

Maths • Parts of a whole, made visible

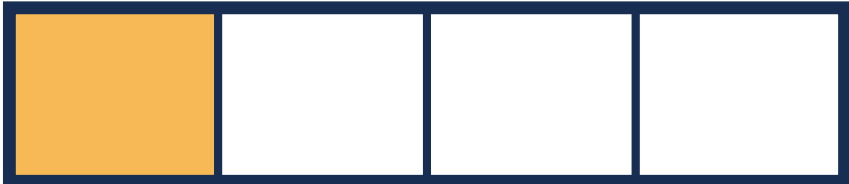
Fractions



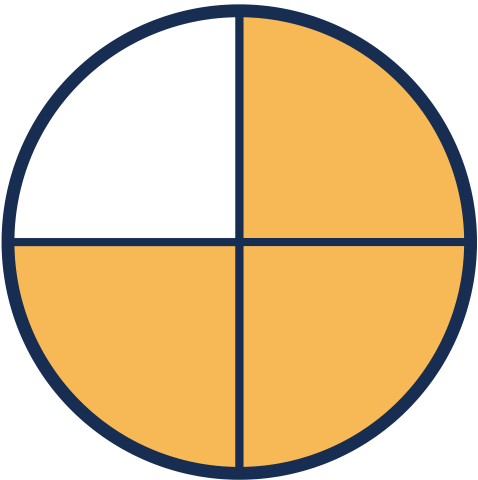
$$\frac{1}{2}$$



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



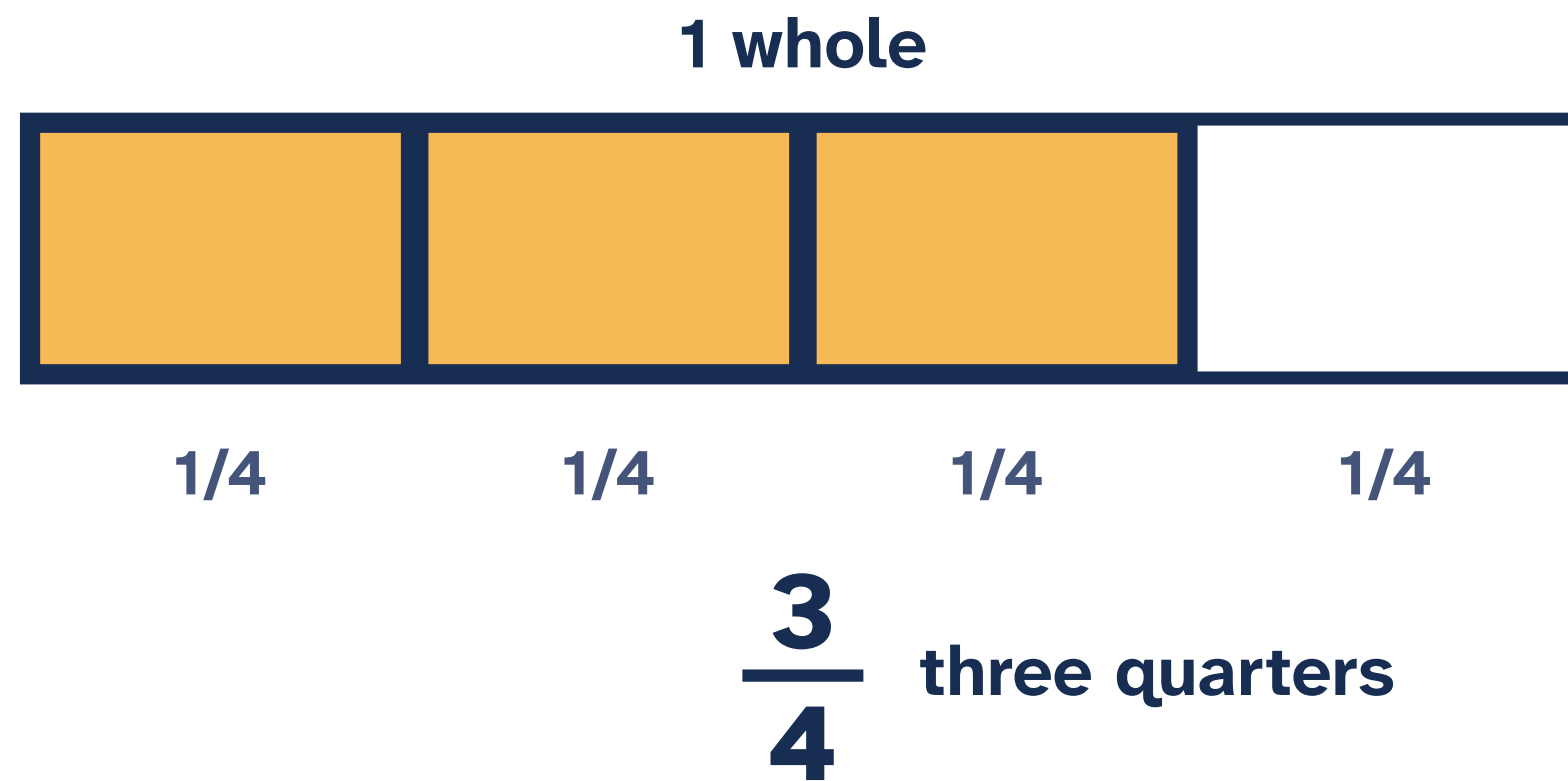
$$\frac{1}{4}$$



Goals

By the end of this lesson you can

- ✓ Explain what the numerator and denominator mean
- ✓ Show a fraction as part of a shape and on a number line
- ✓ Find equivalent fractions and simplify
- ✓ Compare and order fractions
