



Fractions

A guide to solving fraction questions

What is a fraction?

- A fraction is a part of a whole. There are two numbers to every fraction:

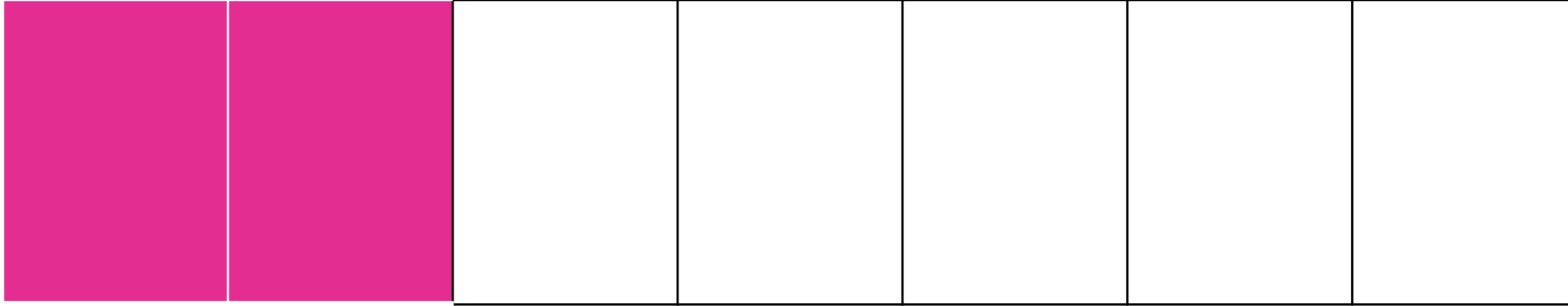
$$\frac{2}{7}$$

Numerator

How many parts you have

Denominator

How many parts the whole has been split up into...



