

Number Facts: Year 6

Ratio and proportion

Pupils should be taught to:

- solve problems involving the calculation of percentages of quantities such as 15% of 360 and then use their solutions for comparison
- represent fractions sums such as $\frac{1}{4} + \frac{3}{4}$ in ratio form (a:b) as 1:3
- simplify ratios such as 2:6 to their simplest form (1:3 in this case) using common factors

Fractions, decimals, and percentages

Pupils should be taught to:

- associate a fraction with division and calculate decimal fraction equivalents for a vulgar fraction (e.g. $0.375 = \frac{3}{8}$)
- recall and use equivalences between vulgar fractions, decimals, and percentages
- use common factors to simplify fractions
- add and subtract fractions with different denominators and mixed numbers
- multiply simple pair of proper fractions
- multiply one-digit numbers with up to two decimal places by whole numbers (e.g. 1.37×5)
- divide numbers where the quotient has up to two decimal places (e.g. $145 \div 4 = 3.75$)

Measurement

Pupils should be taught to:

- convert between common imperial and metric units of measure. (e.g. miles and kilometres)
- recognise when it is possible to use formulae for the area and volume of shapes.
- know and use formulae for the area of a triangle, the area of a rectangle, the area of a parallelogram, the volume of a cuboid and the diameter of a circle (diameter = 2 x radius)

Geometry

Pupils should be taught to:

- illustrate and name parts of circles, including the radius, diameter, and circumference.
- know and use the relationship between the diameter and the radius (diameter = 2 x radius)
- know that vertically opposite angles are equal and use this to calculate missing angles around a point

Number facts: Ratio and proportion

- Derive new % facts from known facts:
For example:
1% doubled will give 2% of a quantity
10% halved will give 5% of a quantity
100% is the whole amount, so twice as much is the same as 200%
- Fluency with multiplication and division facts up to 12 x 12 and derive others beyond known facts.
- For example:
24 : 48 simplifies to 1:2 with a common factor of 24
(24 x 1 and 24 x 2)

Number Facts: Fractions

- $12.5\% = 0.125 = \frac{1}{8}$ $25\% = 0.25 = \frac{2}{8} = \frac{1}{4}$
- $37.5\% = 0.375 = \frac{3}{8}$ $50\% = 0.5 = \frac{4}{8} = \frac{1}{2}$
- $62.5\% = 0.625 = \frac{5}{8}$ $75\% = 0.75 = \frac{6}{8} = \frac{3}{4}$
- $82.5\% = 0.825 = \frac{7}{8}$ $100\% = 1.0 = \frac{8}{8}$
- $112.5\% = 1.125 = \frac{9}{8}$ $125\% = 1.25 = \frac{10}{8}$
- $33.\dot{3}\% = 0.333\dots = \frac{1}{3}$
- $66.\dot{6}\% = 0.666\dots = \frac{2}{3}$
- $100\% = 1.0 = \frac{3}{3}$
- $133.\dot{3}\% = 1.333\dots = \frac{4}{3}$
- $266.\dot{6}\% = 2.666\dots = \frac{8}{3}$

$0.\dot{3} = 0.3333333\dots$ a recurring decimal continually repeats and does not terminate

Number Facts: Measure

- $1 \text{ km} \approx \frac{5}{8} \text{ mile}$
- $1 \text{ mile} \approx \frac{8}{5} \text{ km}$ (or 1.6 km)
- Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$
- Area of a rectangle = length x width
- Area of a parallelogram = length x perpendicular height
- Volume of a cuboid = length x width x height

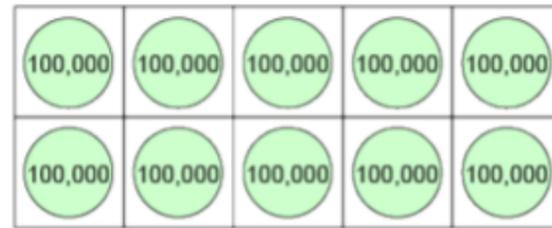
\approx means 'approximately equal to'

Number Facts: Geometry

- Diameter = 2 x radius
- Radius = $\frac{1}{2}$ x diameter

Mathematical models and images to support conceptual understanding underpinning key facts in Year 6

