39) $\overset{+2}{2}, \overset{+2}{4}, \overset{+4}{6}, \overset{+6}{10}, \overset{+10}{16}, \overset{+16}{26}, 42$

The value at which it increases by is found by adding the previous two differences.

$42 + (10 + 16) = 68$
$68 + (16 + 26) = 110$

40) $-9, -8, -4, 5, 21, 46$ (+1, +4, +9, +16, +25)

The value at which they are increasing are all perfect squares whose square roots are increasing by 1 each time.

$46 + 6^2 = 82$
$82 + 7^2 = 131$

41) 4, 9, 25, 49, 121

↓ ↓ ↓ ↓ ↓ square roots

2, 3, 5, 7, 11

These are all prime numbers.

$13^2 = 169$
$17^2 = 289$

42) 6, 15, 35, 77, 143, 221

↓ ↓ ↓ ↓ ↓ ↓ prime factoring

$2 \cdot 3, 3 \cdot 5, 5 \cdot 7, 7 \cdot 11, 11 \cdot 13, 13 \cdot 17$

They are all products of consecutive prime numbers

$17 \cdot 19 = 323$
$19 \cdot 23 = 437$

43) 4, 9, 61, 52, 63, 94, 46

↓ ↓ ↓ ↓ ↓ ↓ ↓ write it backwards

4, 9, 16, 25, 36, 49, 64

They are all perfect squares

$9^2 = 81$

$81 \rightarrow 18$

44)

# of lines	max # of sections	
0	1	
		+1
1	2	
		+2
2	4	
		+3
3	7	

$4 \Longrightarrow 7+4 = 11$

$5 \Longrightarrow 11+5 = 16$

∴ 5 lines can divide a circle into a max of 16 sections

45) $1X = 9$

Stage	Cubes		
1	1		
		+3	
2	4		+3
		+6	
3	10		+4
		+10	
4	20		+5
		15	
5	35		

∴ stage 9 = $(((35+(15+6))+(15+6+7))+(15+6+7+8))+(15+6+7+8+9) = 165$ cubes

46) $3 \times 9 \times 8 = 216$ ∴ the ones digit is 6