

GCSE Maths: Recurring decimals and fractions (Higher): answers

GCSE Maths - Fractions - Higher - Lesson 3.3

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch03-fractions/higher/recurring-decimals-and-fractions/

Exercise 3C Recurring decimals Non-calculator

1 Without dividing, say whether each fraction gives a terminating or recurring decimal.

(a) $\frac{3}{8}$

Answer: terminating

(b) $\frac{7}{12}$

Answer: recurring

(c) $\frac{9}{20}$

Answer: terminating

(d) $\frac{5}{11}$

Answer: recurring

(e) $\frac{13}{40}$

Answer: terminating

(f) $\frac{4}{15}$

Answer: recurring

(g) $\frac{17}{25}$

Answer: terminating

(h) $\frac{5}{6}$

Answer: recurring

2 Write each fraction as a decimal, using dot notation for recurring decimals.

(a) $\frac{2}{11}$

Answer: $0.\dot{1}8$

(b) $\frac{5}{6}$

Answer: $0.8\dot{3}$

(c) $\frac{7}{12}$

Answer: $0.58\dot{3}$

(d) $\frac{4}{7}$

Answer: $0.\dot{5}7142\dot{8}$

(e) $\frac{1}{9}$

Answer: $0.\dot{1}$

(f) $\frac{3}{22}$

Answer: $0.1\dot{3}\dot{6}$

3 Write each recurring decimal as a fraction in its simplest form.

(a) $0.\dot{5}$

Answer: $\frac{5}{9}$

(b) $0.1\dot{4}$

Answer: $\frac{14}{99}$

(c) $0.1\dot{6}$

Answer: $\frac{1}{6}$

(d) $0.2\dot{7}$

Answer: $\frac{5}{18}$

(e) $0.6\dot{3}$

Answer: $\frac{7}{11}$

(f) $0.\dot{0}4\dot{5}$

Answer: $\frac{5}{111}$

4 Prove that $0.2\dot{7} = \frac{3}{11}$.

Answer: Let $x = 0.2727\ldots$ Then $100x = 27.2727\ldots$ Subtract: $99x = 27$, so $x = \frac{27}{99} = \frac{3}{11}$.

5 Show that $0.\dot{9} = 1$.

Answer: Let $x = 0.999\ldots$ Then $10x = 9.999\ldots$ Subtract: $9x = 9$, so $x = 1$.

6 Work out $0.\dot{3} + 0.\dot{6}$ as a fraction, using the fraction for each.

Answer: $\frac{1}{3} + \frac{2}{3} = 1$

7 Explain why $\frac{7}{12}$ gives a recurring decimal but $\frac{7}{20}$ gives a terminating decimal.

Answer: $12 = 2^2 \times 3$ has a prime factor 3, so it recurs. $20 = 2^2 \times 5$ has only 2s and 5s, so it terminates.

- 8 Given that $0.\dot{1}4285\dot{7} = \frac{1}{7}$, write down $\frac{2}{7}$ as a recurring decimal. Explain your answer.

Answer: $\frac{2}{7} = 2 \times \frac{1}{7} = 0.285714285714... = 0.\dot{2}8571\dot{4}$. Doubling $0.142857...$ gives $0.285714...$

- 9 Write down three different fractions with denominators less than 30 that give terminating decimals but are **not** unit fractions.

Answer: For example $\frac{3}{8}$, $\frac{7}{20}$, $\frac{9}{25}$

- 10 **Challenge.** Write $0.1\dot{3}\dot{5}$ as a fraction in its simplest form.

Answer: $\frac{67}{495}$ (let $x = 0.13535...$; $1000x - 10x = 135 - 1 = 134$, so $x = \frac{134}{990}$)