- ✓ Find a fraction of an amount

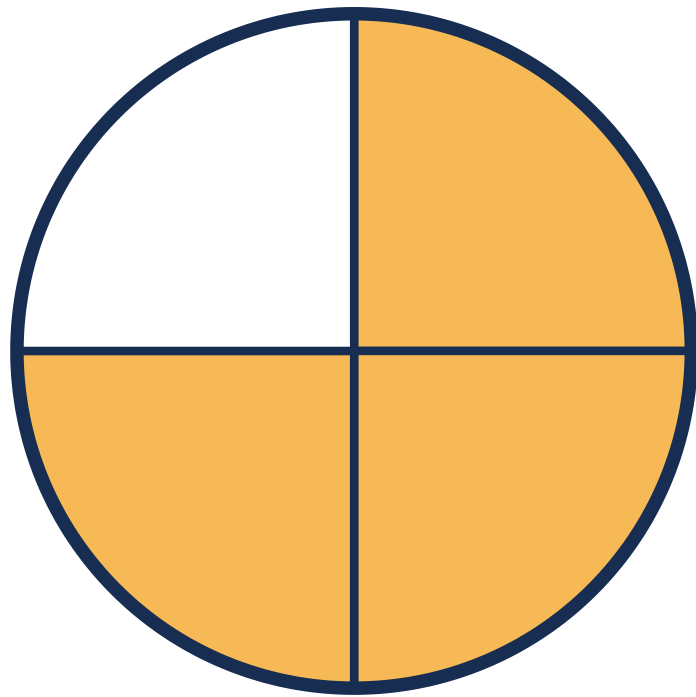


- ① One whole bar
- ② Split into 4 equal parts: each is one quarter
- ③ Shade 3 of the 4 parts: three quarters

A fraction is equal parts of a whole

- ♦ Start with one whole
- ♦ Split it into equal parts
- ♦ Count the parts you are talking about
- ♦ Three of four equal parts is three quarters

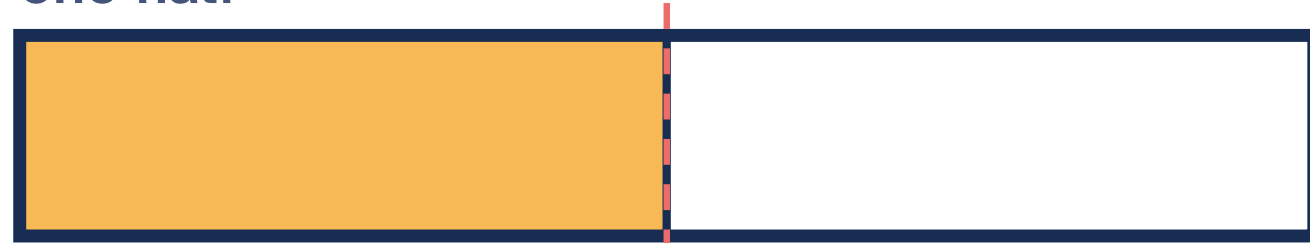
Numerator and denominator



$\frac{3}{4}$: 3 of 4 equal parts are shaded. It is already in its simplest form.

