response**	**Additional guidance**
a				1m	Shows a correct way, other than add 8 then add 12, using exactly two steps eg •  •  • 	✓ *Add 12 then add 8* ✓ *Fractions, decimals or negatives* ! *Operations omitted* Condone, provided the directions of any arrows, if shown, are correct eg, accept •  ! *Arrows not shown or not consistent with their numbers* Condone, provided the directions of any arrows, if shown, are correct eg, accept • 
b				1m	5	! *Answer shown only on the diagram* eg •  Accept provided there is no ambiguity
c				1m	6	
				1m	$2\frac{1}{2}$ or equivalent	
				1m	8	× *Answer of −8*

6.

Tier & Question				Hexagon patterns		
3-5	4-6	5-7	6-8			
19	13	7			Correct response	Additional guidance
				2m	61	✗ *For 2m or 1m, incorrect notation* eg, for 2m • 61*n*
				or 1m	Shows the value 21 or 40, with no evidence of an incorrect method or a method using counting on for the value or Shows a correct method for both types of tile with not more than one computational error eg ▪ 20 + 1, 20 × 2 ▪ 20 × 3 + 1 or Shows a correct expression for the total number of hexagons, in which the terms in *n* have been collected together eg ▪ 3*n* + 1 ▪ *n* × 3 + 1	✗ *For 1m, method shown uses counting on*

Key Stage 3: 2006 Paper 2 Level 3-5

7.

Tier & Question					Using rules	
3-5	4-6	5-7	6-8			
9	2				Correct response	Additional guidance
a	a			1m	20, 28	
				1m	36, 108	
				1m	14, $14\frac{1}{2}$ or equivalent	! *First new term for each sequence correct, with second terms all incorrect or omitted* Mark as 0, 0, 1
b	b			1m	Indicates No and gives a correct explanation The most common correct explanations:	
					Show that the rule does not work for the third term eg ▪ It doesn't work for the second two numbers, 22 – 8 = 14 not 18 ▪ If it was subtract 8, the last number would be 14 ▪ It's 22 – 4 = 18, not 22 – 8 ▪ 22 – 18 = 4 not 8	✓ *Minimally acceptable explanation* eg • 22 – 8 = 14 • When you take away 8, it should be 14 • 18 should be 14 • The third number should be 14 • 22 – 8 ≠ 18 • It's 22 – 4 • 18 to 22 is 4 ✗ *Incomplete or incorrect explanation* eg • 18 is wrong • It should be 14 • It doesn't work for 22 and 18 • You subtract a different number the second time • 8 – 22 = 14 • 22 – 8 = 15
					State what the correct rule could be eg ▪ It should be divide by 2, then add 7 ▪ The rule is add 14 then halve it ▪ You take away half as much each time	✓ *Minimally acceptable explanation* eg • ÷ 2 + 7 • It's take away 8, then take away 4 • –8 and –4 • You halve what you subtract ✗ *Incomplete or incorrect explanation* eg • You subtract a different number each time • You subtract 4 • The rule is subtract 4 • Take away half
				U1		

Key Stage 3: 2006 Paper 1 Level 4-6

8.

Tier & Question				Hexagon patterns		
3-5	4-6	5-7	6-8			
19	13	7			Correct response	Additional guidance
				2m	61	✖ *For 2m or 1m, incorrect notation* eg, for 2m • 61*n*
				or 1m	Shows the value 21 or 40, with no evidence of an incorrect method or a method using counting on for the value or Shows a correct method for both types of tile with not more than one computational error eg ▪ 20 + 1, 20 × 2 ▪ 20 × 3 + 1 or Shows a correct expression for the total number of hexagons, in which the terms in *n* have been collected together eg ▪ 3*n* + 1 ▪ *n* × 3 + 1	✖ *For 1m, method shown uses counting on*

Key Stage 3: 2006 Paper 2 Level 4-6

9.