$$\frac{2}{7}$$

Is a proper fraction

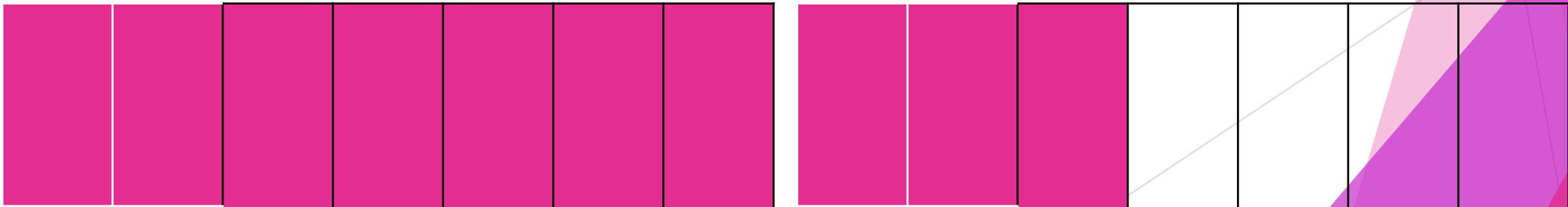
Improper and mixed fractions

- An improper fraction has a numerator that is **bigger** than its denominator,

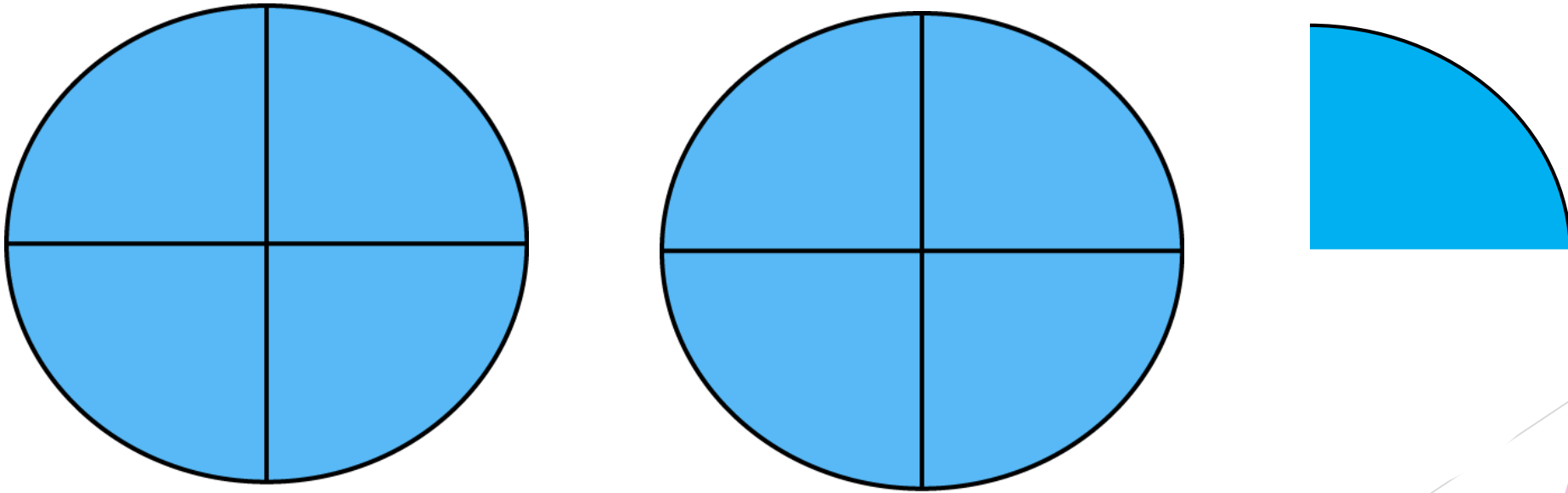
$$\frac{10}{7}$$

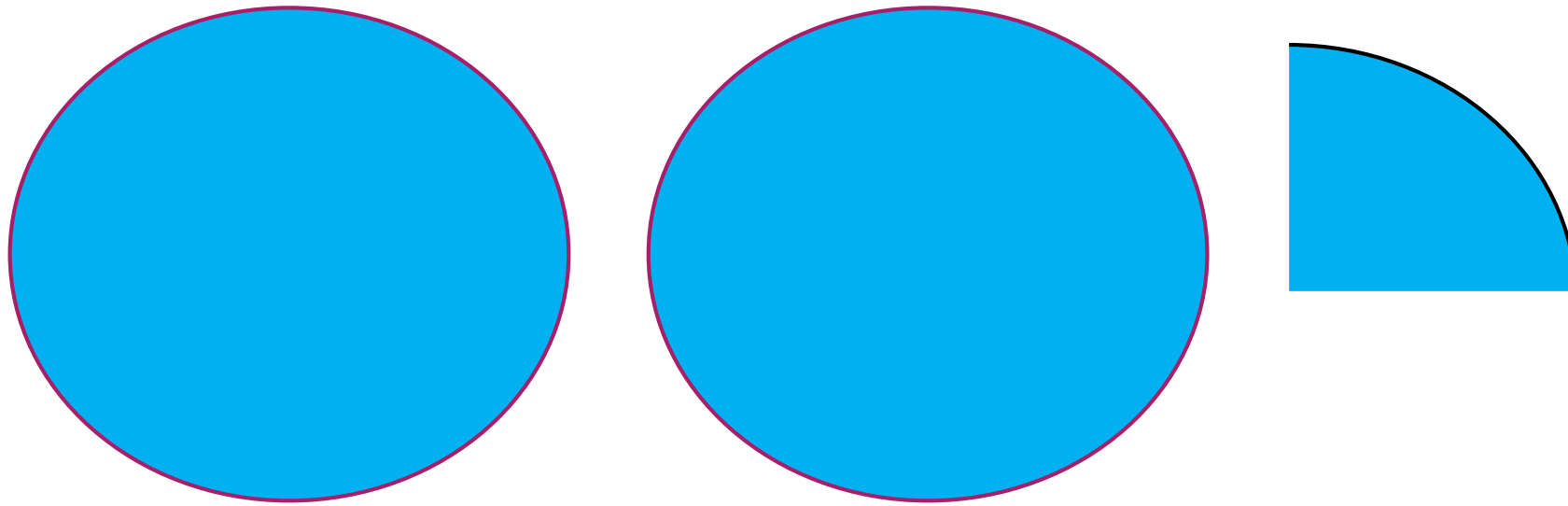
- numerator is bigger than

- denominator



$\frac{9}{4}$ is also an **improper** fraction. It means nine quarters. If you think of this as cakes, nine quarters are more than two whole cakes. It is $2\frac{1}{4}$ cakes.





$2 \frac{1}{4}$ is a **mixed fraction** because it has a whole number and a fraction together.

Food & Fractions!



