1

[2007]

Here is part of a number sequence.

The numbers increase by the same amount each time.

+5

| 750 | 755 | 760 | 765 | 770 |
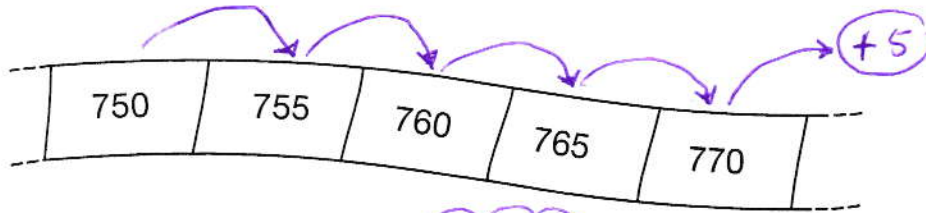
THEY ARE ALL THE MULTIPLES of 5

The sequence continues.

Circle **all** of the numbers below that would appear in the sequence.

(840) (905) 989 (1000) 2051

[1 mark]

2

[2011]

Here is part of a number sequence.

The numbers in the sequence increase by 25 each time. *MULTIPLES OF 25*

50   75   100   125   …

Circle **all** of the numbers below that will appear in the sequence.
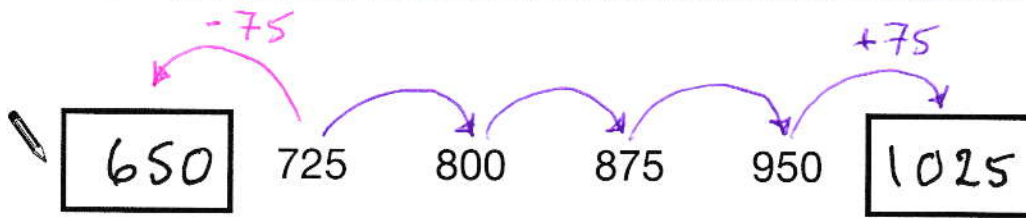
255   (650)   735   (900)   995

[1 mark]

3

[2008]

The numbers in this sequence increase by 75 each time.
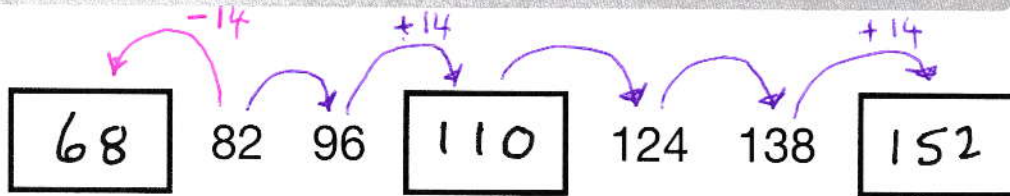
Write in the two missing numbers.

-75 $+75$

| 650 | 725 | 800 | 875 | 950 | 1025 |

[2 marks]

4

[2016]

The numbers in this sequence increase by 14 each time.

Write the missing numbers.

-14 $+14$ $+14$

| 68 | 82 | 96 | 110 | 124 | 138 | 152 |

[2 marks]

5

[2015]

The numbers in this sequence increase by 30 each time.

$+30$ $+30$ $+30$ ETC

20   50   80   110 ..
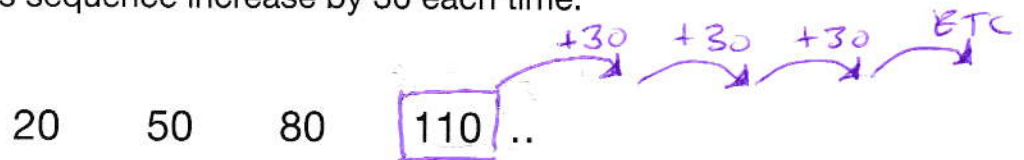
The sequence continues in the same way.

