

The New Primary Mathematics Syllabus

Pupils should

- ↑ have a sense of the size of a number
- ↑ know where a number fits into the number system
- ↑ know by heart number facts
- ↑ use what they know by heart to figure out answers mentally
- ↑ calculate accurately and efficiently
- ↑ make sense of number problems and recognise the operations needed to solve them
- ↑ explain their methods and reasoning using correct mathematical terms
- ↑ judge whether their answers are reasonable and have strategies for checking them where necessary
- ↑ suggest suitable units for measuring and make sensible estimates of measurements
- ↑ explain and make predictions from the numbers in graphs, diagrams, charts and tables

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Children will use

a number line

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

a number square

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

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The Process to Calculation

Concrete Apparatus



Pictorial Representation



Symbolising



Practising in oral and written forms



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Memorisation of Addition Facts

It is sufficient that children memorise the following addition facts:

↑ facts which add by one, and two, rooted in their knowledge of the counting sequence

$$3 + 1, 5 + 2$$

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Memorisation of Addition Facts

It is sufficient that children memorise the following addition facts:

↑ facts which add by one, and two, rooted in their knowledge of the counting sequence

↑ facts to 5

$$1 + 4, 2 + 3$$

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Memorisation of Addition Facts

It is sufficient that children memorise the following addition facts:

↑ facts which add by one, and two, rooted in their knowledge of the counting sequence

↑ facts to 5

↑ facts with 5

$$5 + 1, 5 + 3$$

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Memorisation of Addition Facts

It is sufficient that children memorise the following addition facts:

↑ facts which add by one, and two, rooted in their knowledge of the counting sequence

↑ facts to 5

↑ facts with 5

↑ doubles

$$1 + 1, 3 + 3$$

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Memorisation of Addition Facts

It is sufficient that children memorise the following addition facts:

↑ facts which add by one, and two, rooted in their knowledge of the counting sequence

↑ facts to 5

↑ facts with 5

↑ doubles

↑ facts to 10

$$1 + 9, 2 + 8$$

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Memorisation of Addition Facts

It is sufficient that children memorise the following addition facts:

- ↑ facts which add by one, and two, rooted in their knowledge of the counting sequence
- ↑ facts to 5
- ↑ facts with 5
- ↑ doubles
- ↑ facts to 10
- ↑ facts with 10

$$10 + 1, 10 + 6$$

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Memorisation of Addition Facts

It is sufficient that children memorise the following addition facts:

- ↑ facts which add by one, and two, rooted in their knowledge of the counting sequence**
- ↑ facts to 5**
- ↑ facts with 5**
- ↑ doubles**
- ↑ facts to 10**
- ↑ facts with 10**

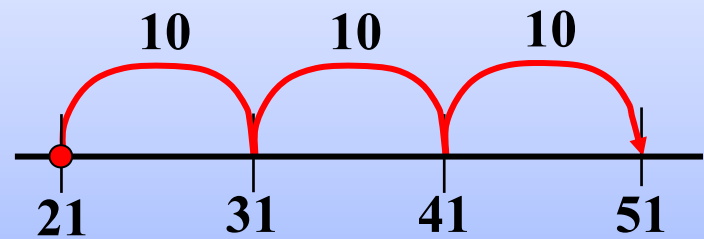
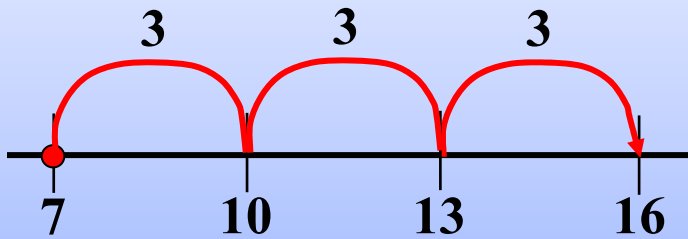
All other addition facts to 20 can be worked by inference.

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Calculation Strategies

Addition

- Preliminary Stage - count on in 2s, 3s, 4s, ...

