

Simplifying and Ordering Fractions

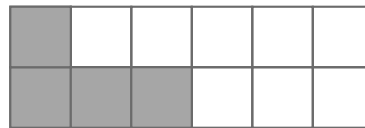
Solutions

For AQA GCSE Mathematics (8300) • Foundation tier

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (2 marks)

Here is a shape made from squares.



What fraction of the shape is shaded?

Give your answer in its simplest form.

Count the squares: 12 altogether, and 4 are shaded.

So $\frac{4}{12}$ of the shape is shaded.

Simplify: divide the top and bottom by 4.

$$\frac{4 \div 4}{12 \div 4} = \frac{1}{3}$$

Answer: $\frac{1}{3}$

Marks: 1 mark for $\frac{4}{12}$. 1 mark for $\frac{1}{3}$.

2 (2 marks)

Write each fraction in its simplest form.

(a) $\frac{12}{18}$

Find the highest common factor of 12 and 18: it is 6.

Divide the top and bottom by 6:

$$\frac{12 \div 6}{18 \div 6} = \frac{2}{3}$$

Answer: $\frac{2}{3}$

Tip: Check that the top and bottom have no common factor left. $\frac{6}{9}$ is not in its simplest form, because 3 still divides into both.

(b) $\frac{35}{56}$

35 and 56 are both in the 7 times table.

Divide the top and bottom by 7:

$$\frac{35 \div 7}{56 \div 7} = \frac{5}{8}$$

Answer: $\frac{5}{8}$

3 (1 mark)

Circle the fraction that is **not** equivalent to $\frac{3}{4}$

Options: $\frac{6}{8}$, $\frac{9}{12}$, $\frac{12}{15}$, $\frac{15}{20}$

Simplify each fraction:

$$\frac{6}{8} = \frac{3}{4} \text{ (divide by 2)}$$

$$\frac{9}{12} = \frac{3}{4} \text{ (divide by 3)}$$

$$\frac{12}{15} = \frac{4}{5} \text{ (divide by 3)}$$

$$\frac{15}{20} = \frac{3}{4} \text{ (divide by 5)}$$

Answer: $\frac{12}{15}$

4 (2 marks)

Write these fractions in order of size.

Start with the smallest fraction.

$$\frac{5}{12} \quad \frac{3}{8} \quad \frac{1}{2} \quad \frac{1}{3}$$

Write them all with the same denominator. 24 works, because 12, 8, 2 and 3 all divide into 24.

$$\frac{5}{12} = \frac{10}{24}$$

$$\frac{3}{8} = \frac{9}{24}$$

$$\frac{1}{2} = \frac{12}{24}$$

$$\frac{1}{3} = \frac{8}{24}$$

In order: $\frac{8}{24}, \frac{9}{24}, \frac{10}{24}, \frac{12}{24}$

Answer: $\frac{1}{3}, \frac{3}{8}, \frac{5}{12}, \frac{1}{2}$

Tip: You cannot order fractions by looking at the denominators alone. Change them to the same denominator (or to decimals) first. Write your answer with the original fractions.

Marks: 1 mark for a correct method, e.g. a common denominator or decimals. 1 mark for the correct order.

5 (1 mark)

Write the missing number.

$$\frac{5}{8} = \frac{\boxed{}}{40}$$

The bottom has been multiplied by 5: $8 \times 5 = 40$

Do the same to the top: $5 \times 5 = 25$

Answer: 25

6 (1 mark)

Mia says,

' $\frac{1}{9}$ is bigger than $\frac{1}{7}$ because 9 is bigger than 7'

Is Mia correct? Tick a box.

Give a reason for your answer.

$\frac{1}{9}$ means sharing 1 whole into 9 equal parts.

$\frac{1}{7}$ means sharing 1 whole into 7 equal parts.

Sharing into more parts makes each part smaller.

So $\frac{1}{9}$ is smaller than $\frac{1}{7}$, and Mia is wrong.

Answer: No, $\frac{1}{7}$ is bigger

7 (1 mark)

Write a fraction that is between $\frac{1}{4}$ and $\frac{1}{2}$

Write both fractions with denominator 8:

$$\frac{1}{4} = \frac{2}{8} \text{ and } \frac{1}{2} = \frac{4}{8}$$

$\frac{3}{8}$ is between them.

Other answers are possible, e.g. $\frac{1}{3}$ or $\frac{2}{5}$.

Answer: e.g. $\frac{3}{8}$

8 (2 marks)

(a) Write $\frac{17}{5}$ as a mixed number.

How many whole 5s go into 17?

$$17 \div 5 = 3 \text{ remainder } 2$$

So 3 wholes and $\frac{2}{5}$ left over.

Answer: $3\frac{2}{5}$

(b) Write $2\frac{3}{4}$ as an improper fraction.

Each whole is $\frac{4}{4}$, so 2 wholes = $\frac{8}{4}$

Add the $\frac{3}{4}$: $8 + 3 = 11$

So $2\frac{3}{4} = \frac{11}{4}$

Answer: $\frac{11}{4}$

Tip: Multiply the whole number by the denominator, then add the numerator:
 $2 \times 4 + 3 = 11$. The denominator stays as 4.

