

WA8MNAUN1

Understanding number

Core + Challenge

Recurring Decimals and Fractions

I can convert fractions to terminating or recurring decimals, predict which will terminate, and write recurring decimals as fractions.

Name: _____ Date: _____ Score: _____ / 58

Key idea

Fraction → decimal: divide the numerator by the denominator. $\frac{3}{8} = 3 \div 8 = 0.375$ (terminates). $\frac{5}{11} = 5 \div 11 = 0.454545\dots$ (the block 45 repeats).

Predict first: simplify, then look at the denominator. It **terminates** only if its prime factors are 2s and 5s: $\frac{7}{40}$ ($40 = 2 \times 2 \times 2 \times 5$) terminates; $\frac{7}{12}$ ($12 = 2 \times 2 \times 3$) recurs.

Recurring → fraction: $0.111\dots = \frac{1}{9}$, $0.444\dots = \frac{4}{9}$; $0.0101\dots = \frac{1}{99}$, $0.1818\dots = \frac{18}{99} = \frac{2}{11}$, so $0.454545\dots = \frac{45}{99} = \frac{5}{11}$.

Rounding a recurring decimal: write a few more digits first. $\frac{2}{3} = 0.6666\dots \approx 0.67$ (2 d.p.) $\frac{5}{11} = 0.4545\dots \approx 0.455$ (3 d.p.).

A Fluency *practise the skill*

/ 16 marks

Work out each answer. 1 mark each.

1. $\frac{1}{4}$ as a decimal _____
2. $\frac{3}{8}$ as a decimal _____
3. $\frac{1}{3}$ as a decimal _____
4. $\frac{5}{6}$ as a decimal _____
5. $\frac{2}{11}$ as a decimal _____
6. $\frac{7}{20}$ as a decimal _____
7. $\frac{5}{9}$ as a decimal _____
8. $0.777\dots$ as a fraction _____
9. $0.363636\dots$ as a fraction _____
10. $0.090909\dots$ as a fraction _____
11. Terminating? $\frac{9}{25}$ _____
12. Terminating? $\frac{5}{12}$ _____
13. Terminating? $\frac{21}{28}$ _____
14. $0.454545\dots$ to 2 d.p. _____
15. $\frac{1}{6}$ to 3 d.p. _____
16. $\frac{7}{9}$ to 1 d.p. _____

B

Core *apply the skill to problems*

/ 22 marks

- 1 Use short division to write $\frac{5}{7}$ as a decimal. Keep dividing until the digits repeat, then write the answer with correct notation and state the repeating block. [2 marks]

$$7 \overline{) 5 . 0 0 0 0 0 0 0 0 0}$$

Answer: _____

- 2 Without dividing, decide whether each fraction gives a terminating (T) or recurring (R) decimal. Simplify first and show the prime factors of the denominator. [3 marks]

Fraction	Simplest form	Denominator as primes	T or R?
3/16			
4/15			
11/50			
5/24			
9/12			
7/30			

- 3 Three siblings share a \$20 SmartRider top-up equally. Write each share as a recurring decimal, then round it to the nearest cent. Explain why three rounded shares do not add to exactly \$20. [3 marks]

Answer: _____

- 4 Write 0.272727... as a fraction in simplest form. [2 marks]

Answer: _____

- 5 Write 0.888... and 0.151515... as fractions in simplest form. [2 marks]

Answer: _____

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- 6 An AFL player kicked 11 goals from 18 shots. Write $\frac{11}{18}$ as a decimal using correct notation, [2 marks]
and as a percentage correct to 1 decimal place.

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Answer: _____

- 7 Which is larger, $\frac{4}{11}$ or 0.36? Show how you know. [2 marks]

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Answer: _____

- 8 Write 1.333... as a mixed number and as an improper fraction. [2 marks]

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Answer: _____

- 9 Write 40 as a product of primes. Use this to explain why $\frac{9}{40}$ is a terminating decimal, then [2 marks]
write it as a decimal.

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Answer: _____

- 10 In one June, it rained in Perth on 17 of the 30 days. Write $\frac{17}{30}$ as a decimal using correct [2 marks]
notation, and round it to 3 decimal places.

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Answer: _____

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C

Reasoning *explain, justify and check*

/ 9 marks

- 1 Use $\frac{1}{3} + \frac{2}{3} = 1$ to explain why $0.999... = 1$. [2 marks]

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- 2 Ella says “ $\frac{6}{15}$ will be a recurring decimal because $15 = 3 \times 5$ has a factor of 3.” Is she correct? Explain. [2 marks]

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- 3 Spot the error: “To 2 decimal places, $\frac{2}{3} = 0.66$, because all the digits are 6s.” Correct the statement. [2 marks]

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- 4 When you divide by 7, the only possible non-zero remainders are 1, 2, 3, 4, 5 and 6. Use this to explain why the decimal for any fraction with denominator 7 must start repeating within 6 digits (unless it terminates). [3 marks]

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D

Challenge *multi-step and problem-solving*

/ 11 marks

- 1 Write $0.4181818...$ (the 4 appears once, then 18 repeats) as a fraction in simplest form. Hint: $0.4181818... = 0.4 + 0.0181818...$ [3 marks]

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Answer: _____

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2 $\frac{3}{7} = 0.428571428571\dots$ What is the 2026th digit after the decimal point? [2 marks]

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Answer: _____

3 How many of the fractions $\frac{1}{60}, \frac{2}{60}, \frac{3}{60}, \dots, \frac{59}{60}$ are terminating decimals? [3 marks]

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Answer: _____

4 Use the pattern $\frac{1}{9} = 0.111\dots$, $\frac{1}{99} = 0.0101\dots$, $\frac{1}{999} = 0.001001\dots$ to write $0.123123123\dots$ as a fraction in simplest form. Then find the exact value of $0.123123\dots + 0.876876\dots$ [3 marks]

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Answer: _____

How did I go?

Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 58**

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