

Topic Check In - 3.03 Exact calculations

Do not use a calculator.

1. Calculate $15 \div 35$. Give your answer as an exact fraction.
2. Three fifths of the members of a tennis club are women, of which one ninth are left-handed. What fraction of the members are left-handed women?
3. A cyclist travels 13.5 km in 45 minutes. What is their average speed in kilometres per hour?
4. Using fractions, calculate 0.4×0.75 . Give your answer as an exact fraction.
5. Write 1 hour and 48 minutes as a fraction of 3 hours.
6. Given that $0.454545\dots = \frac{5}{11}$, write down $0.909090\dots$ as an exact fraction. Explain your reasoning.
7. Tammy wants to enlarge a 4 inch by 6 inch photo so it fits exactly into a 5 inch by 7 inch frame. Explain why this can't be done.
8. A car travels at 40 miles per hour for 45 minutes and at 50 miles per hour for 15 minutes. Show that the average speed for the whole journey is 42.5 mph.
9. A baker is making bread rolls. He divides his dough into 8 equal pieces. He then cuts each one of these pieces into 3, each of which is a single bread roll. He sells the rolls in bags of 4. What fraction of the original dough is in one bag of rolls?
10. At Camford station, trains to London arrive every quarter hour, and trains from London arrive every 24 minutes. At midday, trains travelling in each direction arrive at Camford. Assuming all trains run exactly to time, when would be the next time that this happens?



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Extension

A fraction, reduced to its lowest terms, can be expressed as a terminating decimal provided the denominator contains no prime factors other than 2 and 5.

$\frac{23}{40}$ is a terminating decimal because $40 = 2^3 \times 5$ which has prime factors of 2 and 5 only.

$\frac{23}{42}$ is a recurring decimal because $42 = 2 \times 3 \times 7$ which has prime factors other than 2 and 5 (namely 3 and 7).

Investigate which of the following fractions are terminating decimals, and which are recurring. Check your answers with a calculator.

$$\frac{3}{5}, \frac{1}{15}, \frac{7}{32}, \frac{41}{250}, \frac{3}{12}, \frac{5}{12}$$



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Answers

1. $\frac{3}{7}$

2. $\frac{3}{5} \times \frac{1}{9} = \frac{1}{15}$

3. $13.5 \div \frac{3}{4} = 13.5 \times \frac{4}{3} = 4.5 \times 4$ (or $54 \div 3$) = 18 km/h

4. $\frac{2}{5} \times \frac{3}{4} = \frac{3}{10}$

5. $\frac{108}{180} = \frac{12}{20} = \frac{3}{5}$

6. $\frac{10}{11}$, because $0.909090\dots = 2 \times 0.454545\dots$

7. $4 \times \frac{5}{4} = 5$ but $6 \times \frac{5}{4} = 7.5$, not 7 oe

8. $40 \times \frac{3}{4} + 50 \times \frac{1}{4} = 30 + 12.5 = 42.5$ mph oe

(The calculation $\frac{40+50}{2}$ only applies if travelling at these speeds for the same time)

9. $\frac{1}{6}$

10. $\frac{1}{4} = \frac{5}{20}$ and $\frac{2}{5} = \frac{8}{20}$, and $8 \times \frac{1}{4} = 5 \times \frac{2}{5} = 2$, so the trains cross again at 2.00 pm oe

Extension

Recurring: $\frac{1}{15}$, $\frac{5}{12}$

Terminating: $\frac{3}{5}$, $\frac{7}{32}$, $\frac{41}{250}$, $\frac{3}{12}$



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Express a division as a fraction.			
AO1	2	Calculate with fractions.			
AO1	3	Use fractions of an hour in speed calculations.			
AO1	4	Use fractions in calculations with decimals.			
AO1	5	Write one quantity as a fraction of another quantity.			
AO2	6	Express recurring decimals as exact fractions.			
AO2	7	Use fractions as scale factors.			
AO2	8	Use fractions of an hour in speed calculations.			
AO3	9	Use fractions in a worded problem.			
AO3	10	Apply equivalent fractions to a worded problem.			

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