Simplify fractions

1

1

$\frac{1}{2}$		$\frac{1}{2}$	

$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$

$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$

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

$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$

$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

Use the fraction wall to write each fraction in its simplest form.

a) $\frac{4}{6} = \boxed{\frac{2}{3}}$

c) $\frac{6}{8} = \boxed{\frac{3}{4}}$

b) $\frac{8}{10} = \boxed{\frac{4}{5}}$

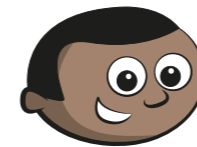**d)** $\frac{4}{8} = \boxed{\frac{1}{2}}$

2 **a)** Use a fraction wall to explain why $\frac{7}{10}$ does not simplify.

It is already in its simplest form.

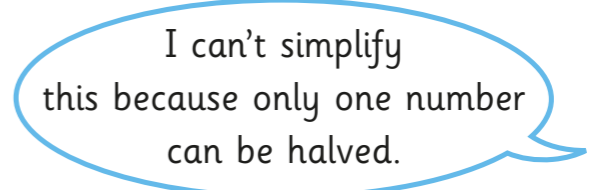**b)** Find three more fractions on the fraction wall that cannot be simplified.

e.g. $\boxed{\frac{2}{3}}$ $\boxed{\frac{3}{7}}$ $\boxed{\frac{9}{10}}$

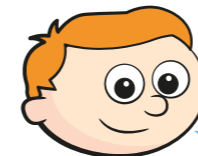**3** Mo, Eva and Ron are trying to simplify $\frac{5}{20}$

> I can't simplify this because one number is odd and the other is even.

Mo

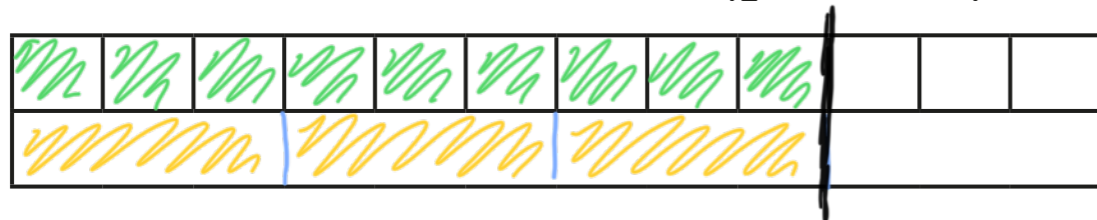> I can't simplify this because only one number can be halved.

Eva

> I can simplify any fraction.

Ron

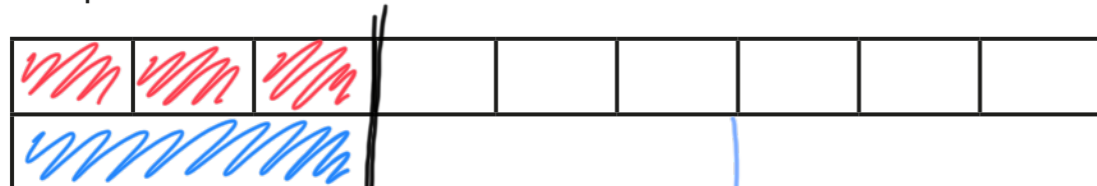Do you fully agree, partly agree or completely disagree with each person?
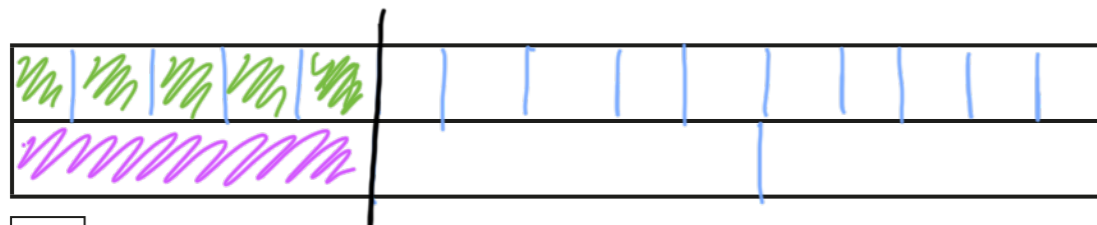
Talk to a partner.

