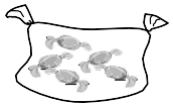
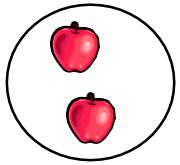
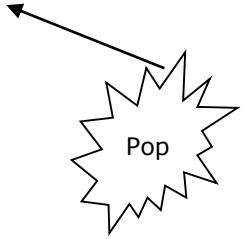
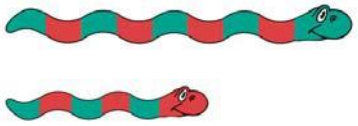
# Rothersthorpe CE Primary School – Calculation Policy - 2015

**EYFS**

| Addition | Subtraction | Multiplication | Division |
|---|---|---|---|
| **Counting on from a number to find the total**<br>I have 5 pennies in my tin. I put in one, two, three pence more. How many pennies are in the tin now?<br><br>Use moveable objects when finding totals. Touch and align each object as it is counted.<br><br>  <br><br>Count first group, start count from first group's total when counting second group<br><br> <br>3 4<br><br>  | **Subtraction as taking away**<br><br> <br><br> <br><br>There were 6 people on the bus. Four people got off. How many are left?<br><br> <br>4-1 =?<br><br>  <br><br><br>**Subtraction as finding the difference**<br><br>  <br><br>The difference in stripes is? | **Laying the foundations by maximising opportunities when counting**<br><br>Number rhymes such as 2,4,6,8<br><br>Ten fat sausages<br><br> <br><br>Counting in pairs<br><br>e.g. pairs of socks<br>pairs of animals<br>eggs in a box<br><br> <br><br>Hop along in twos on a large number track<br><br> | **Laying the foundations for grouping and sharing when counting**<br><br>Number rhymes such as 2,4,6,8<br><br>Ten fat sausages<br><br> <br><br>Counting in pairs<br><br>e.g. pairs of socks<br>pairs of animals<br>eggs in a box<br><br> <br><br>Hop along in twos on a large number track<br><br> <br><br>One for you, one for me<br><br>Two for you, two for me.<br><br>Count in ones **but every ther number is a whisper** |

# Rothersthorpe CE Primary School – Calculation Policy - 2015

## Year 1

### Addition

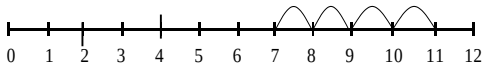
**+ = signs and missing numbers**

3 + 4 = □ □ = 3 + 4
3 + □ = 7 7 = □ + 4
□ + 4 = 7 7 = 3 + □
□ + ∇ = 7 7 = □ + ∇

Promoting covering up of operations and numbers.

**Number lines (numbered)**

7 + 4




Recording by - drawing jumps on prepared lines

○ constructing own lines

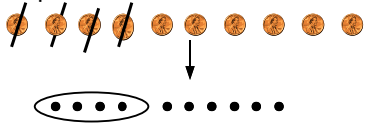
( Teacher model number lines with missing numbers)

*(Teachers model jottings appropriate for larger numbers)*

### Subtraction

**Pictures / marks**

Sam spent 4p. What was his change from 10p?

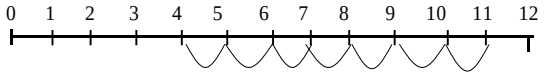


**- = signs and missing numbers**

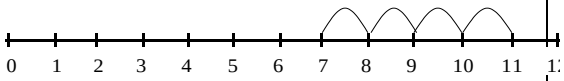
7 - 3 = □ □ = 7 - 3
7 - □ = 4 4 = □ - 3
□ - 3 = 4 4 = 7 - □
□ - ∇ = 4 4 = □ - ∇

**Number lines** (numbered)

11 – 7
(Counting back)




The difference between 7 and 11
(Counting up)



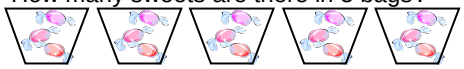

Recording by - drawing jumps on prepared lines
- constructing own lines

(Teachers model jottings appropriate for larger numbers)

### Multiplication

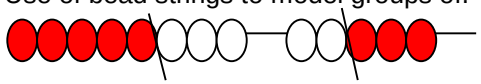
**Pictures and symbols**

There are 3 sweets in one bag.
How many sweets are there in 5 bags?