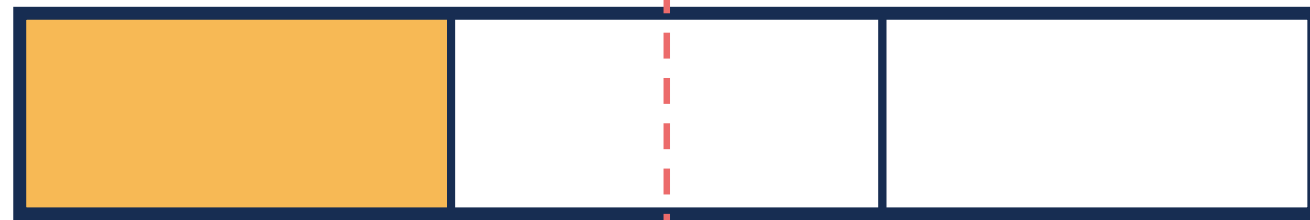
- The denominator (bottom) is how many equal parts the whole has
- The numerator (top) is how many of those parts we mean
- $\frac{3}{4}$ means 3 of 4 equal parts

one half



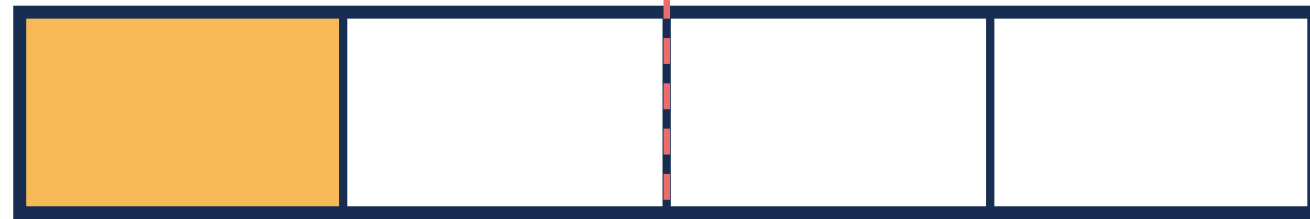
$$\frac{1}{2}$$

one third



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

one quarter

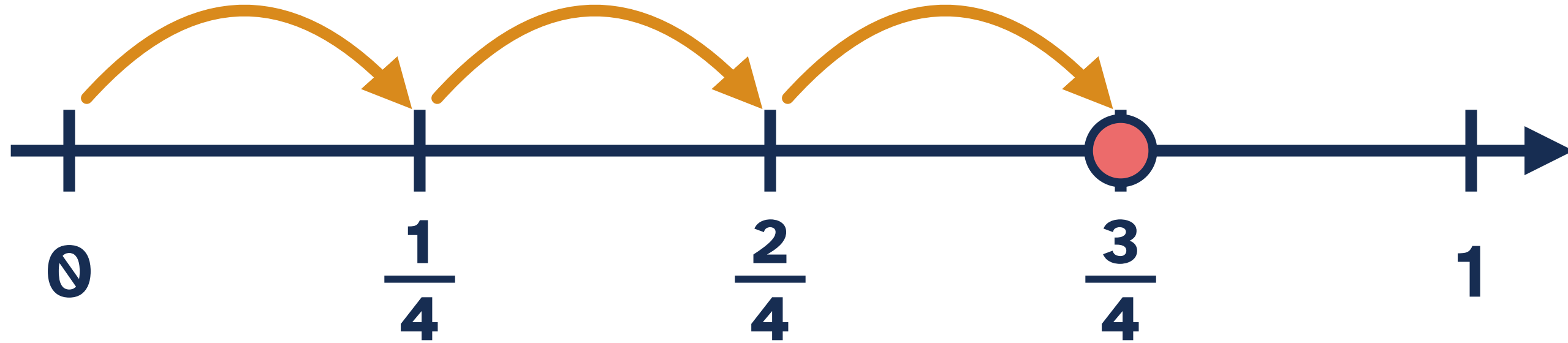


$$\frac{1}{4}$$