4 a) Draw lines on the bar model to show that $\frac{9}{12}$ is equal to $\frac{3}{4}$

b) Complete each bar model and calculation.

$$\frac{1}{3} = \frac{3}{9}$$

$$\frac{1}{3} = \frac{5}{15}$$

5 Simplify the fractions.

a) $\frac{4}{12} = \boxed{\frac{1}{3}}$ **b)** $\frac{8}{12} = \boxed{\frac{2}{3}}$ **c)** $\frac{40}{120} = \boxed{\frac{1}{3}}$ **d)** $\frac{12}{4} = \boxed{3}$

$\frac{4}{16} = \boxed{\frac{1}{4}}$ $\frac{8}{16} = \boxed{\frac{1}{2}}$ $\frac{40}{160} = \boxed{\frac{1}{4}}$ $\frac{120}{4} = \boxed{30}$

$\frac{4}{20} = \boxed{\frac{1}{5}}$ $\frac{8}{20} = \boxed{\frac{2}{5}}$ $\frac{40}{200} = \boxed{\frac{1}{5}}$ $\frac{12}{400} = \boxed{\frac{3}{100}}$

Describe and explain any patterns that you noticed.

Various answers

6 Write 3 fractions that simplify to $\frac{3}{5}$

e.g. $\boxed{\frac{6}{10}}$ $\boxed{\frac{9}{15}}$ $\boxed{\frac{12}{20}}$

7 Teddy and Dora are both simplifying $\frac{30}{42}$

Teddy
$$\frac{30}{42} = \frac{15}{21} = \frac{5}{7}$$

Dora
$$\frac{30}{42} = \frac{5}{7}$$

a) How do you think Dora was able to simplify the fraction in one step?

b) Simplify these fractions in one step.

$\frac{24}{30} = \boxed{\frac{4}{5}}$ $\frac{16}{20} = \boxed{\frac{4}{5}}$

$\frac{56}{64} = \boxed{\frac{7}{8}}$ $\frac{99}{121} = \boxed{\frac{9}{11}}$

8 $\frac{⭐}{💗}$ ⭐ is a prime number.   💗 is a multiple of 10

The fraction can be simplified.
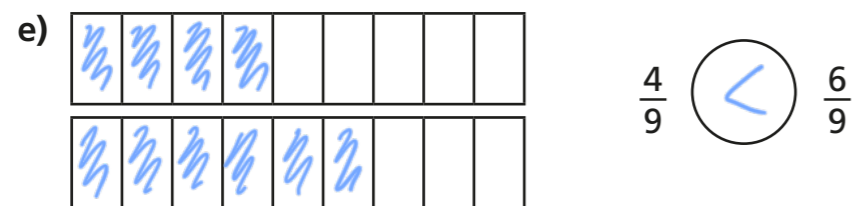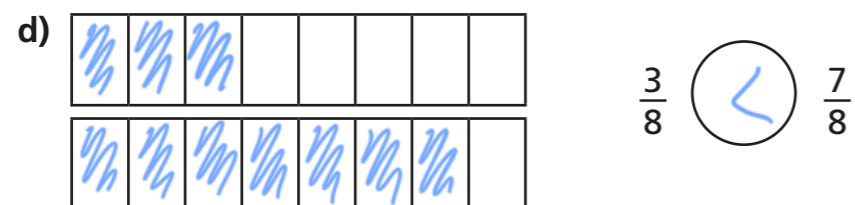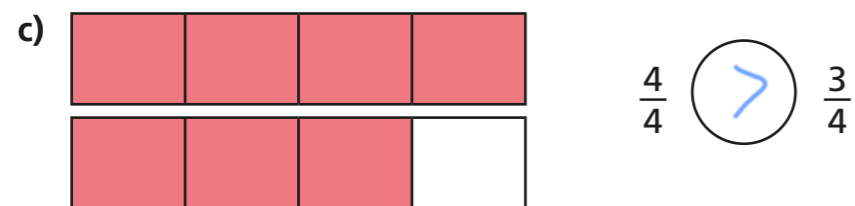
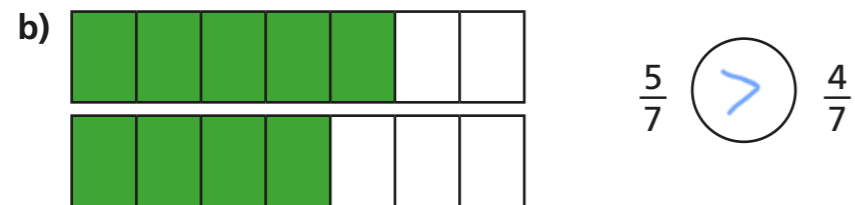What could each number be? Explain your reasoning.

