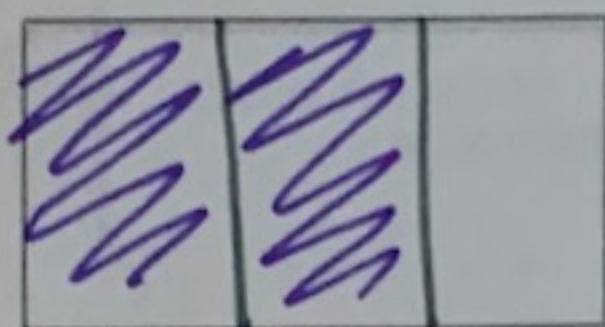
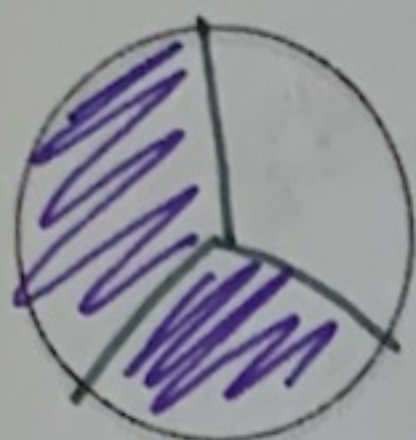


Fractions

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



$$\frac{15}{12}$$

What do you notice about this fraction? *The top # is larger*

$$\frac{15}{12}$$

is called an improper fraction

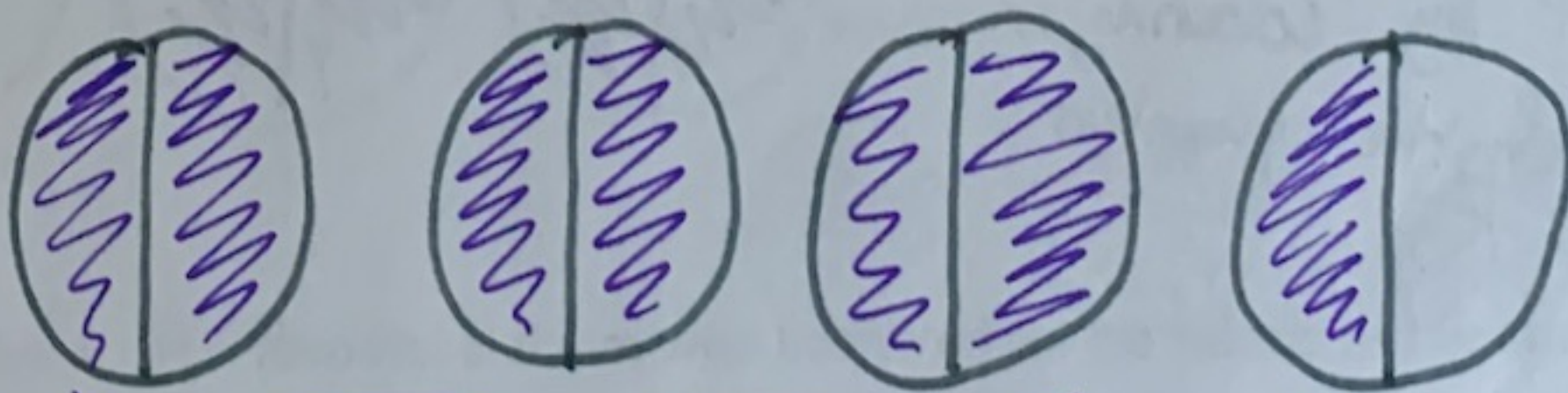
Mixed Numbers to Improper Fractions

$$3 \frac{1}{2}$$

How many $\frac{1}{2}$'s do we have in 3 and $\frac{1}{2}$? Start by drawing some circles!

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

we split the circles in 2 because the denominator is 2.



represents 3 wholes

represents the 1/2.

In total we coloured 7 1/2s.

$$\therefore \frac{7}{2} = 3 \frac{1}{2}$$

Another way we can represent this fraction is by writing it as an improper fraction.