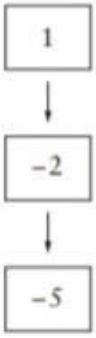
Tier & Question					Using rules	
3-5	4-6	5-7	6-8			
9	2				Correct response	Additional guidance
a	a			1m	20, 28	
				1m	36, 108	
				1m	14, $14\frac{1}{2}$ or equivalent	! *First new term for each sequence correct, with second terms all incorrect or omitted* Mark as 0, 0, 1
b	b			1m	Indicates No and gives a correct explanation The most common correct explanations:	
					Show that the rule does not work for the third term eg ▪ It doesn't work for the second two numbers, 22 – 8 = 14 not 18 ▪ If it was subtract 8, the last number would be 14 ▪ It's 22 – 4 = 18, not 22 – 8 ▪ 22 – 18 = 4 not 8	✓ *Minimally acceptable explanation* eg • 22 – 8 = 14 • When you take away 8, it should be 14 • 18 should be 14 • The third number should be 14 • 22 – 8 ≠ 18 • It's 22 – 4 • 18 to 22 is 4 × *Incomplete or incorrect explanation* eg • 18 is wrong • It should be 14 • It doesn't work for 22 and 18 • You subtract a different number the second time • 8 – 22 = 14 • 22 – 8 = 15
					State what the correct rule could be eg ▪ It should be divide by 2, then add 7 ▪ The rule is add 14 then halve it ▪ You take away half as much each time	✓ *Minimally acceptable explanation* eg • ÷ 2 + 7 • It's take away 8, then take away 4 • –8 and –4 • You halve what you subtract × *Incomplete or incorrect explanation* eg • You subtract a different number each time • You subtract 4 • The rule is subtract 4 • Take away half
				(U1)		

10.

Tier & Question						
3-5	4-6	5-7	6-8			***n*th term**
	19	**11**	**4**		**Correct response**	**Additional guidance**
	a	a	a	**1m**	Gives a correct expression eg ▪ $4n + 2$ ▪ $4n + 1 + 1$	! ***Unsimplified expression or unconventional notation*** eg, for part (a) • $4 \times n + 2$ • $n4 + 2$ Condone
	b	b	b	**1m**	Gives a correct expression eg ▪ $3n + 3$ ▪ $3(n + 1)$ ▪ $\frac{1}{2}(6n + 6)$ ▪ $(6n + 6) \div 2$ ▪ $\frac{6n}{2} + \frac{6}{2}$	× ***Necessary brackets omitted*** eg, for part (b) • $6n + 6 \div 2$ eg, for part (c) • $2 \times 5n - 3$
	c	c	c	**1m**	Gives a correct expression eg ▪ $10n - 6$ ▪ $2(5n - 3)$ ▪ $(5n - 3) \times 2$	

Key Stage 3: 2007 Paper 1 Level 3-5

11.

Tier & Question				Number line		
3-5	4-6	5-7	6-8			
2					Correct response	Additional guidance
				2m	Gives all three correct values in the correct positions, ie  	
				or		
				1m	Gives at least two correct values in the correct positions	! ***For 1m, follow through*** Accept as their previous incorrect value − 3, provided their previous incorrect value < 3 eg, for 1m accept • 1 −3 *(error)* −6 • 2 *(error)* −1 −4

Key Stage 3: 2007 Paper 2 Level 3-5

12.

Tier & Question				Rules		
3-5	4-6	5-7	6-8			
1					Correct response	Additional guidance
				1m	11, 14	
				1m	23, 47	
				1m	41, 122	! ***First new term for each sequence correct with second terms all incorrect or omitted*** Mark as 0, 0, 1

Key Stage 3: 2008 Paper 2 Level 4-6

13.

Tier & Question				Triangular numbers		
3-5	4-6	5-7	6-8			
	28	19	9		Correct response	Additional guidance
	a	a	a	1m	55	
	b	b	b	1m	5050	

Key Stage 3: 2009 Paper 1 Level 3-5

14.

Tier & Question				Number chains		
3-5	4-6	5-7	6-8			
16	9			Mark	Correct response	Additional guidance
a	a			1m	Gives the values 14 and 41 in the correct positions	
b	b			1m	Shows a correct rule eg • × 3 • Multiply by 3 • Triple • × 3 then + 0	✓ ***Minimally acceptable rule*** eg • Add the number 3 times • Add on double itself • Double then add the number • It's the next power of 3 • 3× ! ***Rule embedded or shown in working*** Accept provided a correct rule is shown explicitly, even if an incorrect value for the next number in the chain is shown on the answer line eg, accept • 81 × 3 seen • (4 – 1) × 81 eg, do not accept • 81 + 81 + 81 • 81 × 2 + 81 × ***Incomplete or incorrect rule*** eg • 3 • +54 • 3*n*

Key Stage 3: 2009 Paper 2 Level 3-5

15.