E.g. 2 is prime, 20 is a multiple of 10
and $\frac{2}{20} = \frac{1}{10}$

so star could be 2 and heart could be 20

Compare and order (denominator)

1 Write <, > or = to compare the fractions.
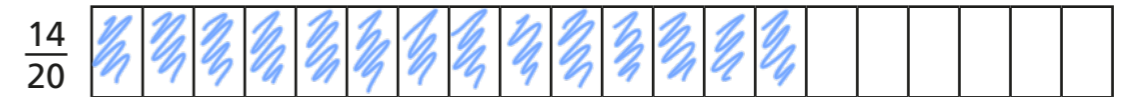
Use the bar models to help you.

a)

$\dfrac{1}{5}$ $\boxed{<}$ $\dfrac{3}{5}$

b)

$\dfrac{5}{7}$ $\boxed{>}$ $\dfrac{4}{7}$

c)

$\dfrac{4}{4}$ $\boxed{>}$ $\dfrac{3}{4}$

d)

$\dfrac{3}{8}$ $\boxed{<}$ $\dfrac{7}{8}$

e)

$\dfrac{4}{9}$ $\boxed{<}$ $\dfrac{6}{9}$

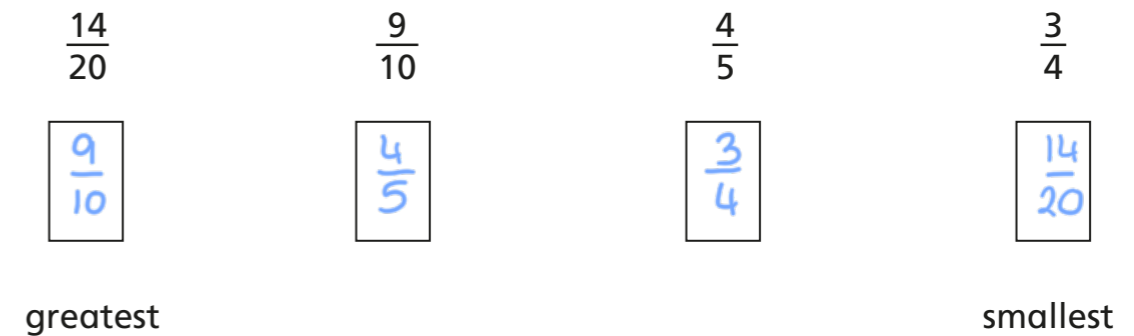**f)** What do you notice about your answers?

g) Complete the sentence.

When the denominators are the same, the __greater__
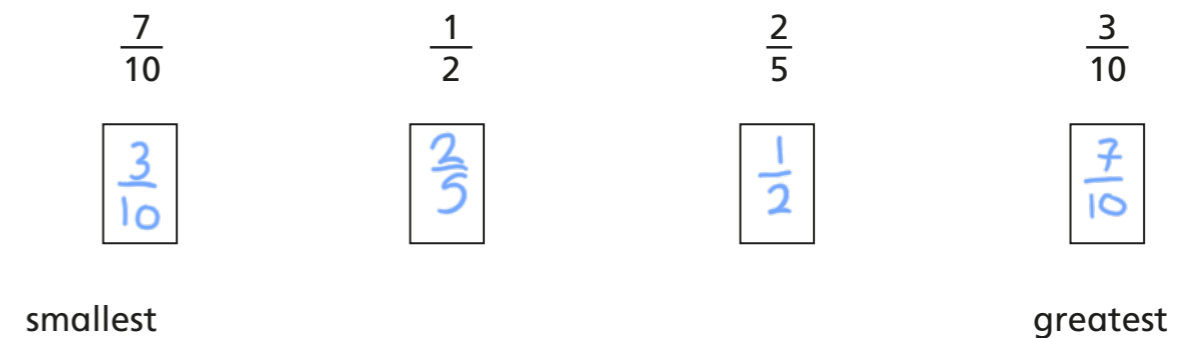
the numerator, the __greater__ the fraction. (or smaller / smaller)

2 a) Colour the bar models to show the fractions.

$\dfrac{14}{20}$

$\dfrac{9}{10}$

$\dfrac{4}{5}$

$\dfrac{3}{4}$

b) Use the bar models to sort these fractions in order from greatest to smallest.