How many $\frac{1}{2}$ are there in total?

$$7 \frac{1}{2} = \frac{7}{2}$$

← represents how many 1/2s we coloured

← represents how many parts we split the circle into

You don't have to rely on circles to convert mixed numbers to improper fractions.
Here's a helpful trick:

Step 1: multiply the denominator by the **whole number**

Step 2: Take your answer from step 1 and **add** the numerator to it

Step 3: Write your answer from step 2 as a fraction over the original denominator

Example: Convert $5\frac{4}{9}$ to an improper fraction

Step 1: $9 \times 5 = 45$

Step 2: $45 + 4 = 49$

Step 3: $\frac{49}{9}$

You try! From a mixed number to an improper fraction:

$9\frac{3}{7}$

step 1
 $7 \times 9 = 63$

step 2
 $63 + 3 = 66$

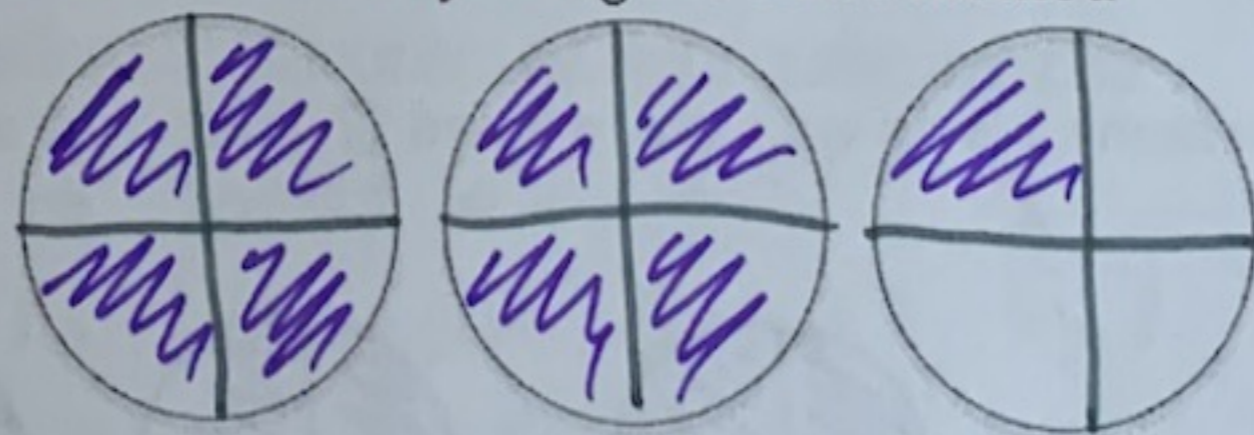
step 3
 $\frac{66}{7}$

You can also convert fractions the opposite way:

Improper Fraction to Mixed Numbers. Let's start by using the circle method

Improper Fraction $\frac{9}{4}$

start by coloring in 9 of the quarters



How many full circles do we have and how much is left over?

2 full circles coloured and 1 of 4 left over.

Therefore $\frac{9}{4} = 2\frac{1}{4}$

A quicker method is by using long division:

Step 1: See how many times the denominator divides **evenly** into the numerator.
(This will become the **whole number** part of your mixed number.)

Step 2: Multiply the **whole number** by the denominator and **subtract** this from the numerator

Step 3: Write the answer from step 2 as the new numerator of the fraction

Example: Convert $\frac{36}{7}$ to a mixed number

Step 1: $36 \div 7 = 5.1428\dots$

\uparrow
~~7~~ goes into 36, 5 whole times.

Step 2:

$$5 \times 7 = 35$$

$$36 - 35 = 1$$

Step 3:

5 wholes and $\frac{1}{7}$ left over

$$= 5\frac{1}{7}$$

Check: $5 \times 7 + 1 = \frac{36}{7} \checkmark$

You Try! Convert $\frac{33}{5}$ to a mixed number.

Long Division:

