Y9 Unit 10 MARKSCHEME (total 30)

1 **a** False – find a counter example e.g. 4 > 3 but −4 is not bigger than −3 **1 mark**

b False – find a counter example e.g. draw a rhombus showing 2 lines of symmetry **1 mark**

2 $2n$ is always even as 2 × any INTEGER is always even **1 mark**

and $2n$ (even) + 10 (even) is always even. **1 mark**

3 **a** Yes, 5 × any number is in the 5 times table and is always a multiple of 5 because 5 will divide into it exactly. E.g. if x = 4, $5x$ = 20 and 20 is a multiple of 5 because 20 ÷ 5 = 4, where we started. **1 mark**

b No, use a counter example: if x = 3, $5x$ = 15 which is not a multiple of 10

OR if x is even, $5x$ is a multiple of 10 but if x is odd the $5x$ ends in 5 and is not a multiple of 10.

1 mark

4

	Example 1	**Example 2**	**Algebra**
Think of a number	e.g. 2	e.g. 23	n
Multiply it by 2	4	46	$2n$
Add 9	13	55	$2n + 9$
Add your original number	15	78	$3n + 9$
Divide by 3	5	26	$n + 3$
Add 4	9	30	$n + 7$
Subtract your original number	7	7	7
What is your result?	**7**	**7**	**7**
	1 mark	**1 mark**	**2 marks** (minus 1 for each error)

5 **a** $5x = 5(x - 1) + 4$

$5x = 5x - 5 + 4$ **1 mark**

$5x = 5x - 1 \rightarrow$ NEVER TRUE **1 mark**

b $(x + 2)^2 = x^2 + 4x + 4$

LHS $= (x + 2)(x + 2)$

$= x^2 + 2x + 2x + 4$ **1 mark**

$= x^2 + 4x + 4$

$=$ RHS $\rightarrow$ ALWAYS TRUE **1 mark**

c $6x = 5x + 1$

subtract $5x$… $x = 1$ **1 mark**

SOMETIMES TRUE **1 mark**

6 In triangle ABC and in triangle CDE:

angle BAC = 40° and angle CDE = 40° (alternate angles on parallel lines) **1 mark**

angle ABC = 60° and angle CED = 60° (alternate angles on parallel lines) **1 mark**

angle ACB = 80° and angle DCE = 80° (angles in a triangle add up to 180°) **1 mark**

So the triangles have 3 equal angles

$\therefore$ triangle ABC is similar to triangle CDE **1 mark**

7 a Either $2k - 1$ **or** $2k + 3$ **1 mark**

b	**For** $2k - 1$:	**Or for** $2k + 3$:	
	Sum $= 2k - 1 + 2k + 1$	Sum $= 2k + 3 + 2k + 1$	**1 mark**
	$= 4k$	$= 4k + 4$	**1 mark**
	$= 4 \times k$	$= 4 \times (k + 1)$	
	This is always a multiple of 4	This is always a multiple of 4	**1 mark**

c	**For** $2k - 1$:	**Or for** $2k + 3$:	
	Product $= (2k - 1)(2k + 1)$	Product $= (2k + 3)(2k + 1)$	**1 mark**
	$= 4k^2 - 1$	$= 4k^2 + 8k + 3$	**1 mark**
		$= 4 \times (k^2 + 2k) + 3$	
	= multiple of 4 minus 1	= multiple of 4 add 3	
	Which is 1 less than a multiple of 4	Which is 1 less than a multiple of 4	**1 mark**

8

Working	Answer	Mark	Notes
$4n^2 + 12n + 3^2 - (4n^2 - 12n + 3^2)$ $= 4n^2 + 12n + 9 - 4n^2 + 12n - 9$ $= 24n$ $= 8 \times 3n$	Proof	3	M1 for 3 out of 4 terms correct in expansion of either $(2n + 3)^2$ or $(2n - 3)^2$ **or** $((2n + 3) - (2n - 3))((2n + 3) + (2n - 3))$ A1 for $24n$ from correct expansion of both brackets A1 (dep on A1) for $24n$ is a multiple of 8 or $24n = 8 \times 3n$ or $24n \div 8 = 3n$