$\dfrac{14}{20}$ $\qquad$ $\dfrac{9}{10}$ $\qquad$ $\dfrac{4}{5}$ $\qquad$ $\dfrac{3}{4}$

$\boxed{\dfrac{9}{10}}$ $\qquad$ $\boxed{\dfrac{4}{5}}$ $\qquad$ $\boxed{\dfrac{3}{4}}$ $\qquad$ $\boxed{\dfrac{14}{20}}$

greatest $\qquad\qquad\qquad\qquad\qquad\qquad$ smallest

c) Order the fractions from smallest to greatest.

$\dfrac{7}{10}$ $\qquad$ $\dfrac{1}{2}$ $\qquad$ $\dfrac{2}{5}$ $\qquad$ $\dfrac{3}{10}$

$\boxed{\dfrac{3}{10}}$ $\qquad$ $\boxed{\dfrac{2}{5}}$ $\qquad$ $\boxed{\dfrac{1}{2}}$ $\qquad$ $\boxed{\dfrac{7}{10}}$

smallest $\qquad\qquad\qquad\qquad\qquad\qquad$ greatest

3 Amir is comparing the fractions $\frac{4}{15}$ and $\frac{3}{10}$

$$\frac{4}{15} = \frac{8}{30} \qquad \frac{3}{10} = \frac{9}{30}$$

$$\frac{9}{30} \text{ is greater than } \frac{8}{30}$$

$$\frac{3}{10} \text{ is greater than } \frac{4}{15}$$
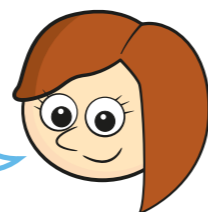
Explain Amir's method.

Amir used equivalent fractions to find a common denominator and then compared the numerators.

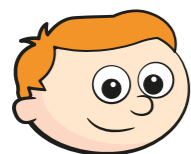**4** Ron and Rosie are practising penalties.

Ron scored 7 out of 10.

Rosie scored 23 out of 30

I scored more than you, so I should take penalties for the school team.

I did not miss as many as you, so I should take the penalties.

Compare fractions to explain who should take penalties for the school team.

$$\frac{7}{10} = \frac{21}{30} \qquad \frac{23}{30} > \frac{21}{30}$$ _Rosie should take penalties for the school team._

5 Write <, > or = to compare the fractions.

a) $\frac{3}{4}$ ⬠< $\frac{5}{6}$

b) $\frac{2}{3}$ ⬠> $\frac{5}{9}$

c) $\frac{2}{3}$ ⬠< $\frac{7}{8}$

d) $\frac{3}{5}$ ⬠< $\frac{5}{7}$

e) $\frac{9}{10}$ ⬠> $\frac{3}{4}$

f) $\frac{9}{10}$ ⬠< $\frac{19}{20}$

6 Annie, Tommy and Kim are making flags for the school fair.

Annie has completed $3\frac{3}{4}$ flags, Tommy has completed $3\frac{2}{3}$ flags and Kim has completed $\frac{18}{5}$ flags.

Who has completed the most flags?

$$\frac{18}{5} = 3\frac{3}{5} \qquad \frac{3}{4} > \frac{2}{3} > \frac{3}{5}$$

Annie has completed the most flags

Compare and order (numerator)

1 Use strips of paper to represent the fractions and complete the sentences.

a) $\frac{1}{3}$, $\frac{1}{5}$ and $\frac{1}{6}$

The smallest fraction is $\boxed{\frac{1}{6}}$ The greatest fraction is $\boxed{\frac{1}{3}}$

b) $\frac{2}{3}$, $\frac{2}{5}$ and $\frac{2}{6}$

The smallest fraction is $\boxed{\frac{2}{6}}$ The greatest fraction is $\boxed{\frac{2}{3}}$

c) $\frac{3}{3}$, $\frac{3}{5}$ and $\frac{3}{6}$

The smallest fraction is $\boxed{\frac{3}{6}}$ The greatest fraction is $\boxed{\frac{3}{3}}$
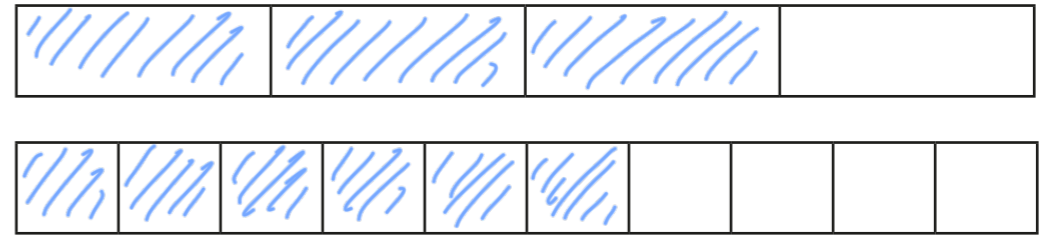
d) What do you notice about your answers?

e) Complete the sentence.