Tier & Question 3–5	4–6	5–7	6–8	Mark	Correct response	Count on Additional guidance
15	6					
a	a			1m	27	
b	b			2m or 1m U1	1 Shows or implies that the size of two steps is 4 eg •  • –3 + 4 or Shows or implies that the size of one step is 2 eg • The gaps are 2 • –3 + 2 • Second number is –1 • Fourth number is 3 • –3 to 5 is 8, 8 ÷ 4	× ***Shows steps of unequal size***

Key Stage 3: 2009 Paper 1 Level 4-6

16.

Tier & Question 3–5	4–6	5–7	6–8	Mark	Correct response	Number chains Additional guidance
16	9					
a	a			1m	Gives the values 14 and 41 in the correct positions	
b	b			1m	Shows a correct rule eg • × 3 • Multiply by 3 • Triple • × 3 then + 0	✓ ***Minimally acceptable rule*** eg • Add the number 3 times • Add on double itself • Double then add the number • It's the next power of 3 • 3× ! ***Rule embedded or shown in working*** Accept provided a correct rule is shown explicitly, even if an incorrect value for the next number in the chain is shown on the answer line eg, accept • 81 × 3 seen • (4 – 1) × 81 eg, do not accept • 81 + 81 + 81 • 81 × 2 + 81 × ***Incomplete or incorrect rule*** eg • 3 • +54 • 3*n*

Key Stage 3: 2009 Paper 2 Level 4-6

17.

Tier & Question				Count on		
3–5	4–6	5–7	6–8			
15	6			Mark	Correct response	Additional guidance
a	a			1m	27	
b	b			2m or 1m	1 Shows or implies that the size of two steps is 4 eg •  • –3 + 4 or Shows or implies that the size of one step is 2 eg • The gaps are 2 • –3 + 2 • Second number is –1 • Fourth number is 3 • –3 to 5 is 8, 8 ÷ 4	× *Shows steps of unequal size*
				U1		

Key Stage 3: 2010 Paper 2 Level 3-5

18.

Tier & Question				Tile patterns		
3–5	4–6	5–7	6–8			
21	11	3		Mark	Correct response	Additional guidance
a	a	a		1m	$2n + 2$	! *Throughout the question, unsimplified expression, or expression with unnecessary addition, subtraction, multiplication or division symbols, or other unconventional notation* eg, for part (a) • $2 \times n + 2$ • $n2 + 2$ eg, for part (b) • $1n + 1$ • $(2n + 2) \div 2$ Condone
b	b	b		1m	$n + 1$	! *Follow-through as their (a) ÷ 2* Provided that their (a) is an algebraic expression with two terms

Key Stage 3: 2010 Paper 1 Level 4-6

19.

Tier & Question						
3–5	4–6	5–7	6–8			**Terms**
	21	**12**	**3**	**Mark**	**Correct response**	**Additional guidance**
				2m	Gives the values –40 and –130 in either order	
				or		
				1m	Shows the value –40 or –130 with the other value incorrect or omitted or Shows the value 360	! ***For 1m, follow-through from an incorrect value*** Accept provided both values are negative and their difference is 90

Key Stage 3: 2010 Paper 2 Level 4-6

20.

Tier & Question						
3–5	4–6	5–7	6–8			**Tile patterns**
21	**11**	**3**		**Mark**	**Correct response**	**Additional guidance**
a	a	a		**1m**	$2n + 2$	! ***Throughout the question, unsimplified expression, or expression with unnecessary addition, subtraction, multiplication or division symbols, or other unconventional notation*** eg, for part (a) • $2 \times n + 2$ • $n2 + 2$ eg, for part (b) • $1n + 1$ • $(2n + 2) + 2$ Condone
b	b	b		**1m**	$n + 1$	! ***Follow-through as their (a) + 2*** Provided that their (a) is an algebraic expression with two terms

Key Stage 3: 2011 Paper 1 Level 4-6

21.

Tier & Question					**Number lines**
4–6	5–7				
8		**Mark**	**Correct response**	**Additional guidance**	
		1m	Indicates the correct number eg • 2 • 2.0		
		1m	Indicates the correct number eg • 0.65 • 0.650 • $\frac{65}{100}$		