$$33 \div 5 = 6.6$$

\uparrow
6 whole times

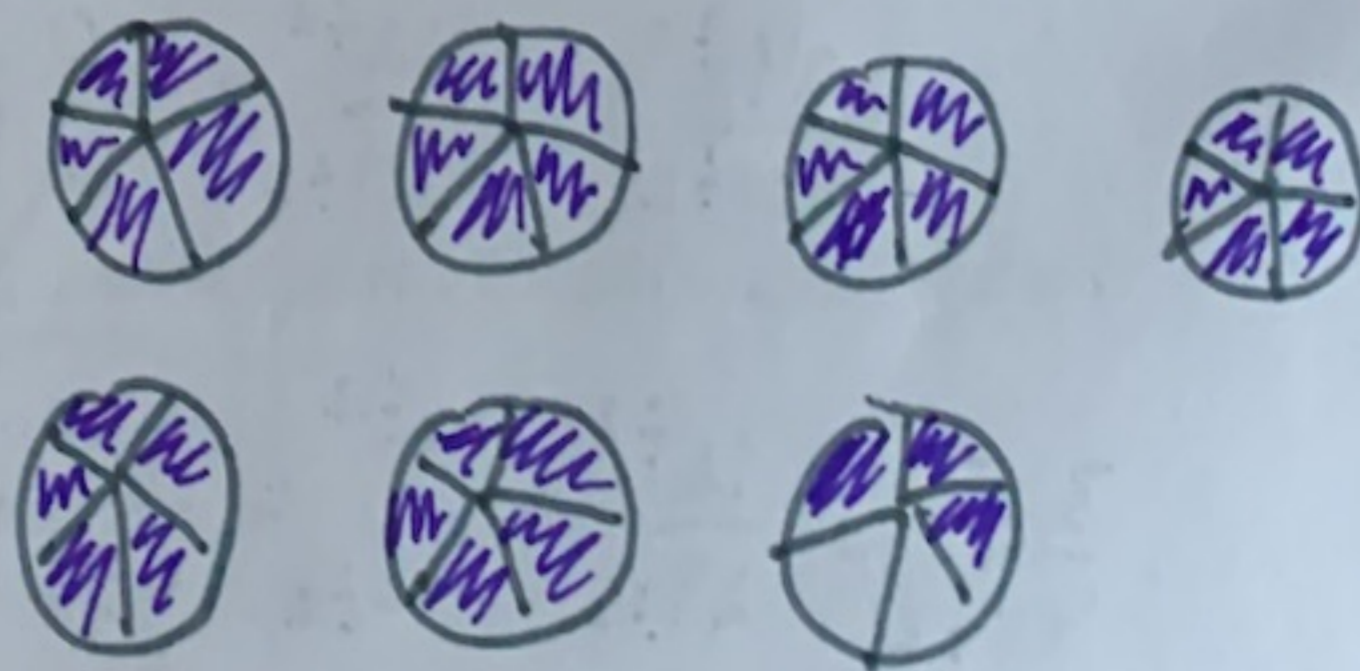
$$5 \times 6 = 30$$

$$33 - 30 = 3$$

6 wholes and $\frac{3}{5}$ leftover

$$= 6\frac{3}{5}$$

Circle Model:



6 whole circles and $\frac{3}{5}$ of another

$$\text{so } = 6\frac{3}{5}$$

Equivalent Fractions

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



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

Why are they the same?

Because they represent the same amount.

$$\frac{18}{36} = \frac{6}{12}$$

Diagram showing the simplification of 18/36 to 6/12 by dividing both numerator and denominator by 3. Arrows point from 18 to 6 and 36 to 12, with '÷3' written above and below the arrows.

What do you have to do to $\frac{18}{36}$ to get $\frac{6}{12}$?

divide by 3.

Find the unknown in each pair of equivalent fractions?

a) $\frac{2}{3} = \frac{[8]}{12}$

Diagram showing the simplification of 2/3 to 8/12 by multiplying both numerator and denominator by 4. Arrows point from 2 to 8 and 3 to 12, with 'x4' written above and below the arrows.

b) $\frac{6}{[7]} = \frac{12}{14}$

Diagram showing the simplification of 6/[7] to 12/14 by multiplying both numerator and denominator by 2. Arrows point from 6 to 12 and [7] to 14, with 'x2' written above and below the arrows.

Reducing Fractions to Lowest Terms

Reduce this fraction to lowest terms:

Factor the numerator and denominator until there are no more common terms

$$\frac{24}{60}$$

What's common to both 24 & 60?

Both are even, so both are divisible by 2:

$$\frac{24 \div 2}{60 \div 2} = \frac{12 \div 2}{30 \div 2} = \frac{6}{15}$$

Now divide both by 3.

$$\frac{6 \div 3}{15 \div 3} = \boxed{\frac{2}{5}}$$

You try! Reduce the following fraction, $\frac{32}{48}$ by:

$$\frac{32 \div 2}{48 \div 2} = \frac{16 \div 2}{24 \div 2} = \frac{8 \div 2}{12 \div 2} = \frac{4 \div 2}{6 \div 2} = \boxed{\frac{2}{3}}$$