When the __numerators__ are the same, the __greater__

the denominator, the __smaller__ the fraction. (or smaller/greater)

2 **a)** Colour the bar models to compare $\frac{3}{4}$ and $\frac{6}{10}$

b) Write <, > or = to complete the statement.

$\boxed{\frac{3}{4}}$ $\bigcirc{>}$ $\boxed{\frac{6}{10}}$ or $\frac{6}{10} < \frac{3}{4}$

3 Which is the greatest fraction? Circle your answer.

$\frac{3}{100}$ $\boxed{\frac{3}{1,000}}$ $\frac{3}{500}$

How do you know?

4 Write < or > to compare the fractions.

a) $\frac{1}{7}$ $\bigcirc{>}$ $\frac{1}{9}$ **d)** $\frac{11}{12}$ $\bigcirc{<}$ $\frac{11}{11}$

b) $\frac{4}{5}$ $\bigcirc{>}$ $\frac{4}{7}$ **e)** $\frac{19}{5}$ $\bigcirc{>}$ $\frac{19}{6}$

c) $\frac{3}{13}$ $\bigcirc{<}$ $\frac{3}{8}$ **f)** $\frac{107}{53}$ $\bigcirc{<}$ $\frac{107}{40}$

5 Explain how can you compare $\frac{2}{3}$ and $\frac{4}{5}$ using the same numerator rule.

$$\frac{2}{3} = \frac{4}{6} \qquad \frac{4}{6} < \frac{4}{5} \qquad so \qquad \frac{2}{3} < \frac{4}{5}$$

Complete the sentence to compare $\frac{2}{3}$ and $\frac{4}{5}$

$\boxed{\frac{4}{5}}$ is greater than $\boxed{\frac{2}{3}}$

6 Scott scored 20 out of 24 in a game.

Dani scored 5 out of 7

Compare their scores.

Explain who you think did best and why.

$$Scott: \quad \frac{20}{24} = \frac{5}{6} \qquad \frac{5}{6} > \frac{5}{7} \qquad so \quad Scott\ did\ better.$$

$$Dani: \frac{5}{7}$$

7 Write <, > or = to complete each statement.

a) $\frac{2}{5}$ $\bigcirc<$ $1\frac{1}{3}$ b) $\frac{2}{5}$ $\bigcirc<$ $\frac{6}{11}$ c) $3\frac{2}{3}$ $\bigcirc>$ $\frac{11}{4}$

$1\frac{2}{5}$ $\bigcirc>$ $\frac{1}{3}$ $1\frac{2}{5}$ $\bigcirc<$ $3\frac{6}{11}$ $11\frac{2}{9}$ $\bigcirc<$ $\frac{101}{3}$

$1\frac{2}{5}$ $\bigcirc>$ $1\frac{1}{3}$ $3\frac{2}{5}$ $\bigcirc<$ $3\frac{6}{11}$ $11\frac{1}{9}$ $\bigcirc<$ $\frac{100}{8}$

$\frac{12}{5}$ $\bigcirc<$ $\frac{12}{3}$ $\frac{12}{5}$ $\bigcirc<$ $\frac{36}{11}$ $27\frac{3}{4}$ $\bigcirc<$ $\frac{111}{3}$
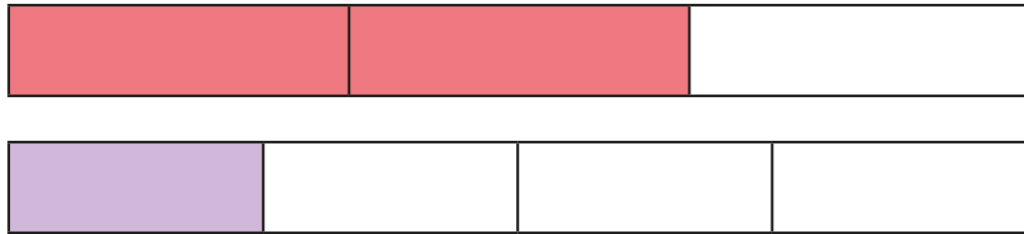
8 Explain how you know when it is best to compare the numerators or denominators of two fractions.

