10 CALCULATION: DIVISION

LEARNING OBJECTIVES

- To divide numbers mentally
- To divide numbers up to 4 digits by a 1-digit or 2-digit number using short or long written division and interpret remainders appropriately for the context using a remainder, fractions or rounding

CONTENT DOMAINS

- C6 divide mentally
- C7 divide using written methods

STARTER ACTIVITY

- **Quick division; 5 minutes; page 72**
  Remind the student of the link between division and multiplication, using the prompt on the sheet. As the student carries out the mental calculations, check they are identifying the related multiplication facts.

MAIN ACTIVITIES

- **Short division; 15 minutes; page 73**
  Recap the method for short division and when to use it (e.g. when dividing by a 1-digit number). Work through the example with the student to check they remember how to carry out the calculation.
- **Long division; 15 minutes; page 74**
  Recap the method for long division and when to use it (e.g. when dividing by a 2-digit number or larger). Work through the example with the student to check they remember how to carry out the calculation.
- **Remainders; 10 minutes**
  Refer to the student's answers for the short division and long division activity sheets. Ask the student to look at any of the answers where they have remainders. Discuss what the remainder means in the context of the question. For example, *Is it a whole number or a fraction?* Talk about when it would be appropriate to round the answer to a whole number (when looking for a number of people or amount of money).

PLENARY ACTIVITY

- **Problems and remainders; 5 minutes**
  Show the student the following problem:
  A school buys pencils in packs of 14. How many packs should they buy for all 1,345 children to have one each?
  Discuss the problem and the method they will use to solve it (long division). When they have solved it (96.071..), discuss the issue of the remainder and why the answer needs to be rounded up to the next whole number (not rounded down). Check the student reflects this in the answer they give. (The school needs to buy 97 packs.)

HOMEWORK ACTIVITY

- **Division methods; 20 minutes; page 75**
  Full instructions are given on the activity sheet.

DIFFERENTIATION AND EXTENSION IDEAS

- **Short division** Support the student by first dividing 2-digit numbers by 1-digit numbers and then 3-digit numbers by 1-digit numbers. Extend by giving the student divisions of 4-digit numbers by 2-digit numbers for which the remainder is a recurring decimal and therefore needs to be rounded, such as 7421 ÷ 6 = 1236.833333333
- **Long division** Support the student by first dividing 3-digit numbers by 2-digit numbers to help them understand the method. Extend by setting the student division calculations with larger 2-digit numbers than those on the sheet.

PROGRESS AND OBSERVATIONS

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STARTER ACTIVITY: QUICK DIVISION

TIMING: 5 MINS

LEARNING OBJECTIVES

- To divide numbers mentally

EQUIPMENT

none

You can use your times-tables to help you divide numbers quickly. Think about the inverse operation of the division to work out which calculation you can use to help.

Example:

If you know that 5 × 4 = 20 then you can quickly say that 20 ÷ 5 = 4 or 20 ÷ 4 = 5

Use your knowledge of multiplication facts to solve these divisions:

1. 64 ÷ 8 = ... related multiplication fact: .....
2. 21 ÷ 7 = ... related multiplication fact: .....
3. 36 ÷ 4 = ... related multiplication fact: .....
4. 56 ÷ 7 = ... related multiplication fact: .....
5. 48 ÷ 6 = ... related multiplication fact: .....
6. 54 ÷ 9 = ... related multiplication fact: .....
7. 65 ÷ 5 = ... related multiplication fact: .....
8. 420 ÷ 2 = ... related multiplication fact: .....
9. 72 ÷ 6 = ... related multiplication fact: .....
10. 42 ÷ 6 = ... related multiplication fact: .....

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MAIN ACTIVITY: SHORT DIVISION — TIMING: 15 MINS

LEARNING OBJECTIVES

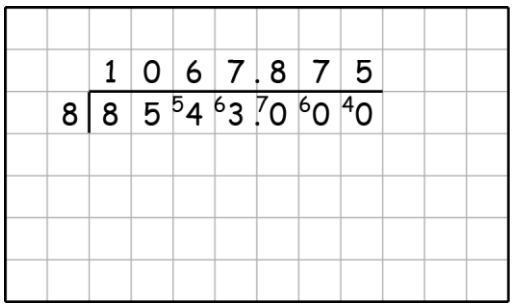
- To divide numbers up to 4 digits by a 1-digit or 2-digit number using short or long written division and interpret remainders appropriately for the context using a remainder, fractions or rounding

EQUIPMENT

none

When you are asked to divide a large number by a 1-digit number, and cannot use mental methods, you can use short division.

