

Maths Reasoning Activity: Fractions

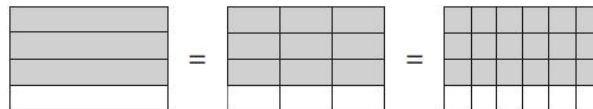
To help you answer these reasoning questions on fractions, there are some useful video links you could take a look at, before you start.

- [What are fractions?](#)
- [Adding and subtracting fractions](#)
- [Finding equivalent fractions](#)
- [How to convert fractions to decimals](#)

Warming up*

Q1.

These diagrams show three equivalent fractions.



Write the missing values.

$$\frac{3}{4} = \frac{9}{\boxed{}} = \frac{\boxed{}}{24}$$

1 mark

Q2

Tick the **two** numbers that are equivalent to $\frac{1}{4}$

Tick **two**.

0.25 ☐

0.75 ☐

$\frac{25}{100}$ ☐

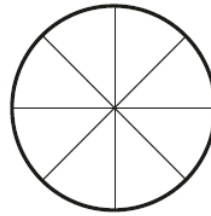
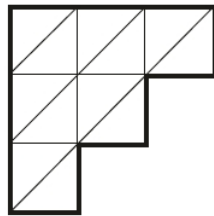
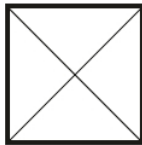
0.5 ☐

$\frac{2}{5}$ ☐

Q3

Each diagram below is divided into equal sections.

Shade three-quarters of each diagram.

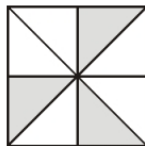


2 marks

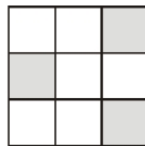
Q4

Each of these diagrams is divided into equal parts.

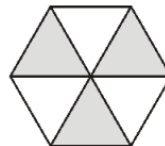
Some of the parts are shaded.



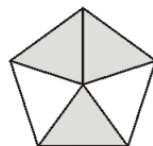
A



B



C



D



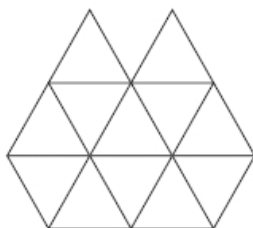
E

Write the letters of all the diagrams that have exactly $\frac{1}{2}$ shaded.

Q5

1 mark

Shade $\frac{1}{4}$ of this shape.



1 mark

Q4

Match each box to the number which has the same value.
One has been done for you.

$\frac{3}{4}$

$\frac{1}{2}$

$\frac{4}{5}$

0.5

0.8

0.3

0.75

0.4

2 mark

Q5

Put a tick (✓) in **each row** to complete this table.
One has been done for you.

	greater than $\frac{1}{2}$	less than $\frac{1}{2}$
0.9	✓	
0.06		
$\frac{11}{20}$		
0.21		

Q6

Sam has 90 bricks.

He uses $\frac{3}{5}$ of them to build a tower.

Grace has 120 bricks.

She uses $\frac{5}{6}$ of them to build a tower.

How many bricks are left over altogether?

Show your method

bricks

2 marks

Q7

Sam and Ben share a pizza with their Dad.

Sam ate $\frac{1}{3}$ of the pizza.

Ben ate $\frac{1}{6}$ of the pizza.

Dad ate the rest.

What fraction of the pizza did Dad eat?

Q8

A book has 276 pages.

Amina has read $\frac{1}{3}$ of the book.

How many pages are **left** for Amina to read?

Q1

$$3\frac{9}{10} - 2\frac{1}{8} + 1\frac{4}{5}$$

Tick one

9

1

7

7

Q2

The length of a day on Mercury is $58\frac{2}{3}$ times the length of a day on Earth.

Show your method

hours

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Q3

Here are five number cards.



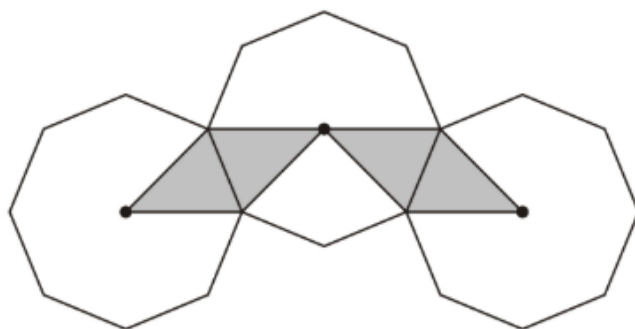
Use **three** of the number cards to make this calculation correct.

$$\left(\boxed{} + \boxed{} \right) \times \boxed{} = 10$$

Q4

The diagram shows three regular octagons joined together.

There is a dot at the centre of each octagon.



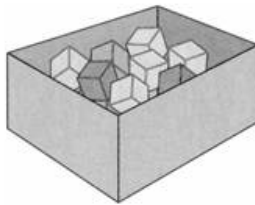
What fraction of the diagram is shaded?



Q5

There are 24 coloured cubes in a box.

Three-quarters of the cubes are red,
four of the cubes are blue
and the rest are green.