When the lowest common multiple of either the numerators or denominators is easier to find.
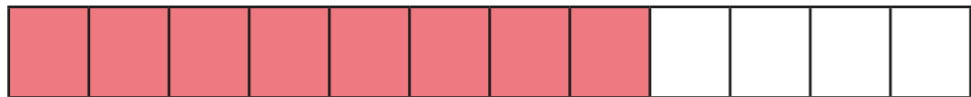
Add and subtract fractions (2)

1 Amir is using fraction strips to work out $\frac{2}{3} + \frac{1}{4}$

Amir says he needs to find a common denominator.
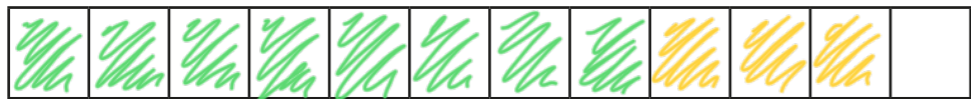
a) Complete Amir's method.

$\frac{2}{3} = \frac{\boxed{8}}{12}$

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

$\frac{2}{3} + \frac{1}{4} = \frac{\boxed{8}}{12} + \frac{\boxed{3}}{12} = \frac{\boxed{11}}{12}$

b) Show the addition on the fraction strip.

c) Could you have used a different denominator?

2 What common denominator can you use to add the fractions?

a) $\frac{2}{5} + \frac{1}{2}$ Common denominator = $\boxed{10}$

b) $\frac{2}{3} + \frac{4}{5}$ Common denominator = $\boxed{15}$

c) $\frac{7}{8} - \frac{1}{4}$ Common denominator = $\boxed{8}$

d) $\frac{7}{9} - \frac{1}{6}$ Common denominator = $\boxed{18}$

e) $\frac{11}{15} + \frac{3}{10}$ Common denominator = $\boxed{30}$

3 Ron and Eva are working out $\frac{1}{4} + \frac{5}{6}$

Ron's method

$\frac{1}{4} + \frac{5}{6} = \frac{3}{12} + \frac{10}{12} = \frac{13}{12}$

Eva's method

$\frac{1}{4} + \frac{5}{6} = \frac{6}{24} + \frac{20}{24} = \frac{26}{24}$

a) What is the same about Ron's and Eva's methods?

They both found a common denominator.

b) What is different about their methods?

They used a different common denominator.

c) Which method do you prefer? Why?

4 Complete the calculations.

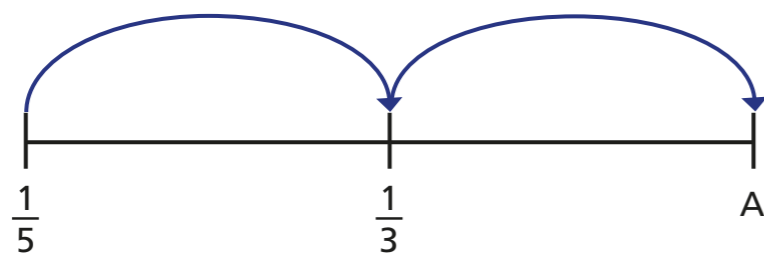a) $\dfrac{1}{5} + \dfrac{3}{4} = \boxed{\dfrac{19}{20}}$ c) $\dfrac{1}{2} - \dfrac{1}{7} = \boxed{\dfrac{5}{14}}$

b) $\dfrac{7}{8} - \dfrac{1}{3} = \boxed{\dfrac{13}{24}}$ d) $\dfrac{11}{18} + \dfrac{7}{12} = \boxed{1\dfrac{7}{36}}$

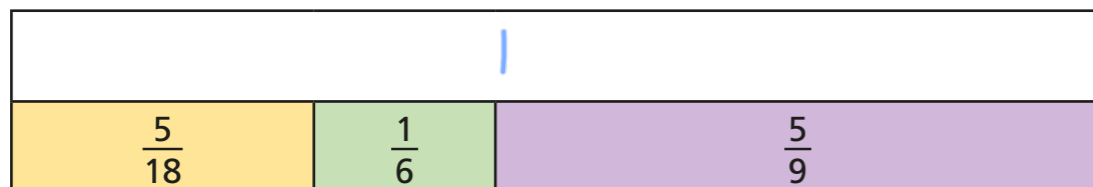**5** Mo is drawing jumps on a number line.

The jumps are the same size.

$\dfrac{1}{5}$ $\dfrac{1}{3}$ A

a) What is the size of the jump?

$\boxed{\dfrac{2}{15}}$

b) What is the value of A?

