

At-Home Investigation

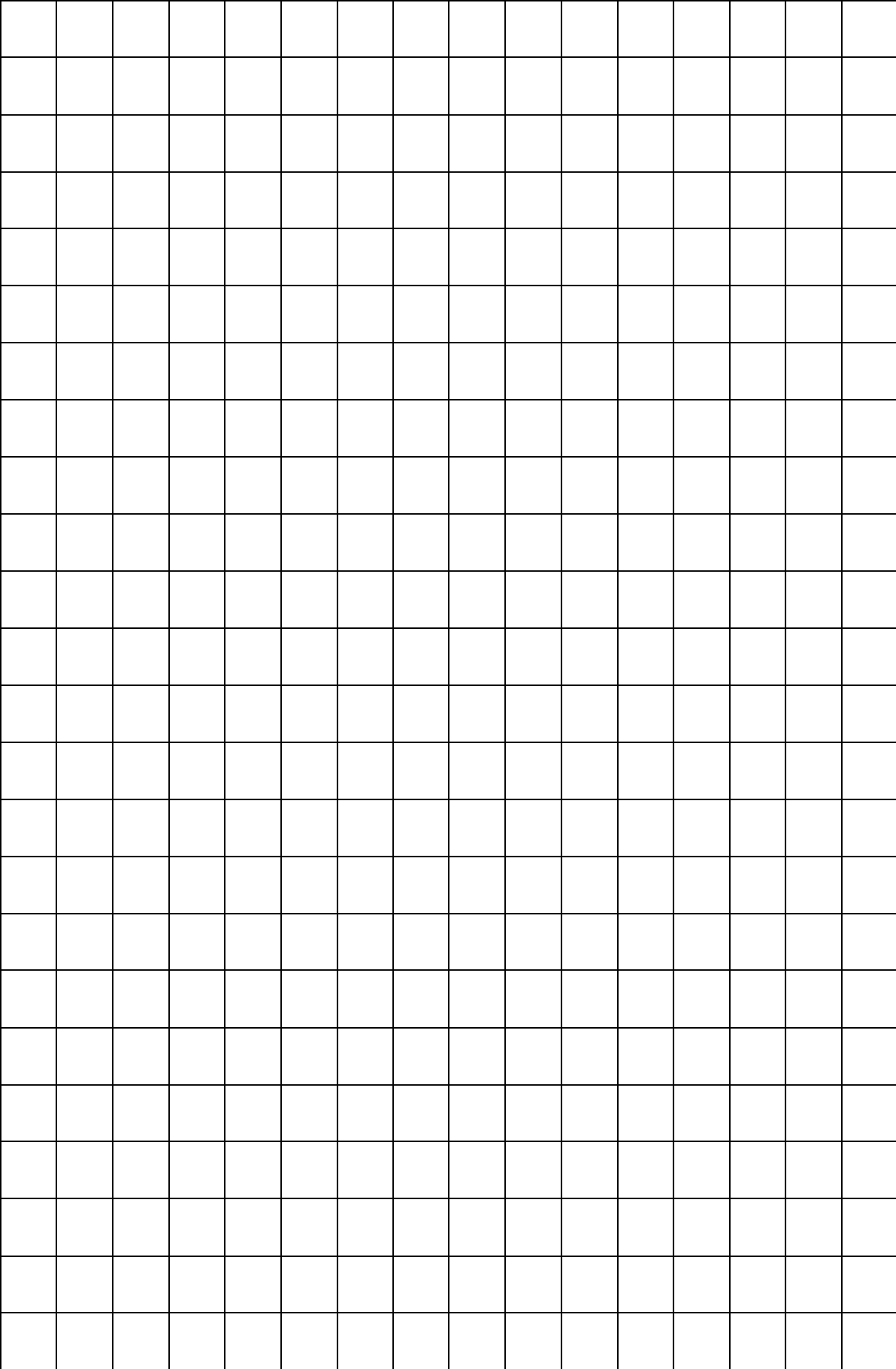
You have \$24 to share between 5 people. How could it be done?

Make sure that you show how much each person would receive. Show all your working.

What would happen if you had to share the \$24 between 10 people?

Show how much money each person would receive and explain how you did it.





D14. Division remainders

☐ Sometimes when you divide a number it does not fit entirely into groups. For example, if you divided 16 by 5, you would have 3 groups of five, with 1 left over.