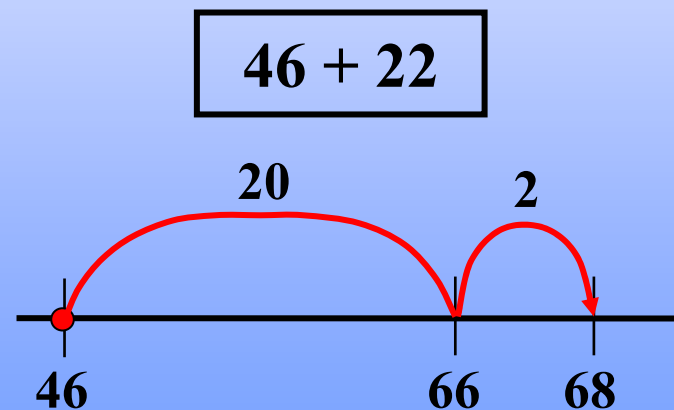
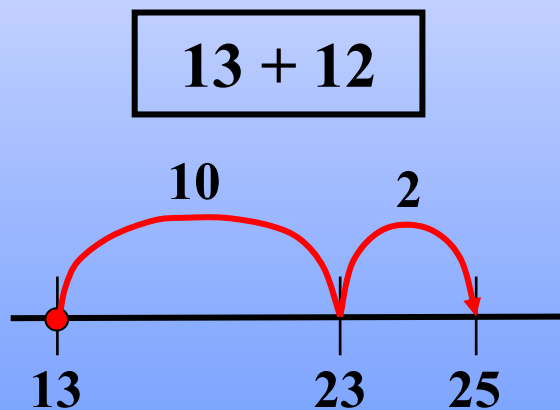


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Calculation Strategies

Addition

- Preliminary Stage - count on in 2s, 3s, 4s, ...
- Adding on 10s then units, with no carry

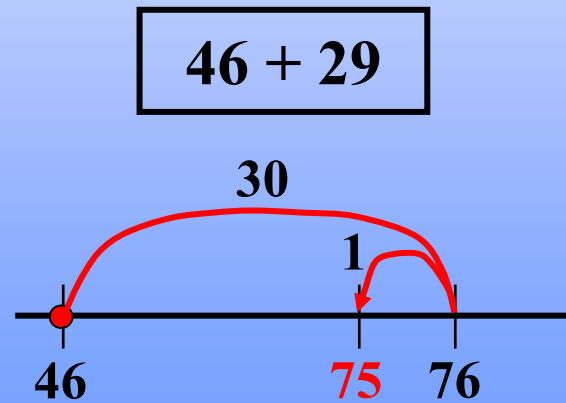
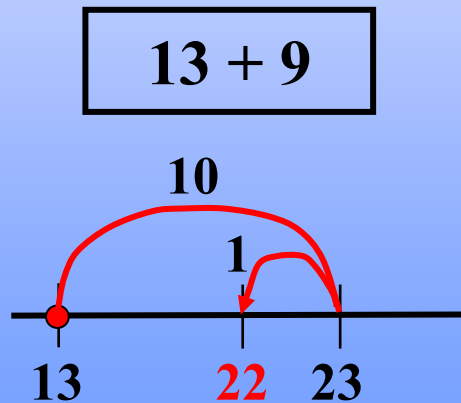


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Calculation Strategies

Addition

- Preliminary Stage - count on in 2s, 3s, 4s, ...
- Adding on 10s then units, with no carry
- Adding 9s by adding 10s and adjusting

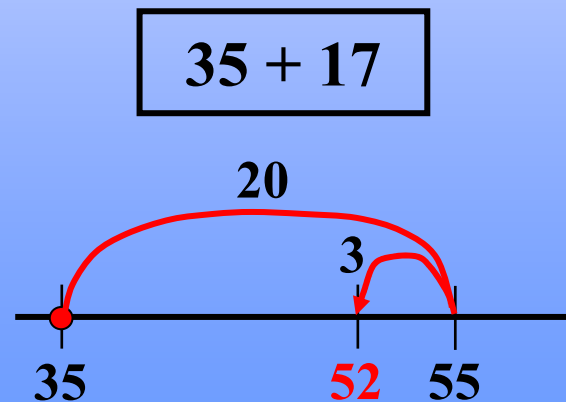
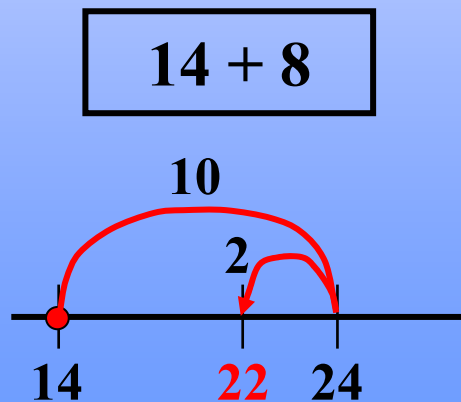