9 (1 mark)

Circle the largest fraction.

Options: $\frac{5}{6}$, $\frac{4}{5}$, $\frac{7}{9}$, $\frac{3}{4}$

Change each fraction to a decimal (divide the top by the bottom):

$$\frac{5}{6} = 0.833 \dots$$

$$\frac{4}{5} = 0.8$$

$$\frac{7}{9} = 0.777 \dots$$

$$\frac{3}{4} = 0.75$$

The largest is $\frac{5}{6}$.

Another way: each fraction is 1 part away from a whole. $\frac{1}{6}$ is the smallest part, so $\frac{5}{6}$ is closest to 1.

Answer: $\frac{5}{6}$

10 (2 marks)

There are 30 students in a class.

12 of the students are boys.

What fraction of the class are girls?

Give your answer in its simplest form.

Number of girls: $30 - 12 = 18$

Fraction of girls: $\frac{18}{30}$

Simplify: the HCF of 18 and 30 is 6.

$$\frac{18 \div 6}{30 \div 6} = \frac{3}{5}$$

Answer: $\frac{3}{5}$

Marks: 1 mark for $\frac{18}{30}$. 1 mark for $\frac{3}{5}$.

11 (2 marks)

A bottle holds 1.5 litres of water.

Orla drinks 450 ml of the water.

What fraction of the water in the bottle does Orla drink?

Give your answer in its simplest form.

Use the same units: 1.5 litres = 1500 ml

So the fraction is $\frac{450}{1500}$

Divide the top and bottom by 50: $\frac{9}{30}$

Divide the top and bottom by 3: $\frac{3}{10}$

Answer: $\frac{3}{10}$

Tip: Change both amounts to the same units before you write the fraction. 1 litre = 1000 ml, so 1.5 litres is 1500 ml, not 150 ml.

Marks: 1 mark for $\frac{450}{1500}$ (or an equivalent fraction). 1 mark for $\frac{3}{10}$.

12 (2 marks)

Dev and Ffion share the driving on a car journey.

The whole journey takes 2 hours 15 minutes.

Dev drives for the first 1 hour 30 minutes.

Ffion drives for the rest of the journey.

What fraction of the journey time does Ffion drive?

Give your answer in its simplest form.

There are 60 minutes in an hour.

Whole journey: $2 \times 60 + 15 = 135$ minutes

Dev drives: $1 \times 60 + 30 = 90$ minutes

Ffion drives the rest: $135 - 90 = 45$ minutes

Fraction Ffion drives: $\frac{45}{135}$

Divide the top and bottom by 45: $\frac{1}{3}$

Answer: $\frac{1}{3}$

Tip: Change the times into minutes first. Do not treat 2 hours 15 minutes as 2.15 hours.

Marks: 1 mark for 45 and 135, or $\frac{45}{135}$. 1 mark for $\frac{1}{3}$.

13 (2 marks)

The fraction $\frac{7}{12}$ is exactly halfway between $\frac{1}{4}$ and another fraction.
Work out the other fraction.

Write $\frac{1}{4}$ with denominator 12: $\frac{1}{4} = \frac{3}{12}$

From $\frac{3}{12}$ up to $\frac{7}{12}$ is a step of $\frac{4}{12}$

The other fraction is the same step above $\frac{7}{12}$

$$\frac{7}{12} + \frac{4}{12} = \frac{11}{12}$$

Answer: $\frac{11}{12}$

Tip: Check your answer: halfway between $\frac{3}{12}$ and $\frac{11}{12}$ is $\frac{7}{12}$.

Marks: 1 mark for $\frac{3}{12}$ and a step of $\frac{4}{12}$ (or $\frac{1}{3}$). 1 mark for $\frac{11}{12}$.

14 (2 marks)

Ravi says,

‘ $\frac{4}{5}$ is closer to 1 than $\frac{7}{6}$ is, because $\frac{7}{6}$ is bigger than 1’

Is Ravi correct?

Tick a box.

You must show your working.

Find how far each fraction is from 1.

$$\frac{4}{5} \text{ is less than 1: } 1 - \frac{4}{5} = \frac{1}{5}$$

$$\frac{7}{6} \text{ is more than 1: } \frac{7}{6} - 1 = \frac{1}{6}$$

$$\frac{1}{6} \text{ is smaller than } \frac{1}{5}.$$

So $\frac{7}{6}$ is closer to 1, and Ravi is wrong.

With decimals: 0.8 is 0.2 away from 1, and 1.166... is 0.166... away.

Answer: No, $\frac{7}{6}$ is closer to 1

Tip: A fraction bigger than 1 can still be the closest to 1. Work out the distance from 1 for each fraction.

Marks: 1 mark for $\frac{1}{5}$ and $\frac{1}{6}$ (or using decimals, or a common denominator of 30). 1 mark for No with correct working.