Example 1: Leaving remainders as whole numbers

$$\begin{array}{r} 3 \text{ rem } 1 \\ 5 \overline{) 16} \end{array} \quad \begin{array}{r} 3 \text{ rem } 2 \\ 5 \overline{) 17} \end{array} \quad \begin{array}{r} 3 \text{ rem } 3 \\ 5 \overline{) 18} \end{array}$$

What is the pattern?

Example 2: Expressing remainders as common fractions

$$\begin{array}{r} 3 \frac{1}{5} \\ 5 \overline{) 16} \end{array} \quad \begin{array}{r} 3 \frac{2}{5} \\ 5 \overline{) 17} \end{array} \quad \begin{array}{r} 3 \frac{3}{5} \\ 5 \overline{) 18} \end{array}$$

What is the pattern?

Example 3: Expressing remainders as decimal fractions

$$\begin{array}{r} 3.2 \\ 5 \overline{) 16.10} \end{array} \quad \begin{array}{r} 3.4 \\ 5 \overline{) 17.20} \end{array} \quad \begin{array}{r} 3.6 \\ 5 \overline{) 18.30} \end{array}$$

What is the pattern?

BACKWARDS QUESTION:

Try to work out what the missing numbers are.
Explain how you did it:

$$\begin{array}{r} 3 \text{ rem } 2 \\ 5 \overline{) \quad \quad} \end{array}$$

Division remainders 2

Use what you learned in the previous activity to help you to solve the following problems. You will need to look for where the remainder (left overs) goes.

Example 1: Leaving remainders as whole numbers

$$\begin{array}{r} 3 \text{ rem } 1 \\ 5 \overline{) 16} \end{array} \quad \begin{array}{r} 5 \overline{) 19} \end{array} \quad \begin{array}{r} 5 \overline{) 21} \end{array}$$

What is the pattern?

Example 2: Expressing remainders as common fractions

$$\begin{array}{r} 3 \frac{1}{5} \\ 5 \overline{) 16} \end{array} \quad \begin{array}{r} 5 \overline{) 19} \end{array} \quad \begin{array}{r} 5 \overline{) 21} \end{array}$$

What is the pattern?

Example 3: Expressing remainders as decimal fractions

$$\begin{array}{r} 3.2 \\ 5 \overline{) 16.10} \end{array} \quad \begin{array}{r} 5 \overline{) 19.0} \end{array} \quad \begin{array}{r} 5 \overline{) 21.0} \end{array}$$

What is the pattern?

BACKWARDS QUESTION:

Try to work out what the missing numbers are.
Explain how you did it:

$$\begin{array}{r} 3.2 \\ 6 \overline{) } \end{array}$$

D15. Expressing a remainder

Sometimes different forms are more appropriate for expressing a remainder in division. Examine the following example and use it to help you answer the questions below.

Example: There are 31 children to be divided into 3 groups. How many in each group? Circle the most appropriate answer from those below.

$31 \div 3 =$

10.33

$10 \frac{1}{3}$

$10 \text{ rem } 1$

Answer: 10 remainder 1 is the most appropriate answer because you cannot divide a living child into fractions for different groups. They have to stay as a whole child, therefore as a remainder.

Questions:

For each of the following questions circle the most appropriate answer from the group and justify your choice on the lines below.

3 chocolate bars were split between 2 people. How much chocolate did each one receive?

1.5 bars each

$1 \frac{1}{2}$ bars each

1 bar each and 1 remainder

My Reason:

Gerard ran four 100m races in 54 seconds. How long did he take to run each one?

13.5 seconds each

$13 \frac{2}{4}$ seconds each

13 seconds each, remainder 2

My Reason:

Four people had to divide 9 books between them. How many books did each person get?

2.25 books each

$2 \frac{1}{4}$ books each

2 books each and 1 remainder

My Reason:

Describe how you decided which form was appropriate for each question.

BACKWARDS QUESTION:

Danielle found that she could make $12 \frac{1}{4}$ cookies from each batch of dough. How many batches do you think she cooked to work this out?

Multiplication practice grids:

	2	3	4	5	6	7	8	9	10
2									
3									
4									
5									
6									
7									
8									
9									
10									

	2	3	4	5	6	7	8	9	10
2									
3									
4									
5									
6									
7									
8									
9									
10									

	2	3	4	5	6	7	8	9	10
2									
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7									
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9									
10									

	2	3	4	5	6	7	8	9	10
2									
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7									
8									
9									
10									

D17. Decimals in dividing

Dividing with decimal numbers is very similar to multiplying with decimal numbers, but involves a pattern between the decimals in the dividend and divisors rather than between the terms and answer.