$\boxed{\dfrac{7}{15}}$

6 Complete the bar model.

1		
$\dfrac{5}{18}$	$\dfrac{1}{6}$	$\dfrac{5}{9}$

7 Complete the additions.

Give your answers as mixed numbers and as improper fractions.

a) $\dfrac{4}{5} + \dfrac{5}{4} = \boxed{\dfrac{41}{20}} = \boxed{2\dfrac{1}{20}}$ c) $\dfrac{9}{8} + \dfrac{8}{9} = \boxed{\dfrac{145}{72}} = \boxed{2\dfrac{1}{72}}$

b) $\dfrac{2}{3} + \dfrac{3}{2} = \boxed{\dfrac{13}{6}} = \boxed{2\dfrac{1}{6}}$ d) $\boxed{2\dfrac{4}{15}} = \boxed{\dfrac{34}{15}} = \dfrac{5}{3} + \dfrac{3}{5}$

What patterns do you notice?

8 Look at these additions.

$\dfrac{1}{2} + \dfrac{1}{3} = \boxed{}$	$\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{4} = \boxed{}$	$\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{4} + \dfrac{1}{5} = \boxed{}$

a) When does this pattern first give an answer greater than 2?

$\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{4} + \dfrac{1}{5} + \dfrac{1}{6} + \dfrac{1}{7} + \dfrac{1}{8} + \dfrac{1}{9} + \dfrac{1}{10} + \dfrac{1}{11}$

b) Do you think the pattern will ever give an answer greater than 100?

White Rose Maths

Mixed addition and subtraction

1 Work out the calculations.

a) $\dfrac{2}{5} + \dfrac{3}{4} = \boxed{1\frac{3}{20}}$
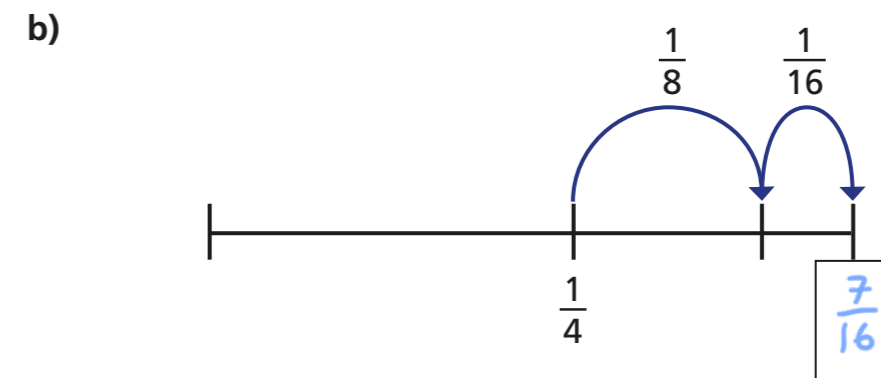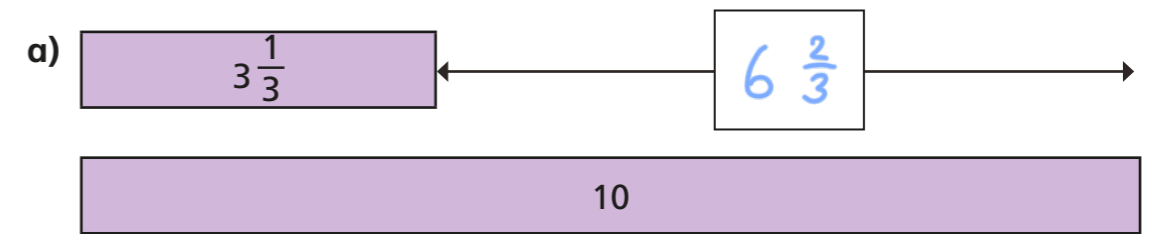
b) $2\dfrac{1}{4} - \dfrac{2}{3} = \boxed{1\frac{7}{12}}$

c) $3\dfrac{7}{10} - 2\dfrac{1}{4} = \boxed{1\frac{9}{20}}$

2 Complete the calculation.

$$\dfrac{5}{6} + 1\dfrac{2}{9} - \dfrac{1}{2} = \boxed{1\frac{5}{9}}$$

3 Work out the missing fractions.

a)

| $3\dfrac{1}{3}$ | ← | $6\frac{2}{3}$ |

| 10 |

b)

$\dfrac{1}{8}$ $\dfrac{1}{16}$

$\dfrac{1}{4}$ $\boxed{\frac{7}{16}}$

4 Complete the calculations.

a) $\dfrac{2}{5} + \dfrac{1}{5} + \boxed{\frac{2}{5}} = 1$

b) $\dfrac{2}{5} + \dfrac{1}{5} + \boxed{\frac{9}{10}} = 1\dfrac{1}{2}$

c) $\dfrac{2}{5} + \dfrac{1}{5} + \boxed{\frac{11}{15}} = \dfrac{4}{3}$

d) $\dfrac{4}{5} = \boxed{1\frac{3}{5}} - \dfrac{4}{5}$

5 Which of these are true and which are false?

Can you decide without having to do the additions or the subtractions?