Halves, thirds and quarters

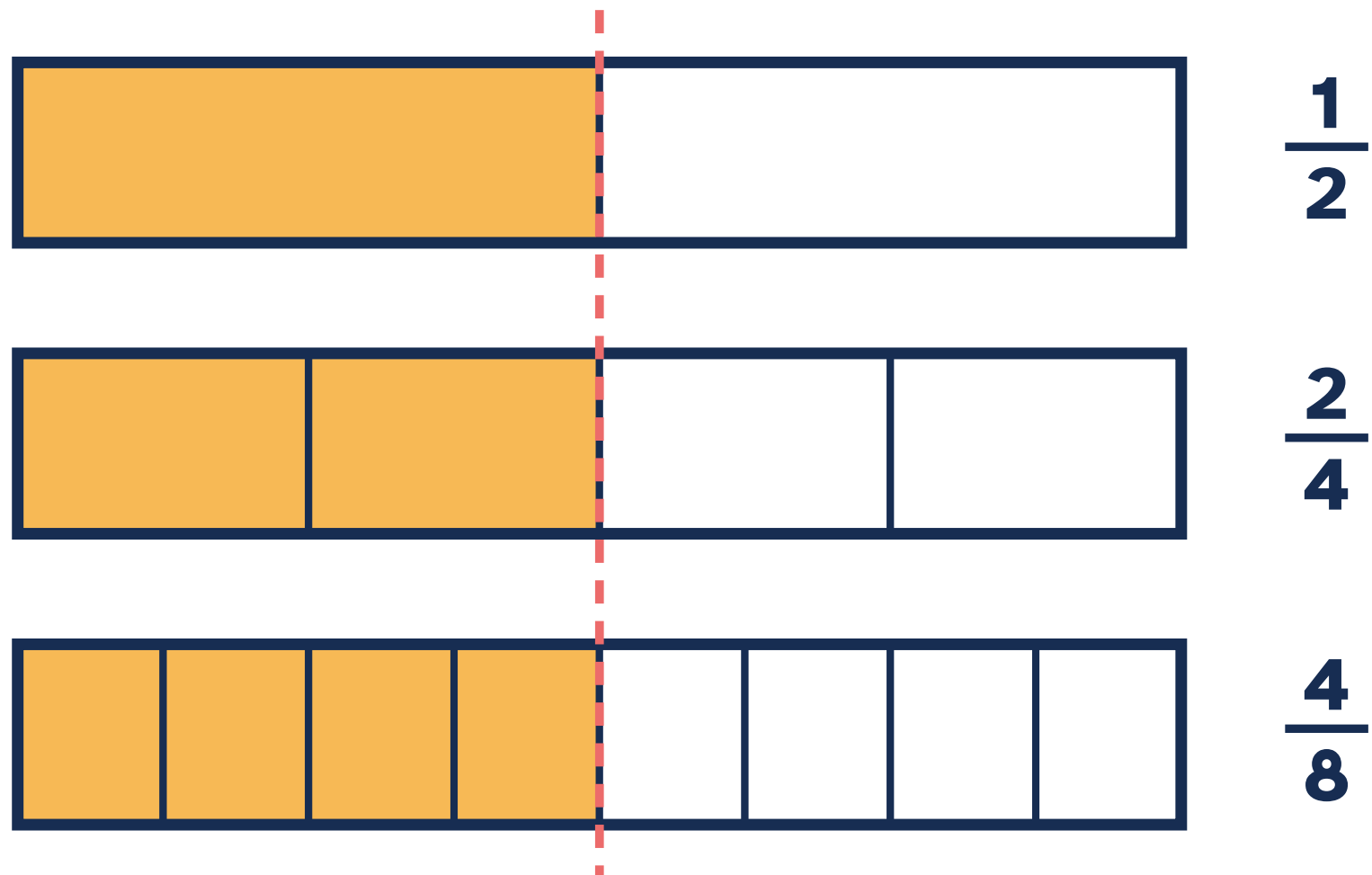
- ♦ Same whole, more parts: each part gets smaller
- ♦ One half is bigger than one third
- ♦ One third is bigger than one quarter

Fractions on a number line



two quarters = one half

- ♦ Split the line from 0 to 1 into equal steps
- ♦ Count steps from 0 to place the fraction
- ♦ Two quarters and one half are the same point