*(Recording on a number line modelled by the teacher when solving problems)*

Use of bead strings to model groups of.



### Division

**Pictures / marks**

12 children get into teams of 4 to play a game. How many teams are there?

# Rothersthorpe CE Primary School – Calculation Policy - 2015

## Year 2

### Addition

**+ = signs and missing numbers**

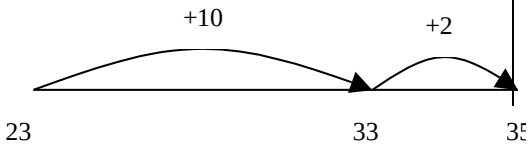
Continue using a range of equations as in Year 1 but with appropriate, larger numbers.
Extend to
14 + 5 = 10 + □
and adding three numbers
32 + □ + □ = 100  35 = 1 + □ + 5

**Partition into tens and ones and recombine**

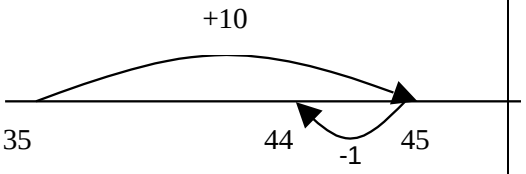
12 + 23 = 10 + 2 + 20 + 3
= 30 + 5
= 35

**refine to partitioning the second number only:**

23 + 12 = 23 + 10 + 2
= 33 + 2
= 35




Add 9 or 11 by adding 10 and adjusting by 1
35 + 9 = 44



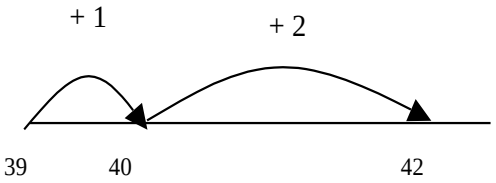

### Subtraction

**- = signs and missing numbers**

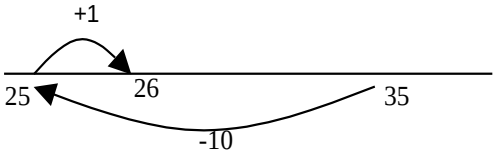
Continue using a range of equations as in Year 1 but with appropriate numbers.
Extend to 14 + 5 = 20 - □

**Find a small difference by counting up**

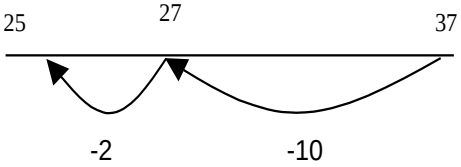
42 – 39 = 3




Subtract 9 or 11. Begin to add/subtract 19 or 21
35 – 9 = 26




**Use known number facts and place value to subtract** (partition second number only)
37 – 12 = 37 – 10 – 2
= 27 – 2
= 25

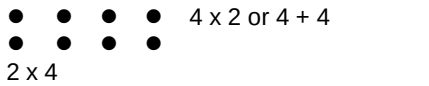



### Multiplication

**x = signs and missing numbers**

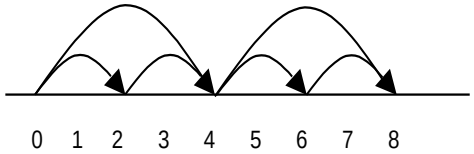
| | |
|---|---|
| 7 x 2 = □ | □ = 2 x 7 |
| 7 x □ = 14 | 14 = □ x 7 |
| □ x 2 = 14 | 14 = 2 x □ |
| □ x ∇ = 14 | 14 = □ x ∇ |

**Arrays and repeated addition**




or repeated addition

2 + 2 + 2 + 2

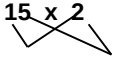



**Doubling multiples of 5 up to 50**

15 x 2 = 30

**Partition**

**15 x 2**



20 + 10 = 30

***OR***

| x | 10 | 5 |
|---|---|---|
| 2 | 20 | 10 |

### Division

**÷ = signs and missing numbers**

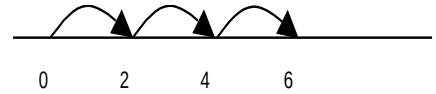
| | |
|---|---|
| 6 ÷ 2 = □ | □ = 6 ÷ 2 |
| 6 ÷ □ = 3 | 3 = 6 ÷ □ |
| □ ÷ 2 = 3 | 3 = □ ÷ 2 |
| □ ÷ ∇ = 3 | 3 = □ ÷ ∇ |

**Understand division as sharing and grouping**

Sharing – 6 sweets are shared between 2 people. How many do they have each?