Talk about your reasons with a partner.

	True or false?
$2\frac{1}{3} + 3\frac{3}{4}$ is equal to $3\frac{1}{3} + 2\frac{3}{4}$	True
$3\frac{3}{4} - \frac{1}{3}$ is less than $4\frac{3}{4} - 1\frac{1}{3}$	False
$3\frac{3}{4} - 2\frac{1}{3}$ is equal to $3\frac{1}{3} - 2\frac{3}{4}$	False

6 Complete the addition grid.

$1\frac{1}{4}$	$2\frac{1}{10}$	$\frac{1}{4}$	$= 3\frac{3}{5}$
$\frac{1}{25}$	$1\frac{3}{20}$	$2\frac{1}{5}$	$= 3\frac{39}{100}$
$3\frac{2}{5}$	$1\frac{1}{50}$	$1\frac{3}{100}$	$= 5\frac{9}{20}$
$\shortparallel$	$\shortparallel$	$\shortparallel$	
$4\frac{69}{100}$	$4\frac{27}{100}$	$3\frac{12}{25}$	

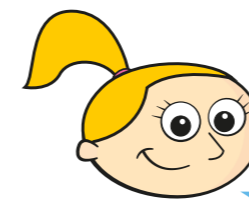**7** A painter uses the following mixtures.

How much more green paint does she have than purple paint?

$\frac{1}{4}$ l $\frac{3}{5}$ l purple paint
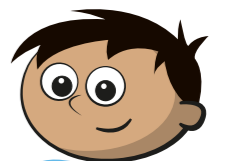
$\frac{2}{3}$ l $\frac{1}{5}$ l green paint

$\frac{1}{60}$ l
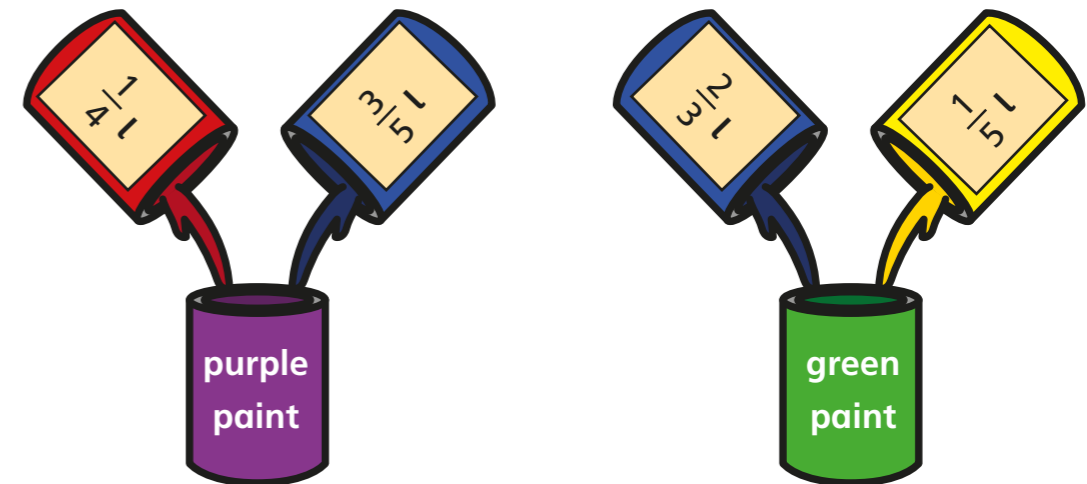
8 Eva and Amir are working out this calculation.

$$\frac{1}{4} + \frac{25}{100} - \frac{2}{8} - \frac{9}{36}$$

This is going to be very difficult, because I can't find a common denominator.

I have found an easier way.

Find Amir's solution. Explain how this calculation can be solved.

All four fractions are equivalent to $\frac{1}{4}$ so the answer is 0

White Rose Maths