Which number in the sequence will be **closest to 300**?

Show your method

$+90$ $+90$ $+30$

110   200   290   320

I ADDED 90
TO START AS
THIS WAS QUICKER THAN
$+30 +30 +30$!

↑
CLOSEST
TO 300

290

[2 marks]

6
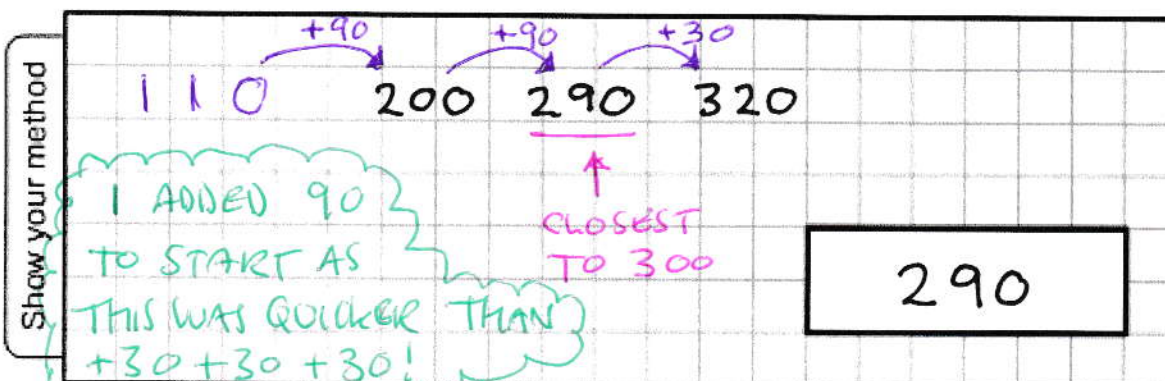
[2011]

The numbers in this sequence increase by 3 each time.

3   6   9   12   ...   *MULTIPLES of 3!*

The numbers in this sequence increase by 5 each time.

5   10   15   20   ...

MULTIPLES OF 5!

Both sequences continue.

Write a number **greater than 100** which will be in **both** sequences.

Show your method

MULTIPLES OF 3 MORE THAN 100:-
102, 105, 108, ...

MULTIPLES OF 5 MORE THAN 100:-
105, 110, 115, ...

105

OR 120, 135, 150, ...

[2 marks]

7

[2006]

The numbers in this sequence increase by the same amount each time.

Write in the missing numbers.

| 1 | 5 | 9 | 13 |

+4   +4   +4

THREE INCREASES ADD ON 12
SO EACH INCREASE ADDS $\frac{12}{3} = 4$

[1 mark]

The numbers in this sequence increase by 10 each time.

3   13   23   ...

ALL THE NUMBERS END IN '3'

The sequence continues in the same way.

33, 43, 53, 63, ETC..

Write **two** numbers from the sequence that add to make a total of **96**

✎ **43** and **53**

[ALSO   33 + 63
23 + 73
13 + 83
3 + 93]

Explain why it is **not** possible to find **three** numbers from the sequence that add to make a total of **96**

EACH NUMBER FROM THE SEQUENCE ENDS IN '3', SO IF YOU ADDED THREE OF THE NUMBERS TOGETHER THE RESULT MUST END IN '9'.

[2 marks]

The numbers in this sequence increase by the same amount each time.

Write the two missing numbers.

-40   *+ 40*   *+ 40*   *+ 40*

✎ **570**   610   650   690   **730**

[2 marks]

The rule for this sequence of numbers is **'add 3 each time'**.

$$1 \quad 4 \quad 7 \quad 10 \quad 13 \quad 16 \ldots$$

The sequence continues in the same way.

Mary says,

> 'No matter how far you go there will never be a
> multiple of 3 in the sequence'.

Is she correct?
Circle Yes or No.

Yes / No

Explain how you know.