Examples:

$$7 \overline{) 102}$$

$$0.7 \overline{) 102}$$

$$7 \overline{) 10.2}$$

$$0.7 \overline{) 10.2}$$

What is the pattern?

Apply this pattern to answer the questions below.

$$5 \overline{) 615}$$

$$0.5 \overline{) 615}$$

$$5 \overline{) 61.5}$$

$$5 \overline{) 6.15}$$

Check your answers with a calculator. If you are still having difficulty seeing the pattern, go back and look at the examples again. Compare the total number of decimal places in the dividend with the total number of decimal places in the divisors. Show your answers to your teacher before continuing.

Apply this pattern to answer the questions below:

$$560 \div 8 = 70$$

$$5.60 \div 8 =$$

$$56.0 \div \square = 70$$

$$5.60 \div 0.8 =$$

$$56.0 \div \square = 0.7$$

Make up a rule to describe how to know where to put the decimal points when dividing:

BACKWARDS QUESTION:

Put the decimal points into the following equation and fill in the box. What other possibilities are there? Write as many as you can:

$$56 \div \square = 0.07$$

Interleaved practice

Number:

1. Complete the following number sequence and describe it:

$$\frac{1}{7}, \frac{3}{7}, \underline{\quad}, \underline{\quad}, \underline{\quad}, 1\frac{4}{7}, \underline{\quad}, \underline{\quad}, 2\frac{3}{7}$$

2. Find the answer and show how you worked it out.

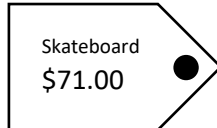
$$\boxed{\quad} + 134 = 3 \times 76$$

3. Complete the table to write numbers as fractions, decimals and percentages.

Fraction	Decimal	Percentage
$\frac{1}{2}$		
	0.2	
		25%
$\frac{3}{4}$		

4. 28×6 Work out the answer in more than one way.

5. The following items are on sale at 10% off. How much would you expect to pay?



Measurement/Geometry:

6. Find 3 prisms in your home and draw them here. What is the same about all of them?
7. List 5 activities that you complete during the day and when they occurred. Write the time in 12-hour and 24-hour time.
8. Use the back of this page to draw as many rectangles as you can with a perimeter of 24cm.

Chance/Data:

9. List all of the possible outcomes when two 6-sided dice are rolled. If the numbers shown on the dice are added, which total or totals would you expect to occur most frequently? Which would occur least frequently?

PROBLEM 10: PRIME FACTORS

Prime factors of:

12: $2 \times 2 \times 3$

20: $2 \times 2 \times 5$

30: $2 \times 3 \times 5$

What do you think prime factors are?

Find them for: 50, 60, 80, 90 and 100.

What do you think prime factors are?

How do you think you could work out the prime factors of a number?

What operations would you need to use?

Find them for: 50, 60, 80, 90 and 100.



If I was trying to find a number with the first four prime factors, what number would it be?
Explain:

If I was trying to find a number with the largest prime factor under 100, what number would it be? What would the prime factors be? Explain:

What number under 100 has the most prime factors? Explain:

Is there another number under 100 with the same number of prime factors? Explain:

Communicating:

How did you work out your answers?



Understanding:

How can you be sure that your answers are right? What would you do to check them?

Manipulation problem:

What number under 100 has the most prime factors, one of which is 5?
Explain:

Teacher initials:

Date:

Problem solving / T&R:

- Problem solved with minimal or non-mathematical prompting
- Some leading questions were used to prompt thinking
- Solved after explanation
- Did not work out solution
- N/A- not a novel problem

Reasoning / Comm.:

(verbal, written, working and equations, or visual representations)

- Clearly and logically reasoned
- Easily understood
- Understood with some interpretation needed
- Some gaps but on topic
- Minimal or off topic

Understanding / Reflect:

- Connected manipulation problems to previous questions and answered easily
- Connected manipulation problems to previous questions with some prompting, and answered correctly
- Answered once the similarities to previous questions had been pointed out
- Had some problems in answers but was on the right track
- Did not answer appropriately
- Student not observed