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Calculation Strategies

Addition

- Preliminary Stage - count on in 2s, 3s, 4s, ...
- Adding on 10s then units, with no carry
- Adding 9s by adding 10s and adjusting
- Adding the nearest multiple of 10 then adjusting

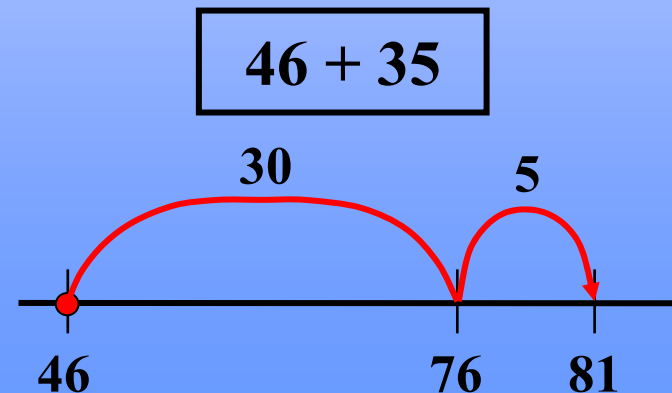
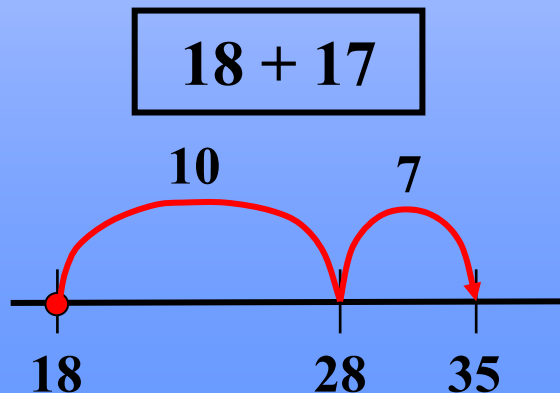


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Calculation Strategies

Addition

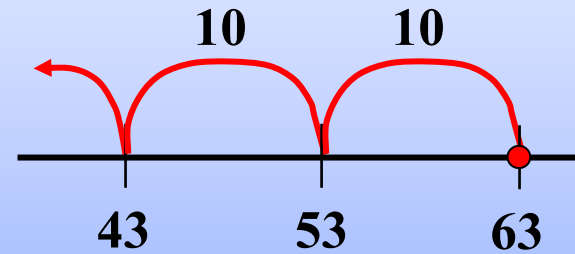
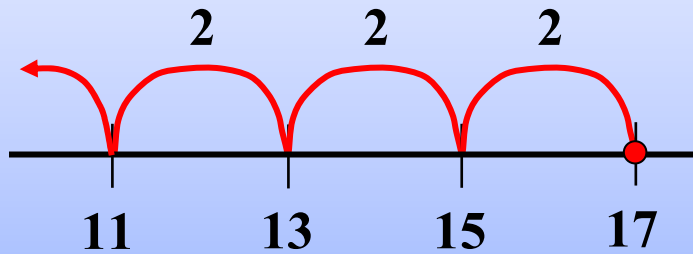
- Preliminary Stage - count on in 2s, 3s, 4s, ...
- Adding on 10s then units, with no carry
- Adding 9s by adding 10s and adjusting
- Adding the nearest multiple of 10 then adjusting
- Adding on 10s then units, with carry



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Calculation Strategies Subtraction

- Subtracting a single digit number or 10



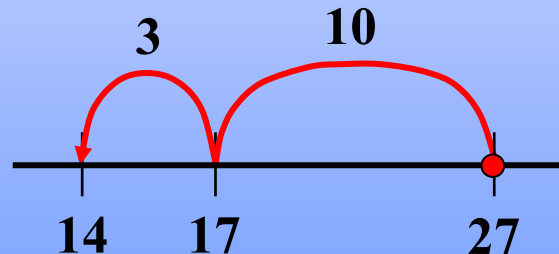
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Calculation Strategies