EACH NUMBER IS ONE MORE THAN A MULTIPLE OF THREE AND IF YOU KEEP ADDING 3 ALL THE NEW NUMBERS WILL ALSO BE ONE MORE THAN A MULTIPLE OF 3.

[1 mark]

Liam makes a sequence of numbers starting with 300

He subtracts 125 each time.

Write the next two numbers in Liam's sequence.

300   175   50   -75   -200

[2 marks]

12

[2002]

A sequence starts at **500** and **80** is **subtracted** each time.

500   420   340 ...   _-80_ _-80_ 260, 180, 100, 20, -60, ...

The sequence continues in the same way.

Write the **first two numbers** in the sequence which are **less than zero**.

-60

-140

[2 marks]

13

[2000]

This sequence of numbers **goes up by 40** each time.

40   80   120   160   200   ...   _+40_   MULTIPLES OF 40

This sequence continues.

Will the number **2140** be in the sequence? Circle Yes or No.   Yes / No

Explain how you know.
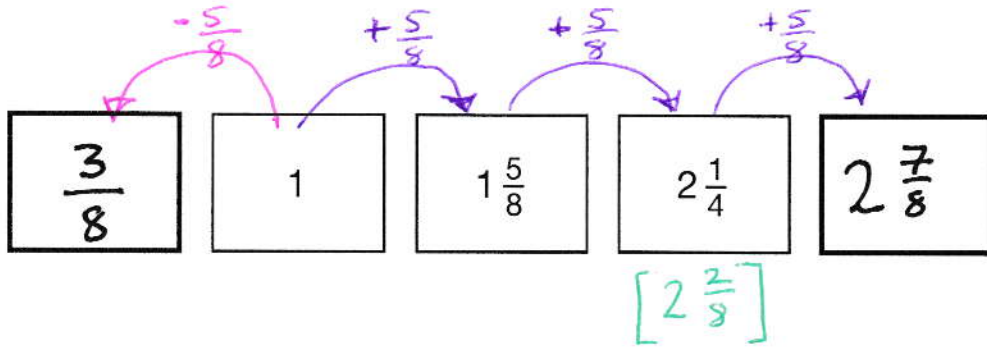
53 REM 20
40) 2140

2140 IS NOT A MULTIPLE OF 40

[1 mark]

14 The numbers in this sequence increase by the same amount each time.

[2017]

Write the missing numbers.

$$-\frac{5}{8} \qquad +\frac{5}{8} \qquad +\frac{5}{8} \qquad +\frac{5}{8}$$

| $\frac{3}{8}$ | 1 | $1\frac{5}{8}$ | $2\frac{1}{4}$ | $2\frac{7}{8}$ |

$\left[2\frac{2}{8} \right]$

[2 marks]

---

15 The numbers in this sequence increase by 7 each time.

[2008]

$$1 \qquad 8 \qquad 15 \qquad 22 \qquad 29 \qquad ....$$

The sequence continues in the same way.

Will the number 777 be in the sequence?
Circle **Yes** or **No**.

Yes / (No)

Explain how you know.

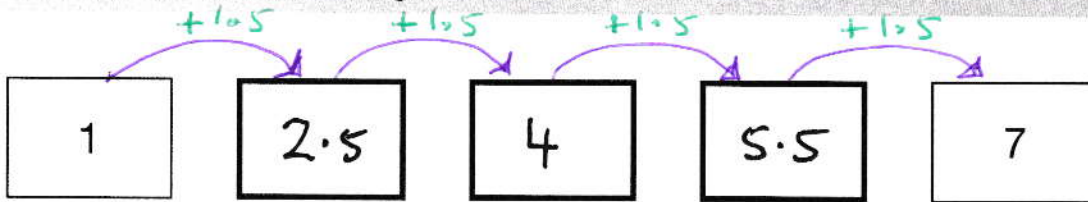> BECAUSE EACH NUMBER IN THE
> SEQUENCE IS ONE MORE THAN
> A MULTIPLE OF 7 AND 777 IS
> A MULTIPLE OF 7.

