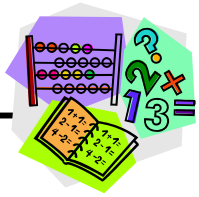
Mixed Numbers and Improper Fractions



Fractions that have numerators larger than their denominators are called **improper fractions**.

Example

Here are three identical shapes.
Two of the shapes have all four squares shaded.
One square out of four is shaded in the last shape.

In total, 9 fourths are shaded.

$\frac{9}{4}$ is an improper fraction.

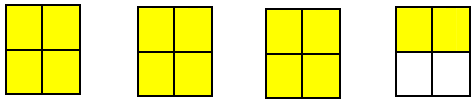
Improper fractions can also be shown as **mixed numbers**.

Mixed numbers have a whole number and a fraction; for example, $2\frac{1}{2}$, $3\frac{1}{4}$, $7\frac{3}{4}$.

Mixed numbers and equivalent improper fractions represent the same quantity.

Examples

A)



3 whole shapes are shaded = 3

plus 2 of 4 parts are shaded = $\frac{2}{4}$

In total, there are $3\frac{2}{4}$ shaded. $3\frac{2}{4}$ is a mixed number.

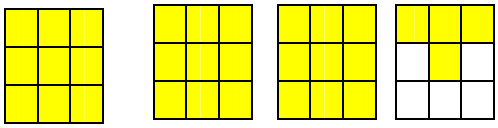
OR There are 4 parts shaded in 3 shapes
plus 2 parts shaded in 1 shape.
14 parts are shaded.

In total, there are $\frac{14}{4}$ shaded. $\frac{14}{4}$ is an improper fraction.

$$3\frac{2}{4} = \frac{14}{4}$$

B)

Here are 4 identical shapes.
Three of the shapes are completely shaded.
Four of the squares are shaded in the last shape.



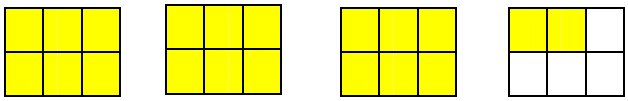
$1 + 1 + 1 + \frac{4}{9} = 3\frac{4}{9}$

$\frac{\mathbf{31}}{\mathbf{9}} = 3\frac{4}{9}$

OR

Three whole shapes are shaded.
Four of 9 are shaded in the last shape.
In total, 31 ninths are shaded $\frac{31}{9}$.

C)



In the shapes above, there are:
3 whole shapes shaded = 3
2 of 6 parts shaded = $\frac{2}{6}$

In total, there are, $3\frac{2}{6}$ shaded.

$3\frac{2}{6}$ is a mixed number.

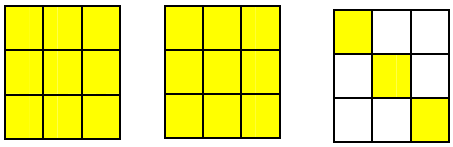
OR

There are 6 parts in each shape.
In total, 20 parts are shaded.

$\frac{20}{6}$ is an improper fraction.

$3\frac{2}{6} = \frac{20}{6}$

D)



In the shapes above, there are:
2 whole shapes shaded = 2
3 of 9 parts shaded = $\frac{3}{9}$
In total, there are $2\frac{3}{9}$.

OR

$$2\frac{3}{9} = \frac{21}{9}$$

There are:
9 equal parts in each shape
21 squares are shaded = 21.
In total, there are $\frac{21}{9}$.

Number Lines

Mixed numbers can also be represented on a number line.

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