Fraction equivalents


Fractions, Decimals and Percentages

$$\frac{1}{2} = 0.5 = 50\%$$

$$\frac{1}{4} = 0.25 = 25\%$$

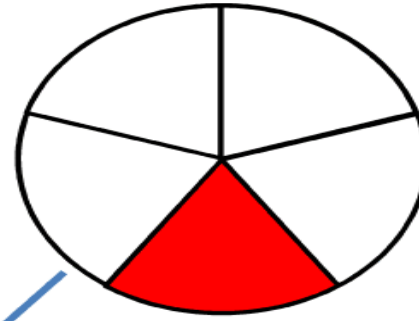
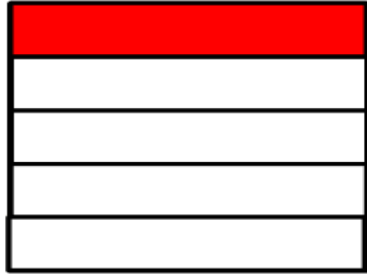
$$\frac{3}{4} = 0.75 = 75\%$$

$$1/1 = 1 = 100\%$$

Equivalent Values					
$\frac{1}{2}$		0.50 50%	$\frac{1}{5}$		0.20 20%
$\frac{1}{3}$		0.33 33%	$\frac{1}{8}$		0.125 12.5%
$\frac{1}{4}$		0.25 25%	$\frac{1}{10}$		0.10 10%

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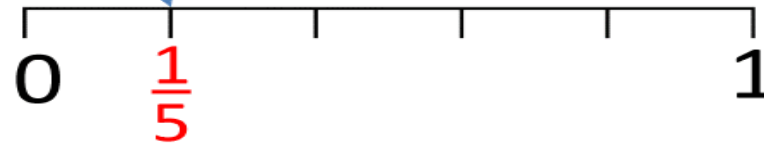
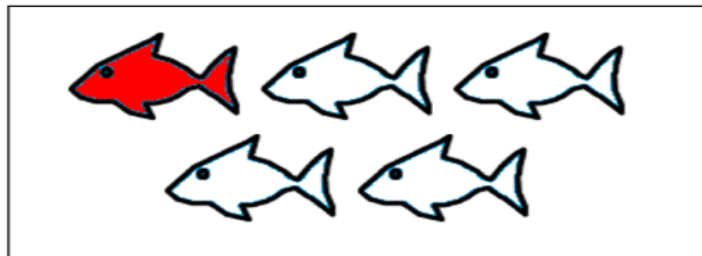
One-fifth



0.2
DECIMAL

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

20%
PERCENT



LEGO FRACTIONS



1 whole



$\frac{1}{2}$



$\frac{1}{4}$



$\frac{1}{8}$



$\frac{1}{2}$



$\frac{2}{4}$



$\frac{4}{8}$



$\frac{1}{4} + \frac{3}{4}$

=



$\frac{4}{4}$

=



1 whole



$\frac{1}{10}$

red

$\frac{1}{10}$

orange

$\frac{2}{10}$

yellow

$\frac{3}{10}$

blue

$\frac{3}{10}$

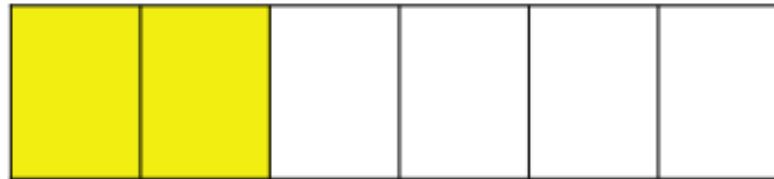
green

Equivalent Fractions

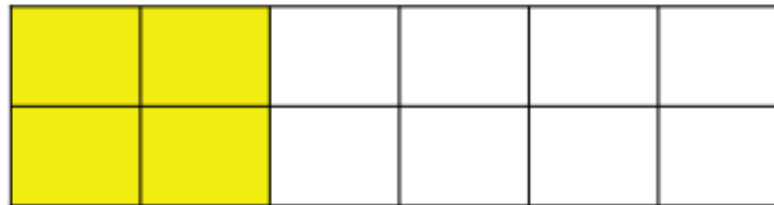
- Equivalent fractions are fractions that look different but show exactly the same amount.