6 ÷ 2 can be modelled as:

Grouping – There are 6 sweets. How many people can have 2 each? (How many 2's make 6?)



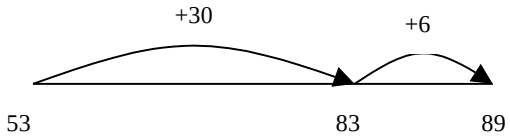
# Rothersthorpe CE Primary School – Calculation Policy - 2015

## Year 3

### Addition

**+ = signs and missing numbers**
Continue using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.

**Partition into tens and ones and recombine**
Partition both numbers and recombine. Refine to partitioning the second number only e.g.
36 + 53 = 53 + 30 + 6
= 83 + 6
= 89




**Add a near multiple of 10 to a two-digit number**
Continue as in Year 2 but with appropriate numbers
e.g. 35 + 19 is the same as 35 + 20 – 1.

**pencil and paper procedures**
83 + 42 = 125

| | G&T | |
|---|---|---|
| 80 + 3 | 83 | 83 |
| +40 + 2 | + 42 | + 42 |
| 120 + 5 =125 | 120 | 5 |
| | 5 | 120 |
| | 125 | 125 |

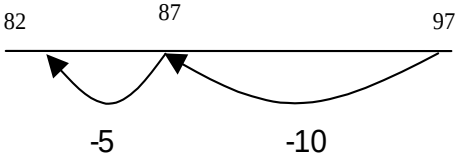
### Subtraction

- = signs and missing numbers
**Continue using a range of equations as in Year and 2 but with appropriate numbers.**

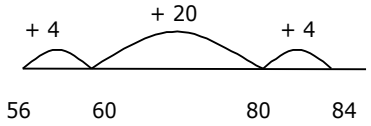
Find a small difference by counting up
**Continue as in Year 2 but with appropriate numbers e.g. 102 – 97 = 5**

Subtract mentally a 'near multiple of 10' to or from a two-digit number
**Continue as in Year 2 but with appropriate numbers e.g. 78 – 49 is the same as 78 – 50 + 1**

Use known number facts and place value to subtract
Continue as in Year 2 but with appropriate numbers e.g.
97 – 15 = 72



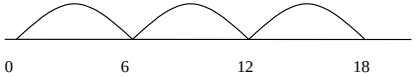

**Pencil and paper procedures**
Complementary addition
84 – 56 = 28




### Multiplication

**x = signs and missing numbers**
Continue using a range of equations as in Year 2 but with appropriate numbers.

Number lines
6 x 3




Arrays and repeated addition
Continue to understand multiplication as repeated addition and continue to use arrays (as in Year 2).

Doubling multiples of 5 up to 50
35 x 2 = 70

Partition

| x | 30 | 5 |
|---|---|---|
| 2 | 60 | 10 |

Use known facts and place value to carry out simple multiplications

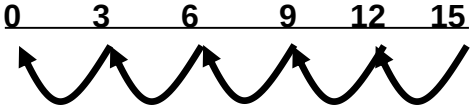
Use the same method as above (partitioning), e.g. 32 x 3 = 96

| x | 30 | 2 |
|---|---|---|
| 3 | 90 | 6 |

### Division

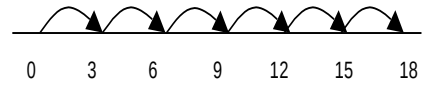
**÷ = signs and missing numbers**
Continue using a range of equations as in Year 2 but with appropriate numbers.

**Understand division as sharing and grouping**
15 ÷ 3 can be modelled as:
Sharing – 15 shared between 3 (see Year 2 diagram)
***OR***




Or
18 ÷ 3 can be modelled as:
Sharing – 18 shared between 3 (see Year 2 diagram)

Grouping - How many 3's make 18?




