

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

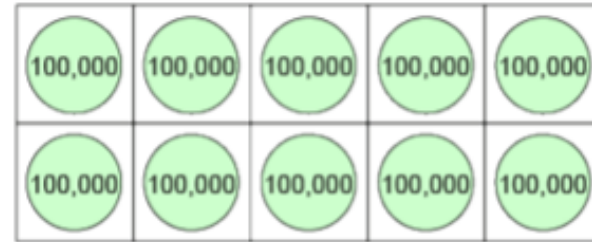
\approx means 'approximately equal to'

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

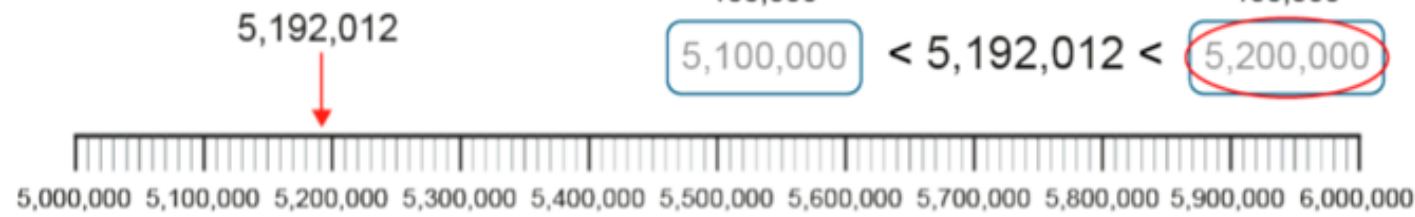
0.01	one hundredth
0.1	one tenth
1	one
10	ten
100	one hundred
1,000	one thousand
10,000	ten thousand
100,000	one hundred thousand
1,000,000	one million
10,000,000	ten million



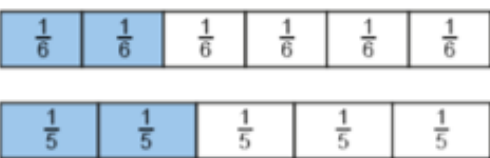
One million represented as ten 100,000-value place-value counters in a tens frame

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

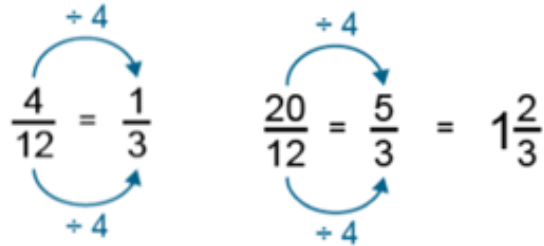
Gattegno chart to multiply and divide by 100



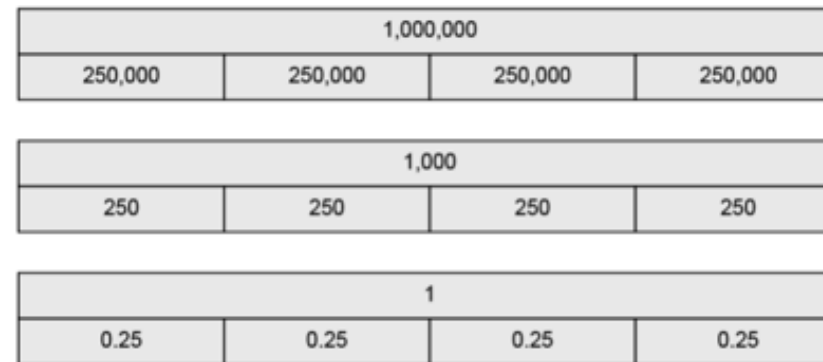
number line to identify the previous and next multiple of 100,000



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



compare and simplify fractions



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

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

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

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

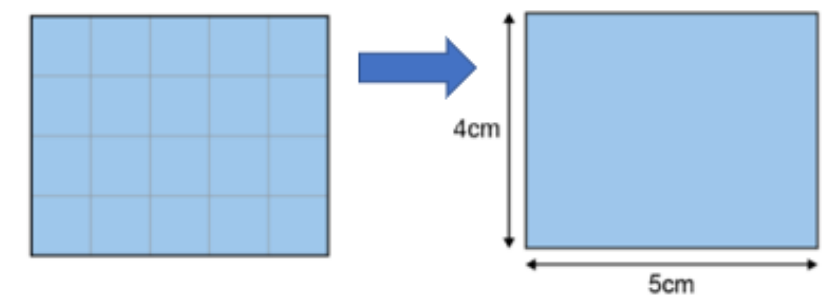


bead strings to show 'for every 1 red bead, there are 3 blue beads'

$$r : b = 1 : 3$$

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
 $4 \times 5 = 5 \times 4 = 20 \text{ cm}^2$