[1 mark]

16

[2015]

The numbers in this sequence increase by equal amounts each time.
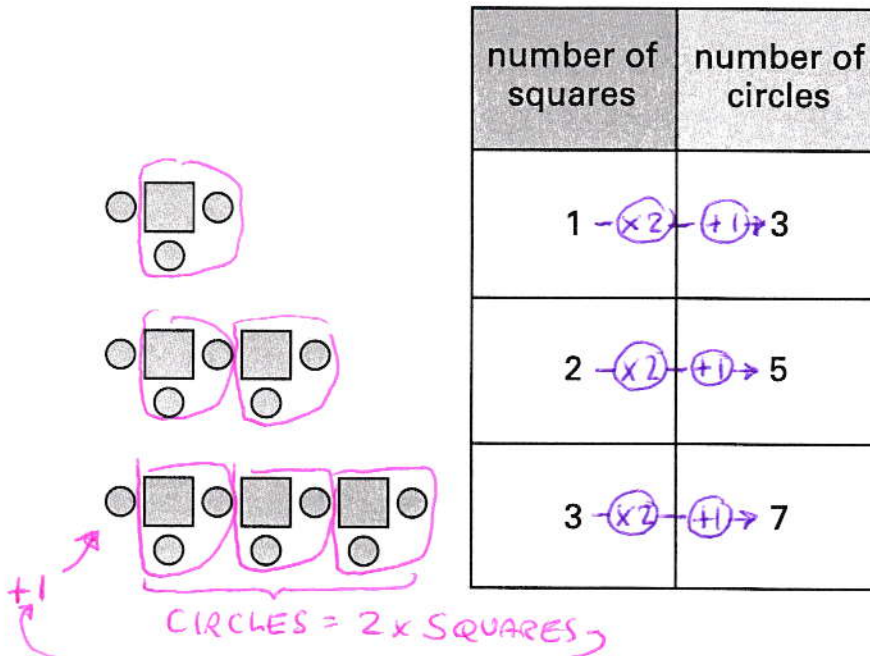
Write in the three missing numbers.

+1·5   +1·5   +1·5   +1·5

| 1 | 2·5 | 4 | 5·5 | 7 |

FOUR STEPS INCREASE SEQUENCE BY 6
SO EACH STEP IS $\frac{6}{4}$ = 1·5

[1 mark]

17

[2001]

Here is a sequence of patterns made from squares and circles.

number of squares	number of circles
1 —(×2)—(+1)→ 3	
2 —(×2)—(+1)→ 5	
3 —(×2)—(+1)→ 7	

+1

CIRCLES = 2 × SQUARES

The sequence continues in the same way.

Calculate how many **squares** there will be in the pattern which has **25 circles**.

Show your method

FORWARDS RULE

→(×2)→(+1)→ CIRCLES

SO BACKWARDS RULE IS

→(−1)→(÷2)→ SQUARES

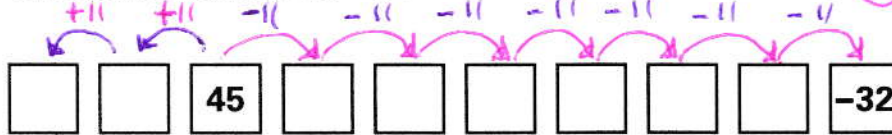12

$25 →(−1)→(÷2)→ 12$
24

[2 marks]

18

[2002]

Paulo makes a sequence of numbers.

He chooses a starting number and then subtracts equal amounts each time.

The **third number** in his sequence is **45**

The **tenth number** is **–32**

$$+11 \quad +11 \quad -11 \quad -11 \quad -11 \quad -11 \quad -11 \quad -11 \quad -11$$

| | | 45 | | | | | | | –32 |

What is the first number in the sequence?

