Higher Check In – 2.01 Fractions

1. Work out $2\dfrac{4}{7} \times 3\dfrac{8}{9}$.

2. Work out $\dfrac{2}{5} - \dfrac{3}{4}$.

3. Work out $3 - 2\dfrac{1}{7} \div 1\dfrac{11}{14}$.

4. Work out $\dfrac{2a}{3} + \dfrac{a}{4} - \dfrac{3a}{8}$.

5. Work out possible integer values for *a*, *b* and *c*.

$$\frac{a^2}{b^2} = 1\frac{c^2}{b^2}$$

6. Explain why $\dfrac{a}{b} \div \dfrac{c}{d} = \dfrac{ad}{bc}$.

7. Joel works out the answer to $\dfrac{3}{n-1} - \dfrac{2}{n+1}$ in his head. His answer of $\dfrac{n-1}{n^2-1}$ is incorrect. Explain the mistake that Joel has made.

8. An extract from a science journal states "To work out how much 500 ml of liquid water at room temperature increases to after freezing: $500\,\text{ml} \times 1\dfrac{181}{2000} = 545.25\,\text{cm}^3$."
   Use this information to show that 800 cm^3 of ice will melt to produce 733.6 ml of liquid water at room temperature.

9. Complete the magic square so that the fractions in each row, each column and each of the two diagonals add up to the same value. Give each fraction in its simplest form.

		$\dfrac{1}{5}$
$\dfrac{3}{10}$	$\dfrac{1}{6}$	
$\dfrac{2}{15}$	$\dfrac{1}{10}$	

10. Sandra and Gill share a box of sweets in the ratio 3 : 2. Jonny takes half of Sandra's sweets and a quarter of Gill's sweets. What fraction of the original box of sweets does Jonny have?

Extension

Arrange the digits 1 to 9, using each one only once, to form a fraction equivalent to $\dfrac{1}{3}$.

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Answers

1. 10

2. $-\dfrac{7}{20}$

3. $1\dfrac{4}{5}$

4. $\dfrac{13a}{24}$

5. Any Pythagorean triple in the correct order e.g. $a = 5$, $b = 4$ and $c = 3$.

6. Dividing by $\dfrac{c}{d}$ is the same as multiplying by $\dfrac{d}{c}$.

7. $\dfrac{3(n+1)-2(n-1)}{(n-1)(n+1)} = \dfrac{3n+3-2n+2}{n^2+n-n-1} = \dfrac{n+5}{n^2-1}$.
   The error has been made when multiplying the -2 by $(n-1)$ to give $-2n - \mathbf{2}$.

8. $800 \div \dfrac{2181}{2000} = 800 \times \dfrac{2000}{2181} = 733.6\,\text{ml}$ to 1dp.

9.

$\dfrac{1}{15}$	$\dfrac{7}{30}$	$\dfrac{1}{5}$
$\dfrac{3}{10}$	$\dfrac{1}{6}$	$\dfrac{1}{30}$
$\dfrac{2}{15}$	$\dfrac{1}{10}$	$\dfrac{4}{15}$

10. $\dfrac{2}{5}$

Extension

$\dfrac{5823}{17469} = \dfrac{1}{3}$

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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Multiply mixed numbers			
AO1	2	Subtract simple fractions			
AO1	3	Calculate with mixed numbers using the correct order of operations			
AO1	4	Add and subtract fractions in more complex calculations, including algebraic fractions			
AO1	5	Recognise equivalence between simple fractions and mixed numbers			
AO2	6	Explain the method for dividing fractions correctly			
AO2	7	Subtract algebraic fractions involving quadratic terms			
AO2	8	Calculate a fraction of a quantity with fractions greater than 1			
AO3	9	Solve a fractional magic square			
AO3	10	Solve a contextual problem involving a ratio of quantities and fractions of quantities			