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



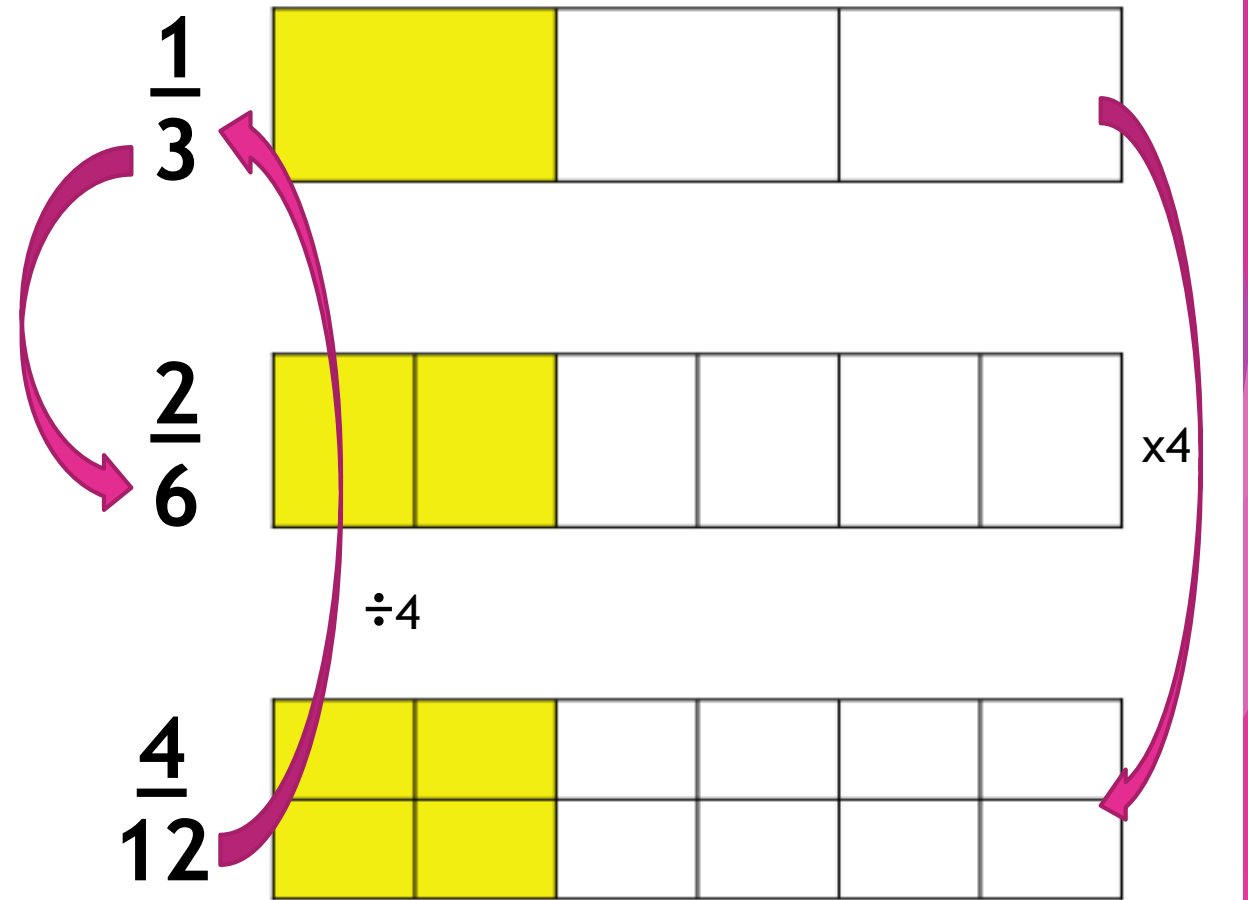
$$\frac{2}{6}$$



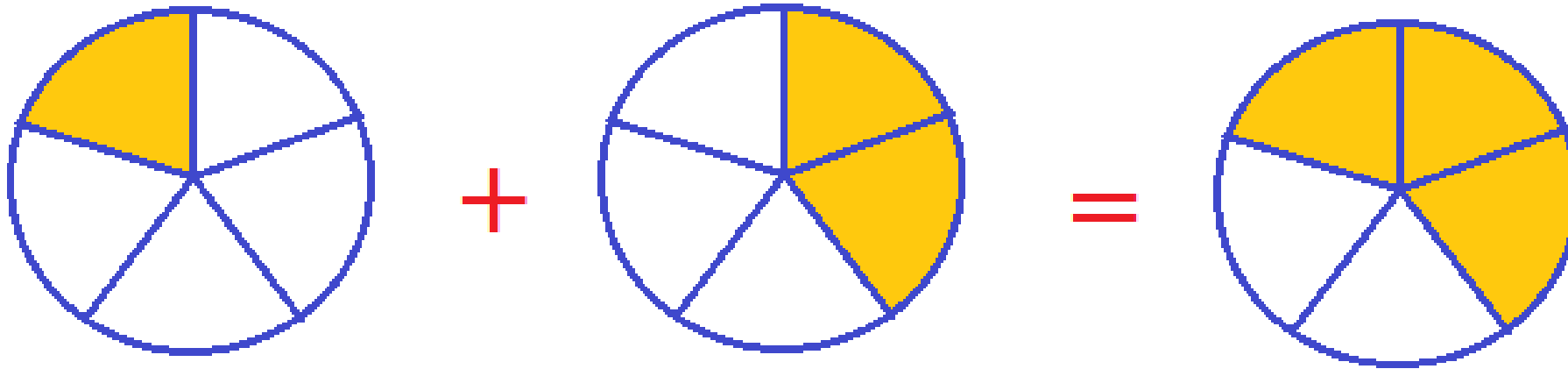
$$\frac{4}{12}$$

Equivalent Fractions

- ▶ You can make equivalent fractions by multiplying the numerator and denominator by the same number.
- ▶ You can simplify fractions by dividing the numerator and denominator by the same number.
- ▶ To find the simplest form of a fraction, you need to find the highest number that you can divide the numerator and denominator by.



Adding Fractions



$$\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$$

- ▶ Just add up the numerators, when the denominators are the same



$\frac{2}{6}$

+



$\frac{1}{6}$

=



$\frac{3}{6}$.

$$\frac{2}{5} + \frac{2}{5} =$$

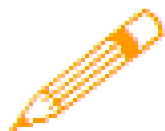
$$\frac{1}{4} + \frac{1}{4} =$$

$$\frac{4}{7} + \frac{2}{7} =$$

$$\frac{3}{5} + \frac{2}{5} =$$