Remainders
16 ÷ 3 = 5 r1
Sharing - 16 shared between 3, how many left over?
Grouping – How many 3's make 16, how many left over?
e.g.

# Year 4

## Addition

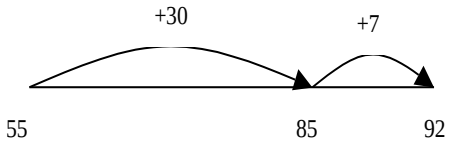
**+ = signs and missing numbers**

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

**Partition into tens and ones and recombine**

Either partition both numbers and recombine or partition the second number only e.g.

55 + 37 = 55 + 30 + 7
= 85 + 7
= 92




**Add the nearest multiple of 10, then adjust**

Continue as in Year 2 and 3 but with appropriate numbers e.g. 63 + 29 is the same as 63 + 30 - 1

**Pencil and paper procedures**

358 + 73 = 431

**either** **or**

300+50+8
\+ 70+3
300+120+11 = 431

358
\+ 73
11
120
300
431

Extend to decimals in the context of money (vertically)

£ 2.50 + £ 1.75 = £ 4.25

£ 2.50
\+ £ 1.75
£ 4.25
1

(Revert to expanded methods if the children experience any difficulty.)

## Subtraction

**- = signs and missing numbers**

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

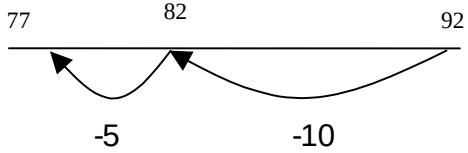
Find a small difference by counting up
e.g. 5003 – 4996 = 7
This can be modelled on an empty number line (see complementary addition below).

**Subtract the nearest multiple of 10, then adjust.**

Continue as in Year 2 and 3 but with appropriate numbers.

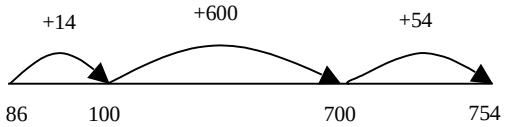
**Use known number facts and place value to subtract**

92 – 15 = 77




**Pencil and paper procedures**

Complementary addition
754 – 86 = 668




## Multiplication

**x = signs and missing numbers**

Continue using a range of equations as in Year 2 but with appropriate numbers

**Partition**

23 x 4 = 92

23 x 4 = (20 x 4) + (3 x 4)
= ( 80 ) + ( 12 )
= 92

OR

Use the grid method of multiplication (as below)

**Pencil and paper procedures**

Grid method
23 x 7 is approximately 20 x 10 = 200

| x | 20 | 3 |
|---|---|---|
| 7 | 140 | 21 |

| x | 70 | 2 |
|---|---|---|
| 30 | 2100 | 60 |
| 8 | 560 | 16 |

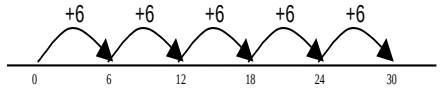
## Division

**÷ = signs and missing numbers**

Continue using a range of equations as in Year 2 but with appropriate numbers.

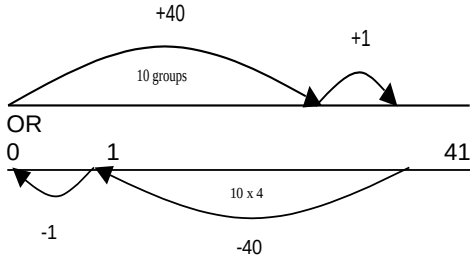
**Sharing and grouping**

30 ÷ 6 can be modelled as:
grouping – groups of 6 taken away and the number of groups counted e.g.




sharing – sharing among 6, the number given to each person

Remainders
41 ÷ 4 = 10 r1




OR 41 = (10 x 4) + 1

**Pencil and paper procedures**

72 ÷ 5 lies between 50 ÷ 5 = 10 and 100 ÷ 5 = 20

72
\- 50 (10 groups) or (10 x 5)
22
\- 20 (4 groups) or (4 x 5)
2

Answer : 14 remainder 2

# Year 5

## Addition

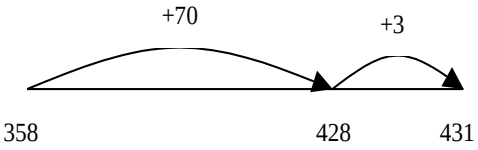
**+ = signs and missing numbers**

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

**Partition into hundreds, tens and ones and recombine**

Either partition both numbers and recombine or partition the second number only e.g.