$\times 2$

$\times 2$

Equivalent fractions

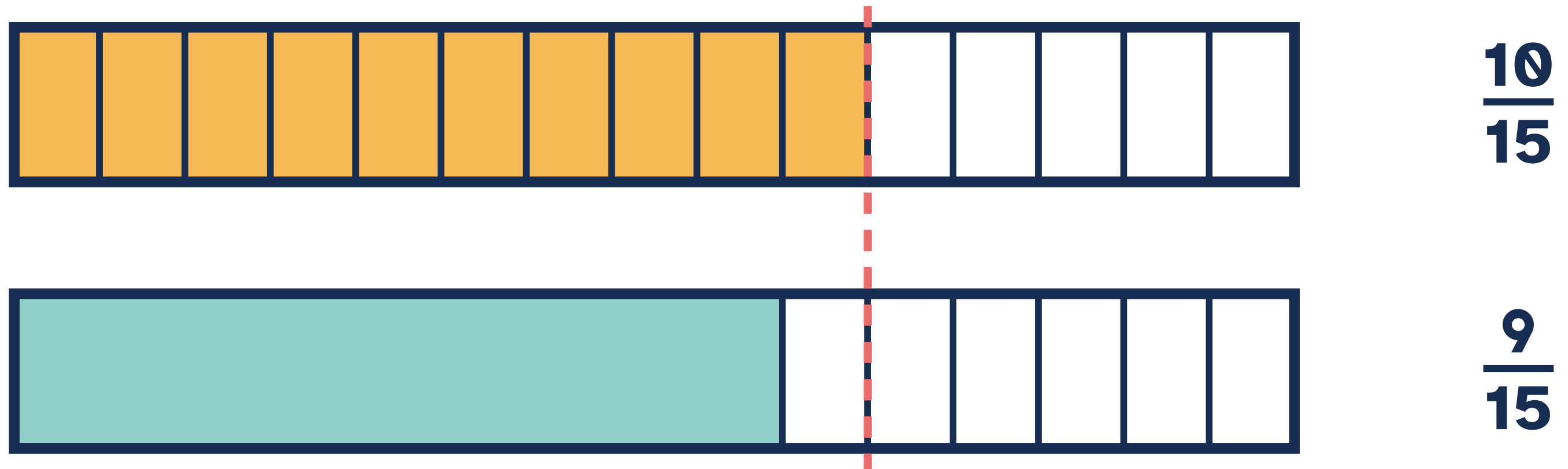
- $\frac{1}{2}$, $\frac{2}{4}$ and $\frac{4}{8}$ shade the same amount
- Multiply top and bottom by the same number to find one
- Divide top and bottom by the same number to simplify

 Worked example

Write 12/18 in its simplest form

- Find a number that divides both 12 and 18: the biggest is 6
- $12 \div 6 = 2$ and $18 \div 6 = 3$
- So $12/18 = 2/3$
- Check: 2 and 3 have no common factor except 1

Comparing fractions



10 fifteenths is more than 9 fifteenths
so two thirds is bigger than three fifths

- ♦ Hard to see: is $\frac{2}{3}$ bigger than $\frac{3}{5}$ ♦ Write both with the same denominator: 15
- ♦ $\frac{2}{3} = \frac{10}{15}$ and $\frac{3}{5} = \frac{9}{15}$, so $\frac{2}{3}$ is bigger

Two shortcuts

Same denominator

- Compare the numerators
- $3/8$ is less than $5/8$
- The parts are the same size