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

$$\frac{2}{4} + \frac{3}{4} =$$


$$\frac{2}{15} + \frac{3}{5} = ?$$

$$\frac{2}{15} + \frac{9}{15}$$

x3

Same

$$= \frac{2 + 9}{15} = \frac{11}{15}$$

Convert fraction so that they have common denominators.
What you do to the bottom, you must do to the top!

Adding Fractions with different denominators

- ▶ Thirds and fifths are different so it is difficult to add them like this
- ▶ We need to find a common denominator
- ▶ The lowest common multiple of 3 and 5 is 15
- ▶ $3 \times 5 = 15$ so we must multiply 1 by 5
- ▶ $5 \times 3 = 15$ so we must multiply 1 by 3
- ▶ Now we can add the fractions together

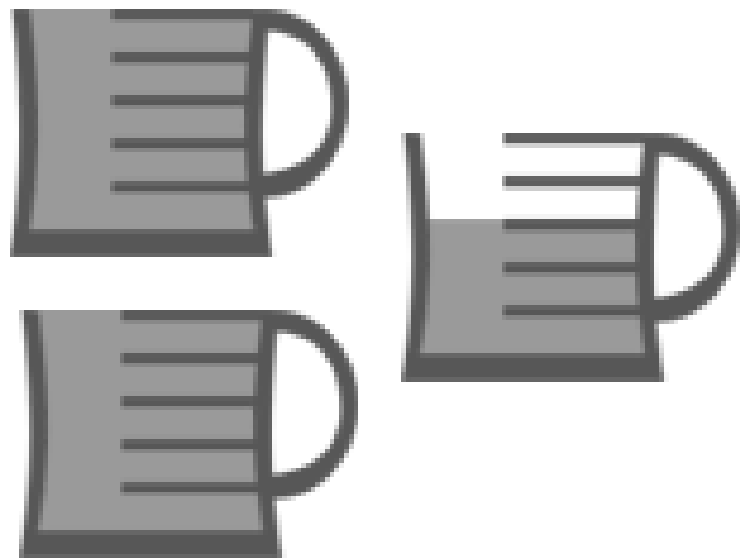
$$\frac{1}{3} + \frac{1}{5} = \frac{5}{15} + \frac{3}{15} = \frac{8}{15}$$

Whatever
you do to the
top, you
must do to
the bottom!

Explain why
these answers
are correct...