358 + 73 = 358 + 70 + 3
= 428 + 3
= 431




**Add or subtract the nearest multiple of 10 or 100, then adjust**

Continue as in Year 2, 3 and 4 but with appropriate numbers e.g. 458 + 79 = is the same as 458 + 80 - 1

**Pencil and paper procedures**

**Leading to formal method, showing numbers carried underneath for G&T children.**

```
  358
+  73
  431
   11
```

Extend to numbers with at least four digits

3587 + 675 = 4262

```
  3587
+  675
  4262
   111
```

Revert to expanded methods if the children experience any difficulty.

Extend to decimals (same number of decimals places) and adding several numbers (with different numbers of digits).

***Model negative numbers using a number line.***

## Subtraction

**- = signs and missing numbers**

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

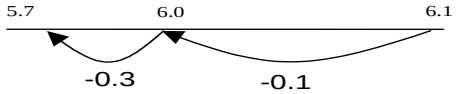
Find a difference by counting up
e.g. 8006 – 2993 = 5013
This can be modelled on an empty number line (see complementary addition below).

**Subtract the nearest multiple of 10 or 100, then adjust.**

Continue as in Year 2, 3 and 4 but with appropriate numbers.

**Use known number facts and place value to subtract**

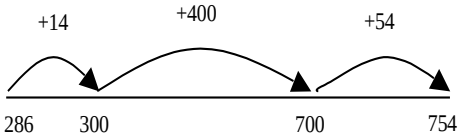
6.1 – 0.4 = 5.7




### Pencil and paper procedures

Complementary addition

754 – 286 = 468




***OR*** ***754 - 286 = 468***

```
  14 (300)        can be refined to      14  (300)
 400 (700)                               454 (754)
  54 (754)                                468
 468
```

## Multiplication

**x = signs and missing numbers**

Continue using a range of equations as in Year 2 but with appropriate numbers

**Partition**

47 x 6 = 92

47 x 6 = (40 x 6) + (7 x 6)
= ( 240 ) + ( 42 )
= 282

***OR***

Use the grid method of multiplication (as below)

**Pencil and paper procedures**

Grid method

72 x 38 is approximately 70 x 40 = 2800

| x | 70 | 2 |
|---|---|---|
| 30 | 2100 | 60 |
| 8 | 560 | 16 |

Extend to simple decimals with one decimal place.

```
 12.5
x  2
  1.0   (2.0 x 0.5 )
  4.0   (2.0 x 2.0 )
 20.0   (2.0 x 10.0 )
 25.0
```

**Moving to formal methods of multiplication for decimals. Carrying numbers underneath.**

## Division

**÷ = signs and missing numbers**

Continue using a range of equations as in Year 2 but with appropriate numbers.

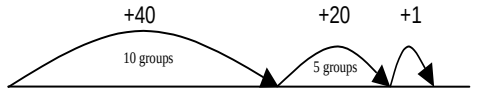
**Sharing and grouping**

Continue to understand division as both sharing and grouping (repeated subtraction).

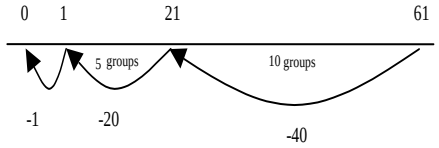
**Remainders**

Quotients expressed as fractions or decimal fractions

61 ÷ 4 = 15 ¼ or 15.25




***OR***




**Pencil and paper procedures**

256 ÷ 7 lies between 210 ÷ 7 = 30 and 280 ÷ 7 = 40

```
   36 r 4
7  256
```

Answer: 36 remainder 4

```
    36.57
7  256.00
```

## Year 6

### Addition

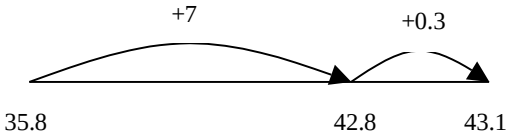
**+ = signs and missing numbers**

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

**Partition into hundreds, tens, ones and decimal fractions and recombine**

Either partition both numbers and recombine or partition the second number only e.g.