How many **green** cubes are in the box?

Show your method

2 marks

Q6

Write two fractions, **each greater than 0 and less than 1**,

which have a difference of $\frac{3}{4}$

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Q7

n and p stand for two numbers.

n is a multiple of 5

p is a multiple of 6

$$\frac{n}{p} = \frac{2}{3}$$

Find numbers that n and p stand for.

Show
your
method

$n =$

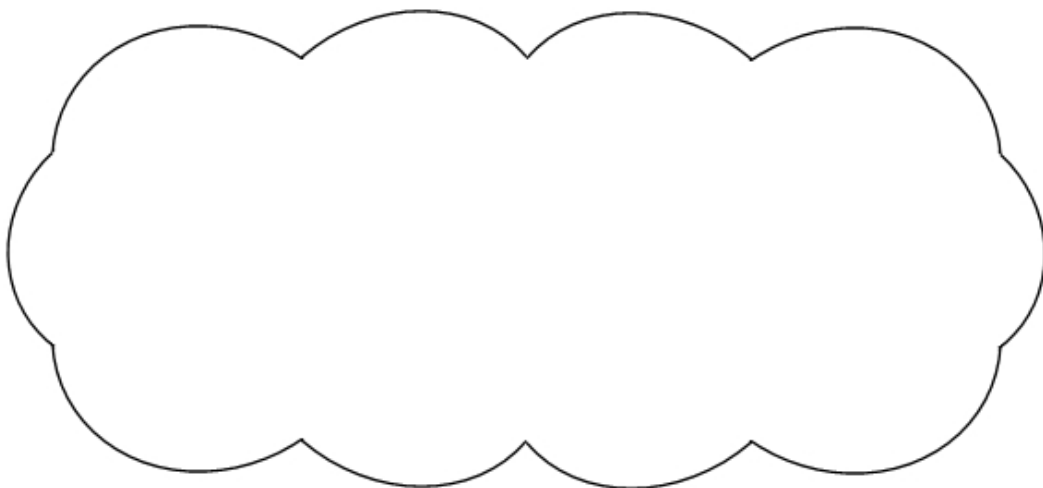
$p =$

2 marks

Q8

Anna says $\frac{4}{7}$ is greater than $\frac{5}{9}$

Explain why Anna is correct.



Answers - Maths Reasoning Activity: Fractions

Warming up*

Mark schemes

Q1

$$\frac{3}{4} = \frac{9}{\boxed{12}} = \frac{\boxed{18}}{24}$$

Q2

Tick two.

0.25

☒

0.75

☐

$\frac{25}{100}$

☒

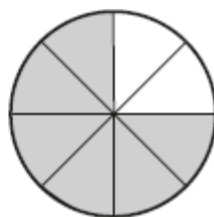
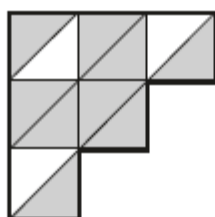
0.5

☐

$\frac{2}{5}$

☐

Q3



Q4

(a) C AND E

Letters may be given in either order.

Q5



Feeling more confident**

Mark schemes

Q1

ward TWO marks for three boxes ticked correctly, as shown:

$\frac{1}{2}$	☒
$\frac{2}{8}$	☒
$\frac{3}{4}$	☐
$\frac{7}{16}$	☒
$\frac{24}{32}$	☐

Q2

Correct number circled, as shown:

$$\frac{67}{8} \quad \frac{48}{8} \quad \frac{62}{8} \quad \left(\frac{55}{8} \right) \quad \frac{76}{8}$$

Q3

Award TWO marks for the correct answer of £1.85

If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.

- $1\frac{1}{2} \times £1.50 = £2.25$
 $\frac{1}{2}$ of £1.80 = 70p (error)
 $£2.25 + 70p = £2.95$
 $£5 - £2.95 =$

OR

- $£1.50 + 75 = £2.25$
 $£2.25 + 90 = 415p$ (error)
 $£5.00 - 415p =$

OR

- sight of £3.15 OR 315p as evidence of evaluating the correct cost of the potatoes and carrots.

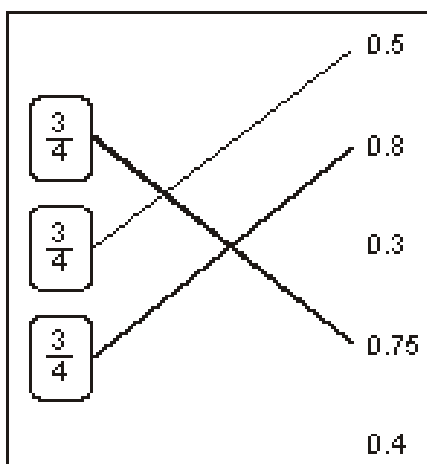
Do not accept misreads for this question.

Answer need not be obtained for the award of ONE mark.

Accept for ONE mark an answer of £185 or £185p as evidence of an appropriate method.

Up to 2 marks

Q 4



Q5

✓	
	✓
✓	
	✓

Q6

Award TWO marks for the correct answer of 56

If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.