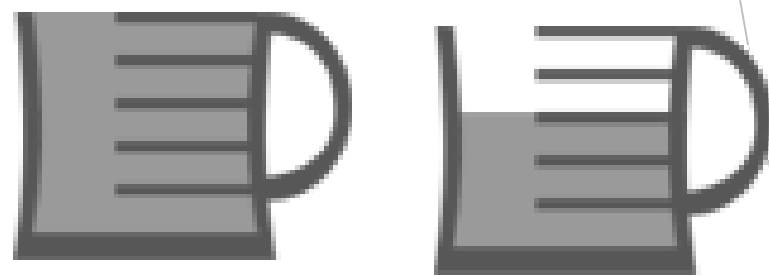
$$\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$$

$$\frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

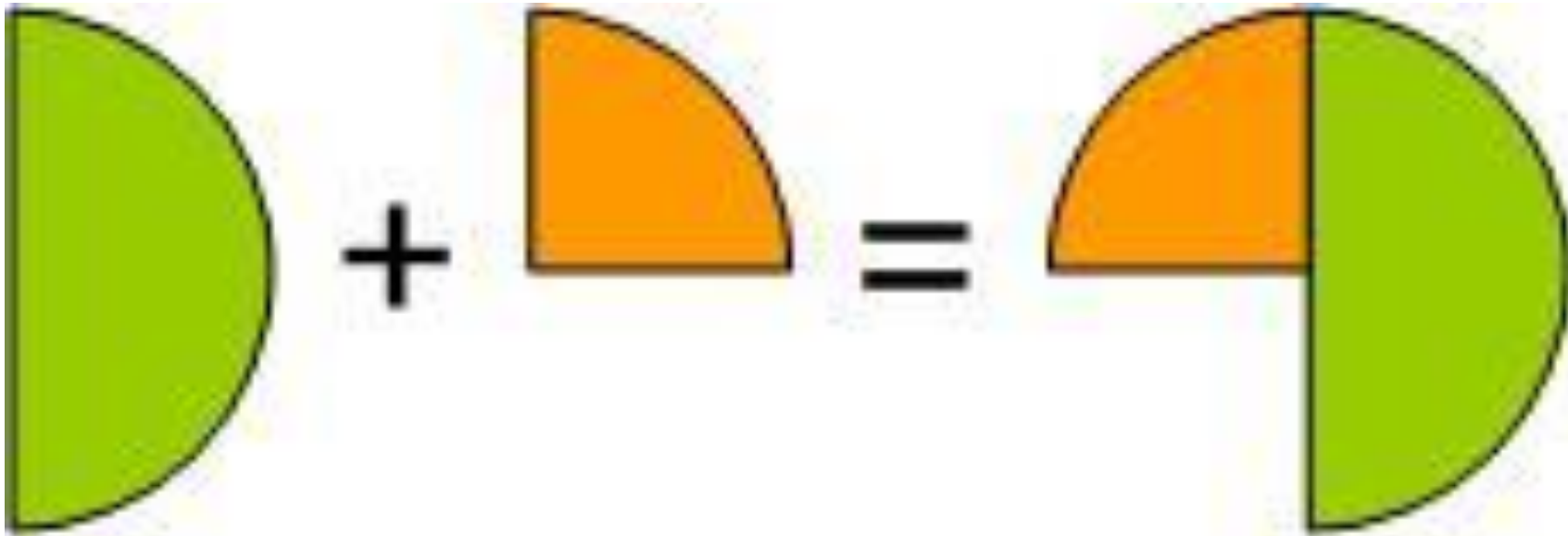


$$2\frac{3}{5}$$

+

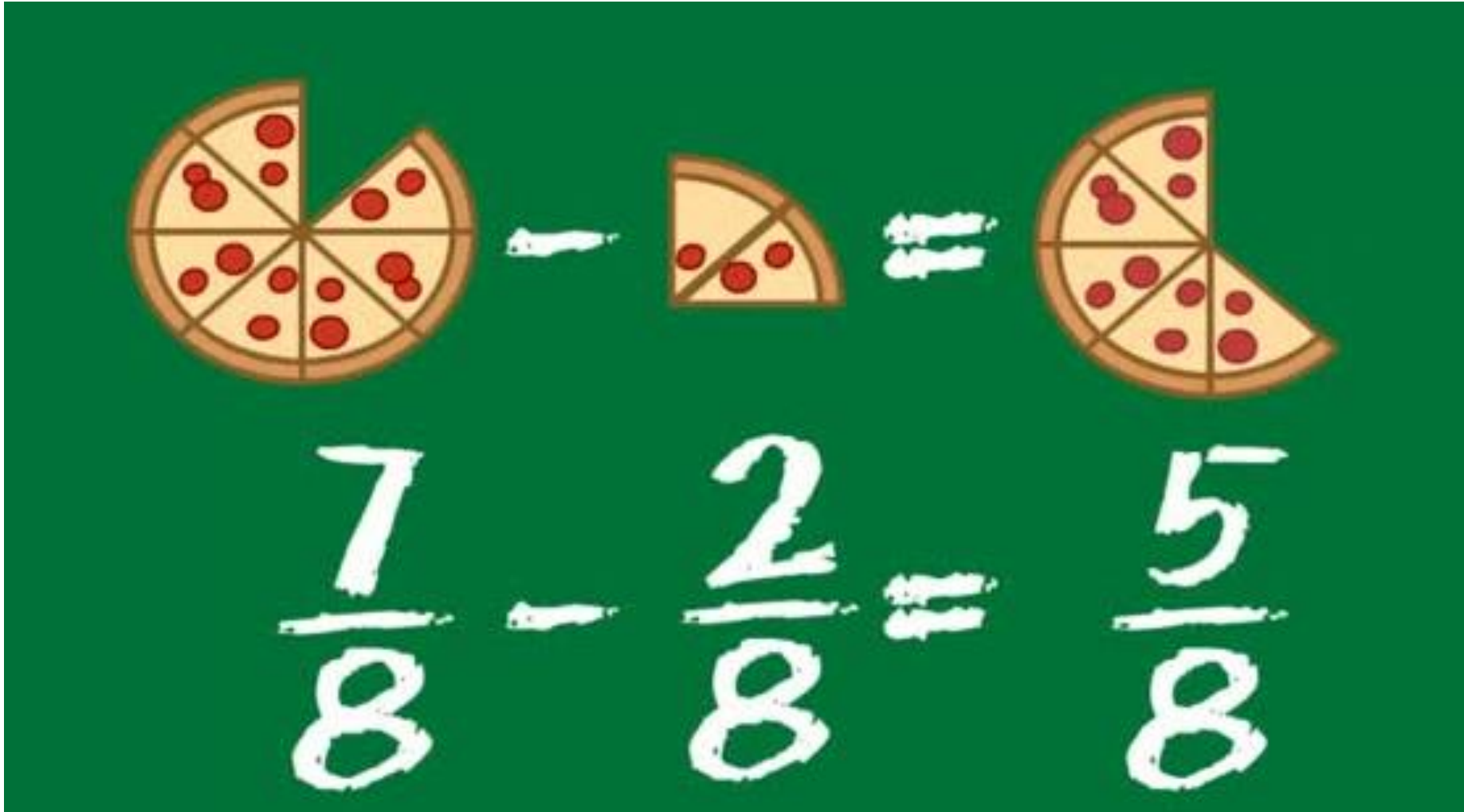


$$1\frac{3}{5}$$



$$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$

Subtracting Fractions



Subtracting Fractions

$$\frac{8}{12} - \frac{3}{12} =$$



Subtracting Fractions

$$\frac{7}{8} - \frac{5}{16} = ?$$

x2

$$\frac{14}{16} - \frac{5}{16} = \frac{9}{16}$$

Convert fraction so that they have common denominators.

What you do to the bottom, you must do to the top!

$$3\frac{2}{7} - \frac{5}{7}$$

Multiplying Fractions

Multiply the
numerators

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$$

Multiply the
denominators

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$$

Reduce the fraction if
necessary

$$\frac{6}{20} = \frac{3}{10}$$

$$\frac{2}{5} \times \frac{3}{4} = ?$$

Dividing Fractions

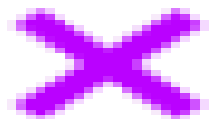
$$\frac{1}{2}$$

leave
me
↓

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



change
me
↓



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

turn
me
over
↓

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

$$\frac{1}{3} \div \frac{4}{5}$$



flip the second fraction...
and multiply!

$$\frac{1}{3} \times \frac{5}{4}$$

Finding a Fraction of an amount

To find a fraction of a quantity:

- Divide the quantity by the denominator
- Multiply the answer you get by the numerator

$$\frac{2}{5} \text{ of } £15$$

$$15 \div 5 = 3$$

$$3 \times 2 = £6$$

$$\frac{3}{8} \text{ of } £24$$

$$24 \div 8 = 3$$

$$3 \times 3 = £9$$

Fraction Problems

Some examples of
reasoning style
fraction questions
from KS2 SATs

2 Find the missing values.

$$4\frac{2}{5} = \frac{\boxed{}}{5}$$

$$4\frac{2}{5} = \frac{\boxed{}}{5} + \frac{9}{5}$$

3 Freya has some money.
She buys a book for £15



She has $\frac{3}{8}$ of her money left.

How much did she have at the start?