35.8 + 7.3 = 35.8 + 7 + 0.3
= 42.8 + 0.3
= 43.1




**Add the nearest multiple of 10, 100 or 1000, then adjust**

Continue as in Year 2, 3, 4 and 5 but with appropriate numbers including extending to adding 0.9, 1.9, 2.9 etc

**Pencil and paper procedures**

Extend to numbers with any number of digits and decimals with 1 and 2 decimal places.

124.9 + 117.25 = 242.15

```
  124.9
+ 117.25
  242.15
   11
```

Revert to expanded methods if the children experience any difficulty.

Extend to decimals (either one or two decimal places).

### Subtraction

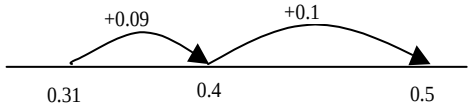
**- = signs and missing numbers**

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

Find a difference by counting up

e.g. 0.5 – 0.31 = 0.19

This can be modelled on an empty number line (see complementary addition below).




**Subtract the nearest multiple of 10, 100 or 1000, then adjust**

Continue as in Year 2, 3, 4 and 5 but with appropriate numbers.

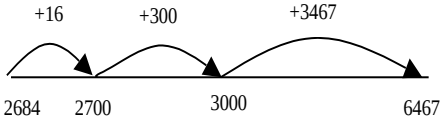
Use known number facts and place value to subtract

Continue as year 5

**Pencil and paper procedures**

Complementary addition

6467 – 2684 = 3783




***OR*** ***6467 – 2684 = 3783***

```
  16 (2700)    can be refined to
 316 (3000)
 300 (3000)
3467 (6467)
3467 (6467)
3783
3783
```

**(Decomposition for G&T children only when secure.)**

### Multiplication

**x = signs and missing numbers**

Continue using a range of equations as in Year 2 but with appropriate numbers

**Partition**

87 x 6 = 522

87 x 6 = (80 x 6) + (7 x 6)
= ( 480 ) + ( 42 )
= 522

**OR**

```
 87
 X6
 42   ( 6 x 7)
480   ( 6 x 80)
522   (units, then tens, hundreds etc)
```

OR

Use the grid method of multiplication (as below)

**Pencil and paper procedures**

**Grid method**

372 x 24 is approximately 400 x 20 = 8000

| x | 300 | 70 | 2 |
|---|---|---|---|
| 20 | 6000 | 1400 | 40 |
| 4 | 1200 | 280 | 8 |

Extend to decimals with up to two decimal places.

```
 12.5
 x2.5
  1.25   (2.5 x 0.5 )
  5.0    (2.5 x 2.0 )
 25.0    (2.5 x 10.0 )
 31.25
```

Moving to formal methods of multiplication for decimals. Carrying numbers underneath.

### Division

There are 552 biscuits altogether in a catering pack.

How many packets of 24 biscuits can be made from the catering pack?

Start dividing 24 into 552.

24 into 5 will not 'go'. 24 into 55 goes twice. Record the 2 on the top line above the second 5. Record the 48 underneath the 55 and subtract, giving 7.

Bring the 2 down and record with the 7 giving 72.

24 into 72 goes three times. Record the 3 on the top line above the 2. Record the 72 underneath the 72 and subtract. Answer zero so no 'remainder'.

```
    23
24 ⟌ 552
   - 48
     72
   - 72
      0
```

552 ÷ 24 = 23

There will be 23 packets of 24 biscuits.

| | | | |
|---|---|---|---|
| | | | There are 558 biscuits. How many packets of 24?<br>23.25<br>24 ⟌ 558.00<br>48<br>78<br>72<br>60<br>48<br>180<br>180<br>0<br>There will be 23 packets with 0.25 of a packet left over or 6 biscuits left over or 6/24 = 1/4 left over.<br><br>A piece of wood measuring 6.75m is sawn into 5 equal sections. How long is each section?<br><br>1.35<br>5 ⟌ 6.75<br>Each section will measure 1.35m. |