- $\frac{1}{5}$ of 90 = 18

$$18 \times 3 = 54$$

$$\frac{1}{6} \text{ of } 120 = 20$$

$$20 \times 5 = 100$$

$$120 + 90 = 210$$

$$210 - 154 =$$

OR

- $\frac{2}{5}$ of 90 = 36

$$\frac{1}{6} \text{ of } 120 = 20$$

$$36 + 20 =$$

Q7

$\frac{1}{2}$ or equivalent

Q8

Award TWO marks for the correct answer of 184

If the answer is incorrect, award ONE mark for:

- sight of 92

OR

- evidence of appropriate method, e.g.

- $\frac{1}{3} \times 276 = 92$

- $92 \times 2 =$

- $276 \div 3 = 92$

- $276 - 92 =$

Answer need not be obtained for the award of ONE mark.

Ready for a challenge***

Mark schemes

Q1

Third box only ticked correctly, as shown:

$3 - 2 + 2$

☐

$4 - 2 + 1$

☐

$$4 - 2 + 2$$



$$3 - 2 + 1$$



Q2

Award TWO marks for the correct answer of 1,408

OR

for an answer in the range of 1,406 to 1,409 inclusive.

If the answer is incorrect, award ONE mark for:

- sight of 1,392

OR

- evidence of an appropriate method, e.g.

- $24 \times 58\frac{2}{3} = \text{answer}$

Within an appropriate method, if a decimal

equivalent for $\frac{2}{3}$ is given, it must be rounded or truncated to at least 2 decimal places.

- $24 \times 58 = 1,394$ (error)

$$\frac{2}{3} \text{ of } 24 = 16$$

$$1,394 + 16 = \text{answer}$$

- $24 \times \frac{176}{3} = \text{answer}$

- $24 \times 58.67 = \text{answer.}$

A final answer is required for the award of ONE mark.

Q3

$$\left(\boxed{1\frac{1}{2}} + \boxed{3\frac{1}{2}} \right) \times \boxed{2}$$

Q4

$$\frac{1}{6}$$

Accept: equivalent fractions, eg $\frac{4}{24}$

[1]

Q5

(a) Award TWO marks for the correct answer of 2

If the answer is incorrect, award ONE mark for evidence of appropriate method, eg

$$\frac{3}{4} \text{ of } 24 = 18$$

$$\text{green} = 24 - 18 - 4$$

Answer need not be obtained for the award of the mark.

Q6

Any two fractions, each greater than 0 and less than 1, with a difference of $\frac{3}{4}$,
eg

$$\frac{1}{8} \text{ AND } \frac{7}{8}$$

*Accept decimals with a difference of 0.75
Do not accept '0' OR '1'*

Q7

Award marks as shown below for values of n and p which meet the following criteria:

	$n:p$	
	2:3	3:2
n is multiple of 5 and p is multiple of 6	2 marks [A]	1 mark [C]
n is multiple of 5 or p is multiple of 6	1 mark [B]	0 marks

The following examples are worth 2 marks:

- $n = 20$ and $p = 30$ [A]
- $n = 80$ and $p = 120$ [A]
 - ! For 2m or 1m, accept multiple answers provided all meet the requirements for the mark(s) and are clearly distinguishable as separate answers, eg for 2 marks
 - $n = 20, 40, 60$
 $p = 30, 60, 90$

2

or

The following examples are worth 1 mark:

- $n = 5$ and $p = 7.5$ [B]
- $n = 10$ and $p = 15$ [B]
- $n = 4$ and $p = 6$ [B]
- $n = 90$ and $p = 60$ [C]

OR

Shows or implies a method for rearranging $\frac{n}{p} = \frac{2}{3}$
which moves p from the denominator, eg:

- $3n = 2p$

- $n = \frac{2p}{3}$

OR

Shows or implies a complete correct method, eg:

- $2 \times 5 \times 6 : 3 \times 5 \times 6$

! For 1m, condone a list of at least five additional

ratios or fractions equivalent to $\frac{2}{3}$ with none incorrect

Q8

Gives a correct explanation that converts the given fractions to decimals or fractions with a common denominator / numerator or percentages, eg:

- $\frac{4}{7} = \frac{36}{63}$ but $\frac{5}{9} = \frac{35}{63}$

- $0.57142... > 0.55555$

- Because there is a $\frac{1}{63}$ difference between the two

For $\frac{4}{7}$ accept:

- $0.57(...)$ or $57(. \dots\%)$

For $\frac{5}{9}$ accept:

- 0.56 or $0.55(...)$ or $56(\%)$ or $55(. \dots\%)$

Accept minimally acceptable explanations, eg:

- $\frac{36}{63}$ $\frac{35}{63}$

- 0.56 0.57

Do not accept incomplete explanations that fail to convert both fractions to a common format, eg:

- $\frac{4}{7}$ is 0.57 so it is bigger

- 9ths are smaller than 7ths and there is only one more 9th

than 7th so $\frac{4}{7}$ is greater

! Condone method of conversion incorrectly expressed in an otherwise correct explanation, eg:

- $\frac{4}{7} \times 9 = \frac{36}{63}$