Subtraction

- Subtracting a single digit number or 10
- Subtracting 10s then units, not crossing a multiple of 10

$$27 - 13$$



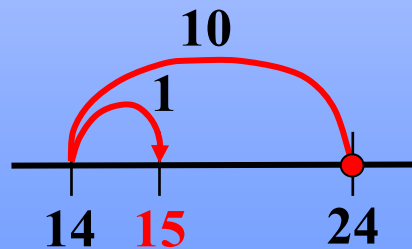
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Calculation Strategies

Subtraction

- Subtracting a single digit number or 10
- Subtracting 10s then units, not crossing a multiple of 10
- Subtracting 9s by subtracting 10s, then adjusting

$$24 - 9$$

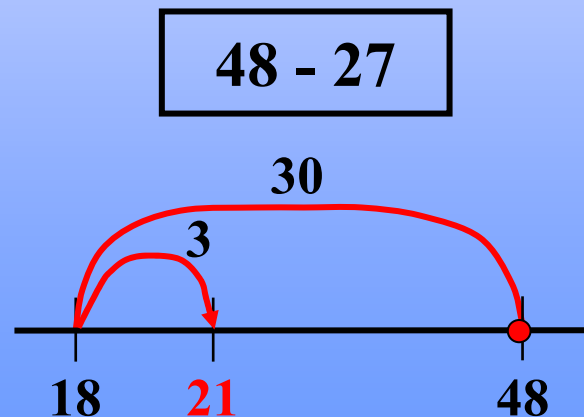


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Calculation Strategies

Subtraction

- Subtracting a single digit number or 10
- Subtracting 10s then units, not crossing a multiple of 10
- Subtracting 9s by subtracting 10s, then adjusting
- Subtracting the nearest multiple of 10, then adjusting

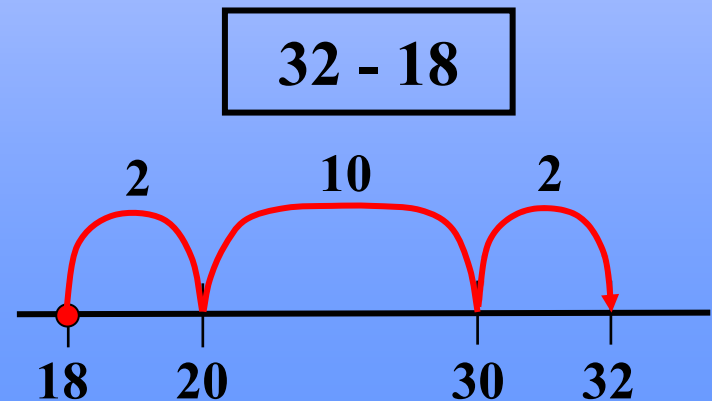
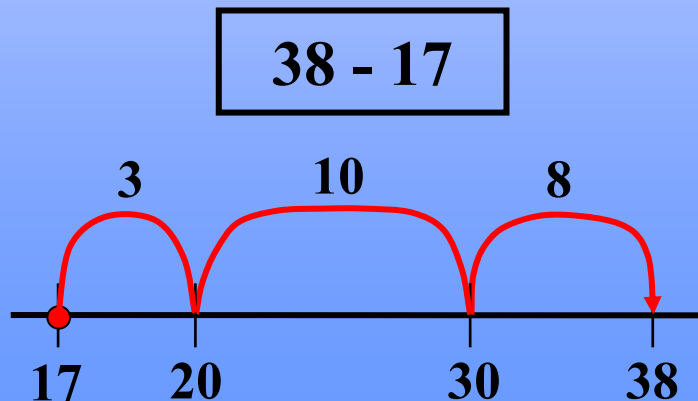


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Calculation Strategies

Subtraction

- Subtracting a single digit number or 10
- Subtracting 10s then units, not crossing a multiple of 10
- Subtracting 9s by subtracting 10s, then adjusting
- Subtracting the nearest multiple of 10, then adjusting
- Adding on to find the difference



