# How many fractions? – Student work samples

Link to the assessment resource, *How many fractions?* (NM1337)

The following student examples show strategies students' used to solve the problems.
Note: answers are not always correct for sufficient strategies.

**Students solve as a division problem with fractions (some equivalence and calculation errors).**

Show how to work out how many $\frac{1}{6}$ s in $\frac{2}{3}$ .

$$\frac{2}{3} \div \frac{1}{6} \qquad \frac{2}{3} \times \frac{6^2}{1} = \frac{2}{1}$$

Answer: $2$

Show how to work out how many $\frac{1}{2}$ s in $\frac{3}{4}$ .

$$\frac{3}{4} \div \frac{1}{2} \qquad \frac{3}{4} \times \frac{2^1}{1} = \frac{3}{2} = 1\frac{1}{2}$$

Answer: $1\frac{1}{2}$

Show how to work out how many $\frac{1}{2}$ s in $\frac{3}{4}$ .

$$\frac{1}{2} \times 2 = \frac{2}{4}$$
$$\frac{3}{4} \div \frac{2}{4} = 1.5$$

Answer: $1.5$

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$ .

$$\frac{1}{6} \div \frac{1}{3} \qquad \frac{1}{2} \times \frac{3^1}{1} = \frac{1}{2}$$

Answer: $\frac{1}{2}$

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$ .

$$\frac{1}{3} \times 2 = \frac{2}{6}$$
$$\frac{2}{6} \div \frac{1}{6}$$

Answer: $2$

**

**Students use equivalent fractions to help solve the problem.**

Show how to work out how many $\frac{1}{4}$ s in 3.

$$\frac{1}{4} \ell \frac{3}{1} = \frac{3 \times 4}{1 \times 4} = \frac{12}{4} \not{a} \frac{1}{4} = \frac{12}{4}$$

Answer: $\frac{12}{4}$ (12)

Show how to work out how many $\frac{1}{6}$ s in $\frac{2}{3}$.

$$2/6 = \frac{1}{3} \because \frac{4}{6} = \frac{2}{3}$$

Answer: $\frac{4}{6}$

Show how to work out how many $\frac{1}{2}$ s in $\frac{3}{4}$.

$$\frac{1}{2} = \frac{2}{4} , + \frac{1}{4} = \frac{3}{4} \text{ so } 1.5 / 1\frac{1}{2} / \text{one and a half}$$

Answer: $1 \frac{1}{2}$

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.

$$\frac{1}{3} \times 2 \atop \times 2 = \frac{2}{6} \qquad \text{So } \frac{2}{6} \text{ doesn't go int } \frac{1}{6} \text{ because its } \frac{2}{6} \text{ is bigger.}$$

Answer: no times

**Unitising**

Show how to work out how many $\frac{1}{4}$ s in 3.

$$\frac{1}{4} \times 4 = 1$$
$$4 \times 3 = 12$$
$$3 \div \frac{1}{4} = 12$$

Answer: 12

Show how to work out how many $\frac{1}{2}$ s in $\frac{3}{4}$.

$$\frac{1}{2} \text{ in } \frac{2}{4}$$
$$.5 \text{ in } \frac{1}{4}$$

Answer: 1.5

**Turns the division problem into a multiplication problem**

Show how to work out how many $\frac{1}{3}$s in $\frac{1}{6}$.

$\cdot 5 \times \frac{1}{3} = \frac{1}{6}$

Answer: $0 \cdot 5$

**A form of *Cross multiplying* to solve for division problem**

Show how to work out how many $\frac{1}{2}$s in $\frac{3}{4}$.

$\frac{1}{2} \times \frac{3}{4}$

$3 \times 2 = 6 \qquad \frac{6}{4}$
$1 \times 4 = 4$

Answer: $\frac{6}{4}$

**Students draw diagrams comparing two representations of the two numbers in the problem.**

Show how to work out how many $\frac{1}{4}$s in 3.