Fraction of an Amount

- 1 Work out the missing values

$$\frac{2}{5} \text{ of } 30 = 3 \times \boxed{}$$

$$\frac{7}{10} \text{ of } 30 = \frac{3}{4} \text{ of } \boxed{}$$

- 2 Here is a number card



A quarter of the card is 14

Find $\frac{2}{7}$ of the card.

- 3 Sarah has some cookies in a jar.

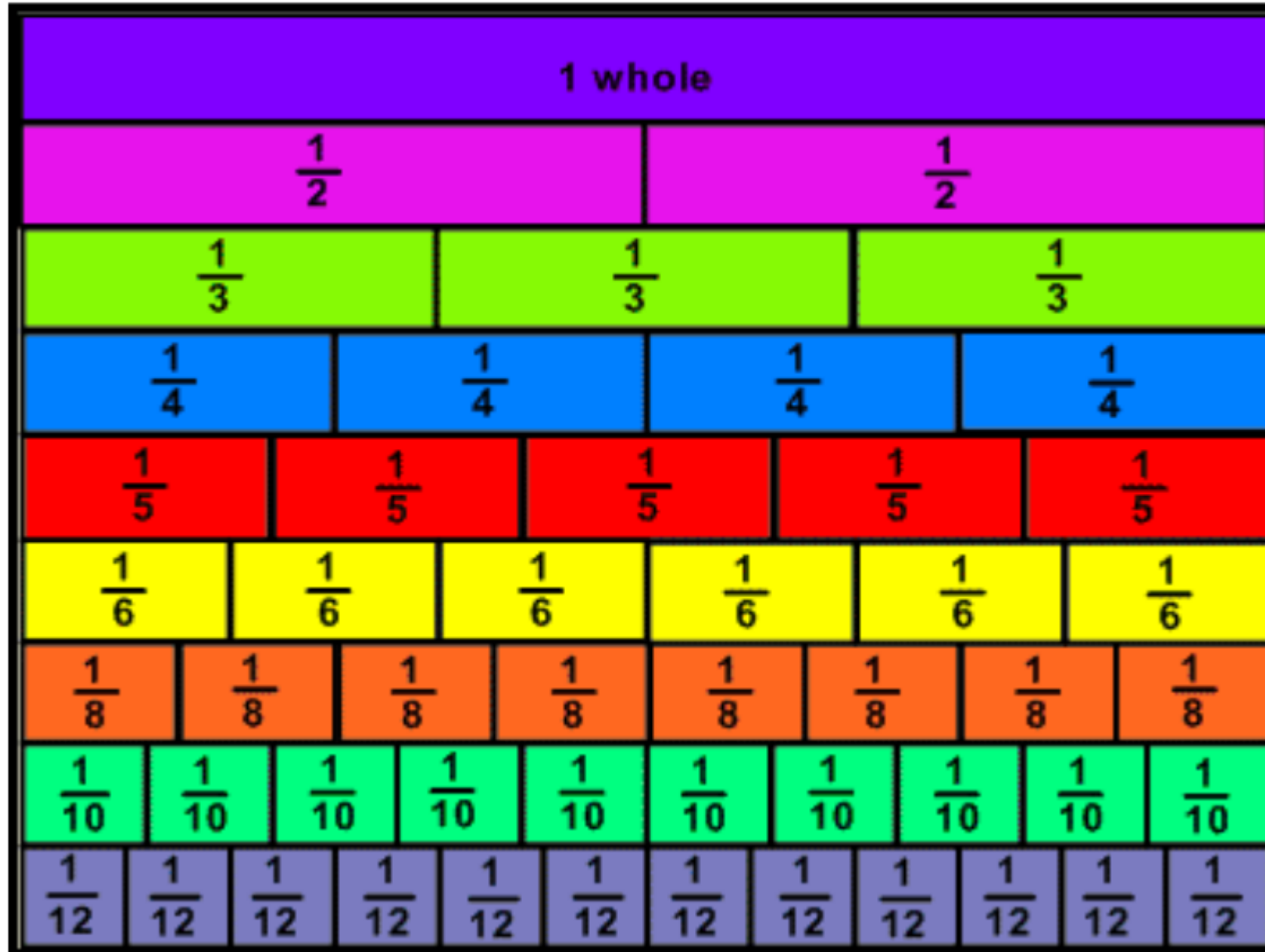


In January she eats $\frac{5}{8}$ of the cookies.

There are 12 cookies left in the jar.

How many were in the jar at the start?

Helpful Tools



×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100