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Calculation Strategies Towards Formal Addition

- Vertical Layout, expanded working

$$\begin{array}{r} 87 \\ +39 \\ \hline 110 \\ 16 \\ \hline 126 \end{array}$$

$$\begin{array}{r} 87 \\ +39 \\ \hline 16 \\ 110 \\ \hline 126 \end{array}$$

$$\begin{array}{r} 379 \\ +285 \\ \hline 500 \\ 150 \\ 14 \\ \hline 664 \end{array}$$

$$\begin{array}{r} 379 \\ +285 \\ \hline 14 \\ 150 \\ 500 \\ \hline 664 \end{array}$$

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Calculation Strategies Towards Formal Addition

- Vertical Layout, condensed working

$$\begin{array}{r} 87 \\ +39 \\ \hline 126 \\ 1 \end{array}$$

$$\begin{array}{r} 379 \\ +285 \\ \hline 664 \\ 11 \end{array}$$

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Calculation Strategies Towards Formal Subtraction

$$563 - 241$$

500	60	3
200	40	1
<hr/>		
300	20	2

leading to

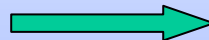
563
<hr/>
- 241
<hr/>
322

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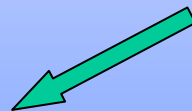
Calculation Strategies Towards Formal Subtraction

$$563 - 278$$

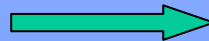
$$\begin{array}{r} 500 \quad 60 \quad 3 \\ 200 \quad 70 \quad 8 \\ \hline \end{array}$$



$$\begin{array}{r} 500 \quad 50 \quad 13 \\ 200 \quad 70 \quad 8 \\ \hline \end{array}$$



$$\begin{array}{r} 400 \quad 150 \quad 13 \\ 200 \quad 70 \quad 8 \\ \hline 200 \quad 80 \quad 5 \end{array}$$



$$\begin{array}{r} 563 \\ - 278 \\ \hline \end{array} \quad \begin{array}{r} 11 \\ 453 \\ - 278 \\ \hline 285 \end{array}$$

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Calculation Strategies

Long Multiplication

Multiplying HTU by U

$$523 \times 8$$

- How many hundreds ... tens ... units?
- Before starting give an estimate for the answer.
- Next, multiply each part by 8, then add the three answers together.

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Calculation Strategies

Long Multiplication

Informal Written Method

$$523 \times 8$$

Estimate - 4000

	500	20	3	4000
8	4000	160	24	160
				+ 24
				<hr/> 4184


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Calculation Strategies

Long Multiplication

Standard Written Method

$$\begin{array}{r} 523 \\ \times 8 \\ \hline 4000 \\ 160 \\ 24 \\ \hline 4184 \end{array}$$



$$\begin{array}{l} 500 \times 8 \\ 20 \times 8 \\ 3 \times 8 \end{array}$$

Compare the answer with the estimate.

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Calculation Strategies

Long Multiplication

Multiplying TU by TU

$$34 \times 17$$

- **Before starting give an estimate for the answer.**
- **To multiply by 17, first multiply each part by 10, then by 7.**

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Calculation Strategies

Long Multiplication

Multiplying TU by TU

$$\begin{array}{r} 34 \\ \times 17 \\ \hline 300 \\ 40 \\ 210 \\ 28 \\ \hline 578 \end{array}$$