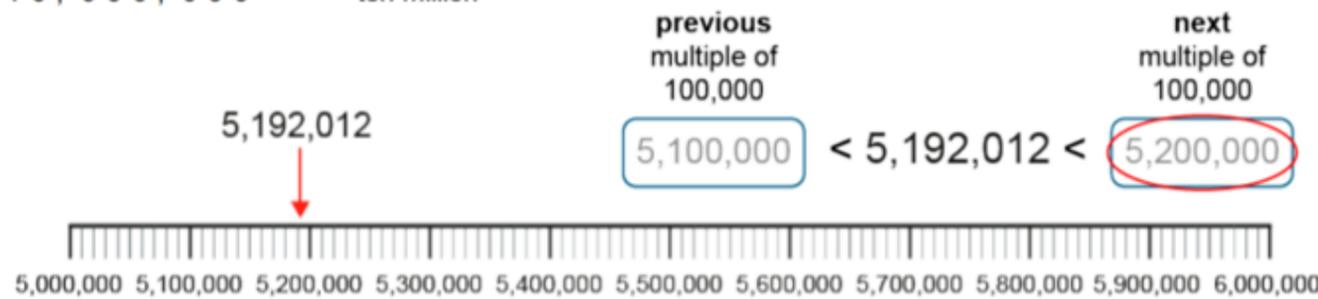
| | |
|------------|----------------------|
| 0.01 | one hundredth |
| 0.1 | one tenth |
| 1 | one |
| 10 | ten |
| 100 | one hundred |
| 1,000 | one thousand |
| 10,000 | ten thousand |
| 100,000 | one hundred thousand |
| 1,000,000 | one million |
| 10,000,000 | ten million |



One million represented as ten 100,000-value place-value counters in a tens frame

| | | | | | | | | |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 10,000,000 | 20,000,000 | 30,000,000 | 40,000,000 | 50,000,000 | 60,000,000 | 70,000,000 | 80,000,000 | 90,000,000 |
| 1,000,000 | 2,000,000 | 3,000,000 | 4,000,000 | 5,000,000 | 6,000,000 | 7,000,000 | 8,000,000 | 9,000,000 |
| 100,000 | 200,000 | 300,000 | 400,000 | 500,000 | 600,000 | 700,000 | 800,000 | 900,000 |
| 10,000 | 20,000 | 30,000 | 40,000 | 50,000 | 60,000 | 70,000 | 80,000 | 90,000 |
| 1,000 | 2,000 | 3,000 | 4,000 | 5,000 | 6,000 | 7,000 | 8,000 | 9,000 |
| 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
| 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |

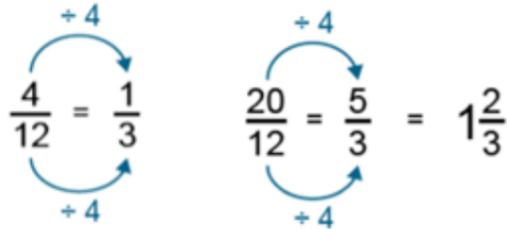
Gattegno chart to multiply and divide by 100



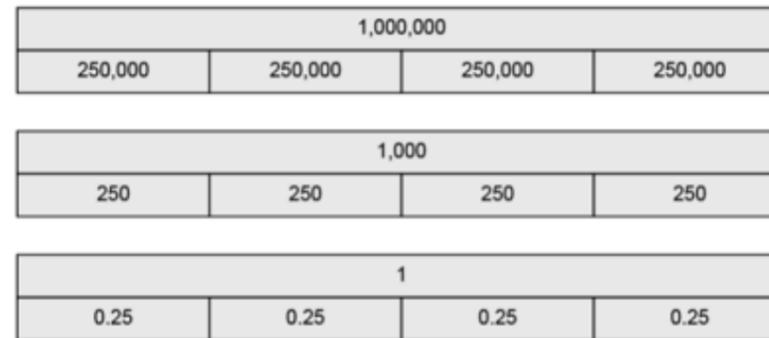
number line to identify the previous and next multiple of 100,000



$$\frac{2}{5} > \frac{2}{6}$$



compare and simplify fractions



Bar models showing 1 million, 1,000 and 1 partitioned into 4 equal parts

$$1,000,000 \div 4 = 250,000 \text{ and } \frac{1}{4} \text{ of } 1,000,000 = 250,000$$

$$1,000 \div 4 = 250 \text{ and } \frac{1}{4} \text{ of } 1,000 = 250$$

$$1 \div 4 = 0.25 \text{ and } \frac{1}{4} \text{ of } 1 = 0.25$$

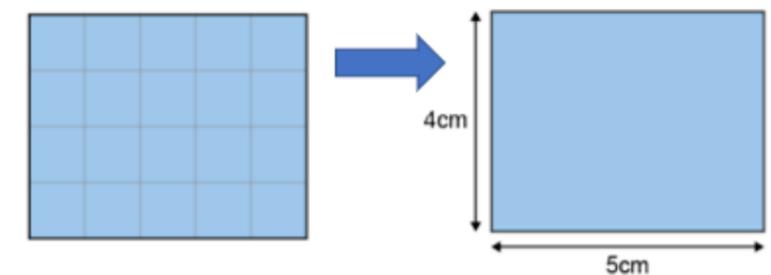


bead strings to show 'for every 1 red bead, there are 3 blue beads'

$$r : b = 1 : 3$$

table to show total quantities in proportion

| | | | | |
|------------------------------|----------|----------|-----------|-----------|
| number of red beads | 1 | 2 | 3 | 4 |
| number of blue beads | 3 | 6 | 9 | 12 |
| total number of beads | 4 | 8 | 12 | 16 |



area of a rectangle = length x width
 $4 \times 5 = 5 \times 4 = 20 \text{ cm}^2$