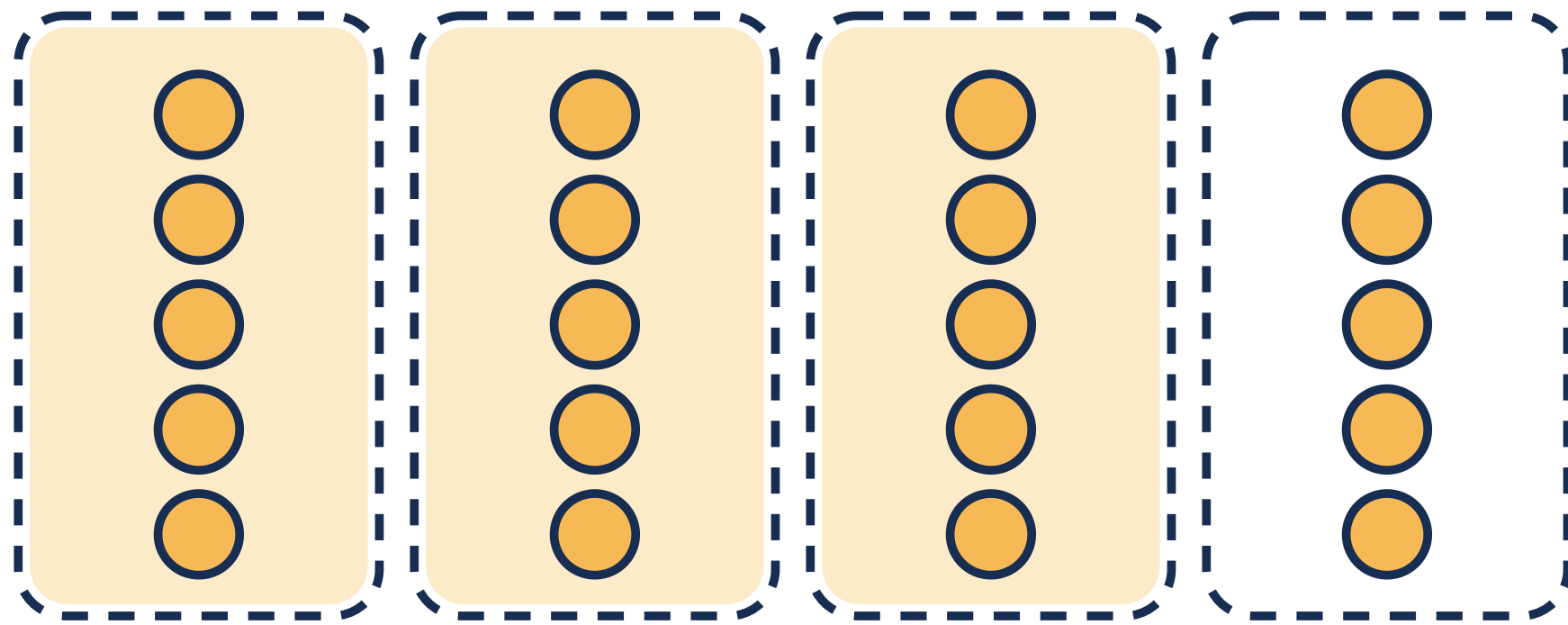
Same numerator

- The bigger denominator is smaller
- $2/5$ is more than $2/7$
- Sevenths are smaller than fifths

 Worked example

Order $\frac{3}{4}$, $\frac{2}{3}$ and $\frac{5}{6}$

- The lowest common denominator of 4, 3 and 6 is 12
- $\frac{3}{4} = \frac{9}{12}$, $\frac{2}{3} = \frac{8}{12}$, $\frac{5}{6} = \frac{10}{12}$
- Order the numerators: 8, 9, 10
- Smallest first: $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$



3 groups of 5 = 15

- ① 20 counters
- ② Divide by the denominator: 4 equal groups of 5
- ③ Take 3 of the groups: $\frac{3}{4}$ of 20 is 15

A fraction of an amount

- ♦ $\frac{3}{4}$ of 20: divide 20 into 4 equal groups
- ♦ Each group is 5
- ♦ Three groups make 15
- ♦ Divide by the denominator, multiply by the numerator

Common mix-ups

Often said

A bigger denominator means a bigger fraction.

What is true

For the same whole, more parts means smaller parts: $1/8$ is less than $1/3$.

Often said

Any four pieces of a shape are quarters.

What is true

Only if the four pieces are equal. Fractions always mean equal parts.

Often said

$2/4$ is more than $1/2$ because the numbers are bigger.

What is true

They are equivalent: both shade exactly the same amount.

Often said

$$1/2 + 1/3 = 2/5$$

What is true

Use a common denominator first: $3/6 + 2/6 = 5/6$.

🔍 Quick check

Which of these fractions is the largest?

A $\frac{3}{5}$

B $\frac{5}{8}$

C $\frac{7}{10}$

D $\frac{2}{3}$

Summary

Key takeaways

- 1 A fraction is a number of equal parts of a whole
- 2 The denominator counts the parts; the numerator counts the ones we mean
- 3 Equivalent fractions show the same amount
- 4 Compare fractions by giving them the same denominator
- 5 Fraction of an amount: divide by the bottom, multiply by the top