Show your method

$$\begin{array}{r} 4\,5 \\ +\,1\,1 \\ \hline 5\,6 \end{array} \qquad \begin{array}{r} 5\,6 \\ +\,1\,1 \\ \hline 6\,7 \end{array}$$

67

[2 marks]

19

[2000]

Look at the sequence below.

To get the next term in the sequence, **subtract 90** from the term before.

$$\xrightarrow{-90} \quad \xrightarrow{-90} \quad \xrightarrow{-90}$$

500   410   320   …

Write the first two terms of the sequence that are **less than zero.**
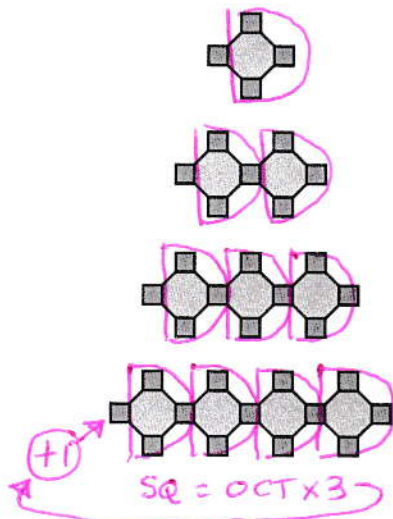
$$\begin{array}{r} 320 \\ -\,90 \\ \hline 230 \end{array} \quad \begin{array}{r} 230 \\ -\,90 \\ \hline 140 \end{array} \quad \begin{array}{r} 140 \\ -\,90 \\ \hline 50 \end{array} \quad \begin{array}{r} 50 \\ -\,90 \\ \hline -40 \end{array} \quad \begin{array}{r} -40 \\ -\,90 \\ \hline -130 \end{array}$$

–40 , –130

[2 marks]

Here is a sequence of patterns made from **octagons** and **squares**.

number of octagons (**n**)	number of squares (**q**)
1 —(×3)—(+1)→ 4	
2 —(×3)—(+1)→ 7	
3 —(×3)—(+1)→ 10	
4 —(×3)—(+1)→ 13	

(+1)
SQ = OCT ×3

The sequence continues.

How many **squares** will there be in the pattern that has **40 octagons**?

FORWARDS RULE

→(×3)→(+1)→ SQUARES

$40 \times 3 = 120$
$120 + 1 = 121$

121

q represents the number of squares.

n represents the number of octagons.

What is the rule connecting **q** and **n**?

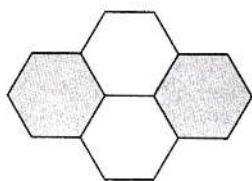...... SQUARES = 3 × OCTAGONS + 1 ...

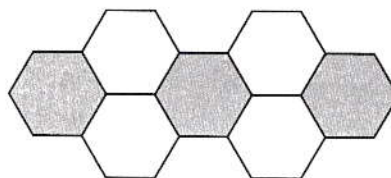...... ⟹ ... q = 3n + 1 ....

[3 marks]

21

[2000]
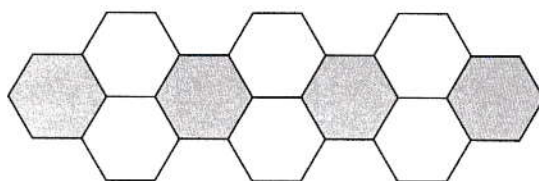
Look at this sequence of patterns made with hexagons.

pattern number **1**

pattern number **2**

pattern number **3**

To find the number of hexagons in pattern number n you can use these rules:

Number of **grey** hexagons	=	$n + 1$
Number of **white** hexagons	=	$2n$

Altogether, what is the total number of hexagons in **pattern number 20**?

Show your method

GREY = 20 + 1 = 21

WHITE = 2 × 20 = 40

TOTAL = 61

$\boxed{61}$

[2 marks]