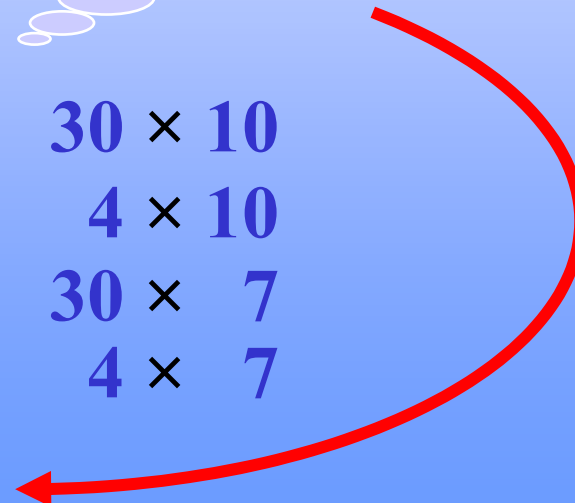


$$30 \times 10$$

$$4 \times 10$$

$$30 \times 7$$

$$4 \times 7$$



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Calculation Strategies

Long Multiplication

Multiplying U.t by U by partitioning

e.g. Work out $€3.84 \times 7$

$$€3.00 \times 7 = \quad \quad \quad € 21.00$$

$$80c \times 7 = 560 c = \quad € \quad 5.60$$

$$4c \times 7 = 28 c = \quad € \quad 0.28$$

$$€ 26.88$$



Estimate
€28

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Calculation Strategies

Long Multiplication

To multiplying U.t by U using a standard written method

e.g. Work out 4.7×9

$$4.7 \times 9 =$$



Estimate

45

$$4.0 \times 9 = 36.0 \text{ (nine lots of four units)}$$

$$0.7 \times 9 = \underline{6.3} \text{ (nine lots of seven tenths)}$$
$$42.3$$

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Calculation Strategies

Long Multiplication

To multiply U.th by U using a standard written method

e.g. Work out 4.73×9

$$4.73 \times 9 =$$

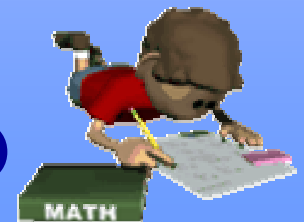
$$4.0 \times 9 = 36.0 \quad (\text{nine lots of four units})$$

$$0.7 \times 9 = 6.3 \quad (\text{nine lots of seven tenths})$$

$$0.03 \times 9 = \underline{0.27} \quad (\text{nine lots of three hundredths})$$
$$42.57$$

Estimate

45



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Calculation Strategies

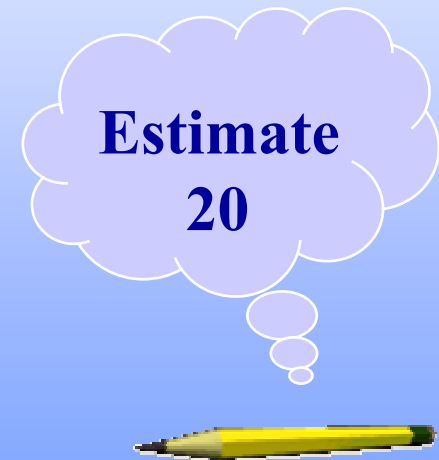
Long Division

$$\begin{array}{r} 18 \\ 4 \overline{) 75} \\ \underline{40} \\ 35 \\ \underline{20} \\ 15 \\ \underline{12} \\ 3 \end{array}$$

10 × 4
5 × 4
3 × 4

→ left over

$$75 \div 4 = 18 \text{ r } 3$$



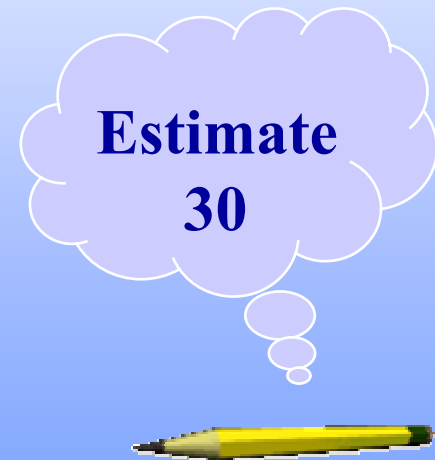
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Calculation Strategies

Long Division

$$\begin{array}{r} 31 \\ 32 \overline{) 995} \\ \underline{960} \\ 35 \\ \underline{32} \\ 3 \end{array}$$

30 × 32
1 × 32
3 → left over



$$995 \div 32 = 31 \text{ r } 3$$

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Calculation Strategies

Long Division

$$\begin{array}{r} 3.2 \\ 9 \overline{) 28.8} \\ \underline{27.0} \\ 1.8 \\ \underline{1.8} \\ 0.0 \end{array}$$

$$\begin{array}{l} 3.0 \times 9 \\ 0.2 \times 9 \end{array}$$

Estimate

3



$$28.8 \div 9 = 3.2$$