Example: 8,543 ÷ 8



8 divides into 8 once, so write 1 above the 8

8 won't divide into 5, so write 0 above the 5 and carry 5

8 divides into 54 six times with 6 remaining, so write 6 above the 4 and carry the 6

8 divides into 63 seven times with 7 remaining, so write 7 above the 3

Write a decimal point in the answer and the question, put a 0 after the decimal point in the answer and write the 7 before it. Continue until you have an answer.

Now use this method to solve these division problems. Show your working out on a separate piece of paper.

1. 567 ÷ 7 = ...

2. 2,381 ÷ 5 = ...

3. 4,875 ÷ 8 = ...

4. 7,105 ÷ 8 = ...

5. 8,005 football fans bought tickets for a match. The stadium had 5 stands with an equal number of seats in each. If the fans spread out equally between the stands, how many fans were there in each stand of the stadium?

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MAIN ACTIVITY: LONG DIVISION

TIMING: 15 MINS

LEARNING OBJECTIVES

- To divide numbers up to 4 digits by a 1-digit or 2-digit number using short or long written division and interpret remainders appropriately for the context using a remainder, fractions or rounding

EQUIPMENT

none

When dividing a large number by a number with 2 or more digits you need to use long division.

Example: 4,387 ÷ 36

Work out the first few multiples of 36: 36, 72, 108, 144, 180, 216, 252, 288

```
        1  2  1
    ┌──────────
3 6 ) 4  3  8  7
      3  6  0  0   (36 x 100)
      ──────────
         7  8  7
         7  2  0   (36 x 20)
         ──────
            6  7
            3  6   (36 x 1)
            ──
            3  1
```

Look at the first two digits of 4,387.
36 goes into 43 once, so write 1 in the hundreds.
Subtract 3,600 from 4,387

Look at the first two digits of 787. 36 goes into 78 twice so write 2 in the tens and subtract 720 from 787

36 goes into 67 once, so write 1 in the units. Subtract 36 from 67
The remainder is 31

Use this method to solve these division calculations. Show your working out on a separate piece of paper.

1. 3,281 ÷ 27 = ...

2. 4,872 ÷ 43 = ...

3. 6,982 ÷ 65 = ...

4. 8,705 ÷ 74 = ...

5. A building contains 32 offices. In total, 3,936 people work in the building. Each office has an equal number of staff members. How many people work in each office?

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HOMEWORK ACTIVITY: DIVISION METHODS

TIMING: 20 MINS

LEARNING OBJECTIVES

- To divide numbers mentally
- To divide numbers up to 4 digits by a 1-digit or 2-digit number using short or long written division and interpret remainders appropriately for the context using a remainder, fractions or rounding

EQUIPMENT

none

1. Use your knowledge of multiplication facts to solve these division calculations mentally. Write the related multiplication facts next to your answers.

a) 65 ÷ 5 = ... related multiplication fact: .....

b) 49 ÷ 7 = ... related multiplication fact: .....

c) 18 ÷ 6 = ... related multiplication fact: .....

d) 32 ÷ 8 = ... related multiplication fact: .....

e) 99 ÷ 9 = ... related multiplication fact: .....

2. Use short division to solve these division calculations. Give your answers as decimals.

a) 8,567 ÷ 4 =

b) 9,436 ÷ 8 =

3. Use long division to solve these division calculations. Give your remainders as whole numbers.

a) 3,765 ÷ 33 =

b) 6,473 ÷ 69 =

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10 ANSWERS

STARTER ACTIVITY: QUICK DIVISION

1. 8 (8 × 8 = 64)	2. 3 (3 × 7 = 21)	3. 9 (4 × 9 = 36)	4. 8 (7 × 8 = 56)
5. 8 (6 × 8 = 48)	6. 6 (9 × 6 = 54)	7. 13 (5 × 13 = 65)	8. 210 (2 × 210 = 420)
9. 12 (6 × 12 = 72)	10. 7 (6 × 7 = 42)		

MAIN ACTIVITY: SHORT DIVISION

1. 81	2. 476.2	3. 609.375	4. 888.125	5. 1,601

MAIN ACTIVITY: LONG DIVISION

1. 121 r 14	2. 113 r 13	3. 107 r 27	4. 117 r 47	5. 123

HOMEWORK ACTIVITY: DIVISION METHODS

1. a) 13 (5 × 13 = 65)	b) 7 (7 × 7 = 49)	c) 3 (6 × 3 = 18)	d) 4 (8 × 4 = 32)	e) 11 (9 × 11 = 99)
2. a) 2,141.75	b) 1,179.5			
3. a) 114 r 3	b) 93 r 56			

GLOSSARY

Remainder
The amount that is left over after a division calculation.

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