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

$4 \times 3 = 12$

Answer: $12$

Show how to work out how many $\frac{1}{4}$s in 3.

$3 \times 4 = 12$
$4 \times 3 = 12$
$\frac{1}{4}$ of $12 = 3$

Answer: $12$

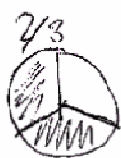Show how to work out how many $\frac{1}{6}$s in $\frac{2}{3}$.

$\frac{1}{6}$

$\frac{2}{3}$

Answer: $4$

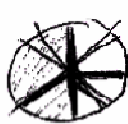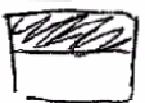Show how to work out how many $\frac{1}{6}$ s in $\frac{2}{3}$.



$\frac{1}{6}$ = ⊘   $\frac{2}{3}$ = ⊘   You split the third in 6th like $\frac{1}{6}$.

You make a pie split into 3rds, shade in 2 thirds then ~~draw~~ draw and add in 6ths.   Answer: __4__

Show how to work out how many $\frac{1}{6}$ s in $\frac{2}{3}$.
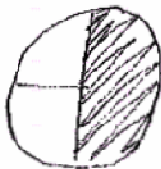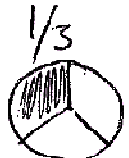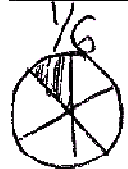


2/3   1/6   Answer: ~~8~~ 4

Show how to work out how many $\frac{1}{2}$ s in $\frac{3}{4}$.



Answer: __1__

Show how to work out how many $\frac{1}{2}$ s in $\frac{3}{4}$.



There is one half in 3/4 and one half of a half left there is n—   Answer: 1 1/2

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.



1/3   1/6   Answer: 0

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.



Answer: __1__

**Students note that 1/3 is bigger than 1/6 and therfore that it "doesn't go"**

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.

$\frac{1}{6}$ = 0 because it like saying

How many $\frac{1}{3}$ is bigger

Answer: $-\frac{1}{6}$

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.

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

No 3rds can fit in a $\frac{1}{6}$

Answer: 0

**Incorrect operation with the fractions**

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.

$\frac{1}{3} = \frac{4}{12} = \frac{2}{12} = \frac{2}{12} = \frac{1}{6}$

Answer: $\frac{2}{12}$

Show how to work out how many $\frac{1}{4}$ s in 3.

$\frac{1}{4}$ ÷ 3 ÷ $\frac{1}{4}$ = 0.75

$\frac{1}{2}$ of 3 is 1.5
$\frac{1}{2}$ of 1.5 is 0.75

Answer: 0.75

**Whole number error – works with fractions as whole numbers (_incorrectly_)**

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.

$\frac{1}{3} + \frac{1}{3} = \frac{1}{6}$   so   2.

Answer: 2

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.

$$\frac{1}{3} = 3 \times 3 = 9 \quad \$ \frac{1}{3} = 3 \qquad 3 + 6 = 9$$

$$\frac{1}{6} = 6 + 6 = 36 \quad \$ \frac{1}{6} = 8 \, 6$$

Answer: __9__

Show how to work out how many $\frac{1}{6}$ s in $\frac{2}{3}$.

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

Answer: __1__

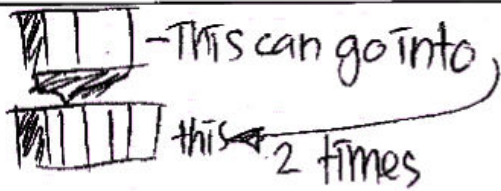## Students attempt to solve using an insufficient diagram

Show how to work out how many $\frac{1}{6}$ s in $\frac{2}{3}$.



Answer: __1 $\frac{2}{3}$__

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.



Answer: __3__

Show how to work out how many $\frac{1}{3}$ s in $\frac{1}{6}$.



—This can go into this 2 times

Answer: __2__