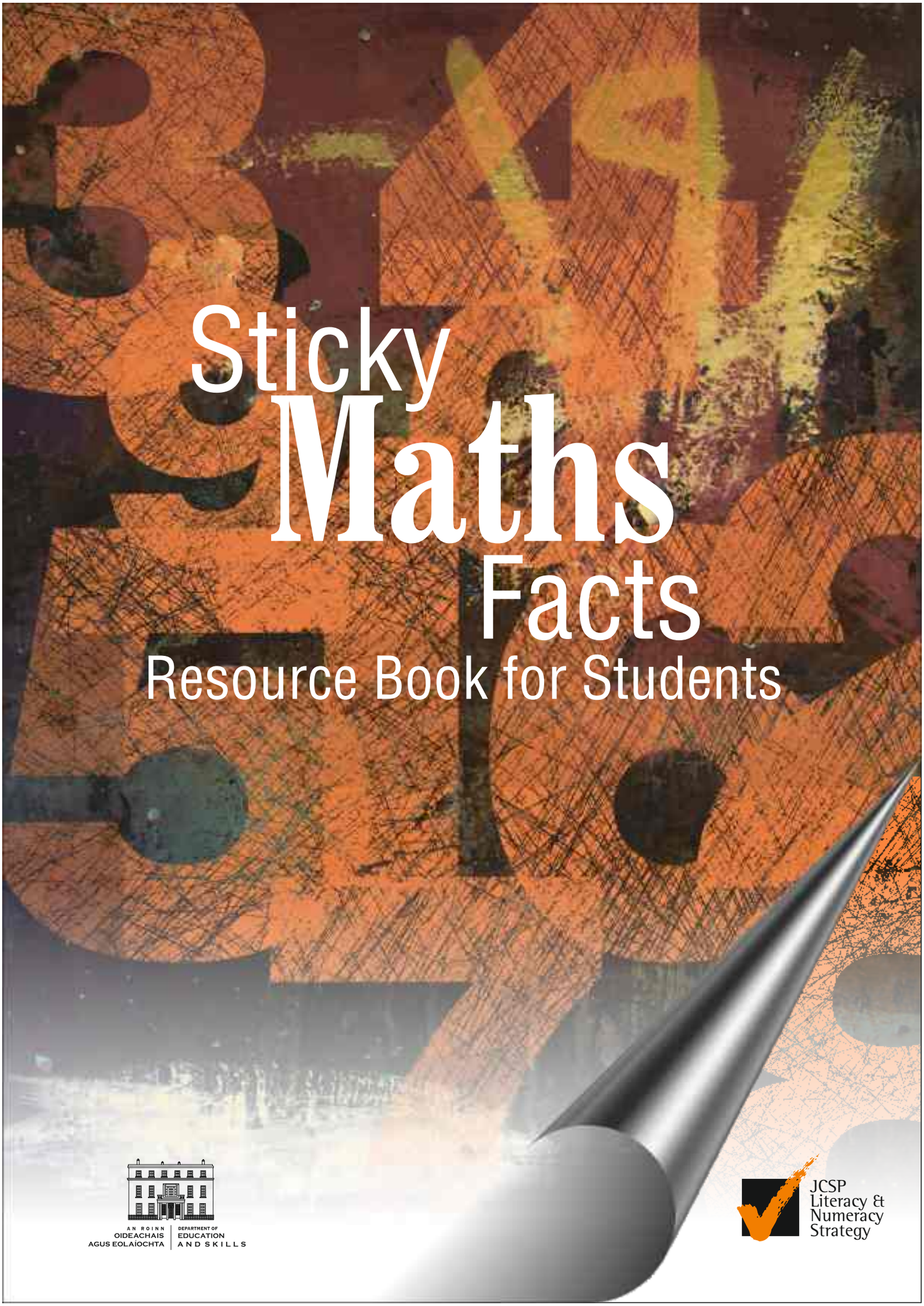

Sticky Maths Facts

Resource Book for Students

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA | DEPARTMENT OF EDUCATION AND SKILLS

JCSP Literacy & Numeracy Strategy

Published in 2010 by
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The Junior Certificate School Programme Support Service is funded by the Teacher Education Section, Department of Education and Skills and the European Social Fund.

The Junior Certificate School Programme Literacy and Numeracy Strategy and the Demonstration Library Project are funded by the Early Literacy Initiative and the Delivering Equality of Opportunity in Schools (DEIS) Action Plan within the Teacher Education Section of the Department of Education and Skills.

The Junior Certificate School Programme is a national programme sponsored by the Department of Education and Skills and the National Council for Curriculum and Assessment.

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Introduction

Dear Student,

This "Sticky Maths Facts Resource Book for Students" has been planned and developed to help you to learn, remember and revise important definitions and measurement formulae in numeracy and maths.

The sticky-labels have been arranged by topic and have been printed in clusters of twenty-one per page.

You will find the "Sticky Maths Facts" sticky-labels especially useful when your teacher is covering these numeracy topics in class. For example, when your teacher has completed the lessons on Measurement, you can peel-off the sticky-labels, which deal with Measurement, and "stick" them in a suitable location to remind you of what has been taught in those lessons. Suitable locations for the sticky-labels might be: in your JCSP Student Portfolio folder, in your JCSP Keyword Notebook, on your bookmarks, on your homework copy, on your homework journal or on your study-planner chart. Reading, studying and revising these definitions and formulae in a variety of locations will help you to memorise the content of the labels.

"Sticky Maths Facts" sticky-labels are also a great way of cutting-down on the amount of writing that you have to do in maths revision, in maths homework or in maths classes. 168 key definitions and formulae have already been printed for you in this student resource book so you will not have to write down these definitions or formulae again; just use the printed sticky-labels!

All these important definitions and measurement formulae have been reproduced and repeated in the second section (Appendix) of this resource book. This means that you will still have one complete set of all these definitions and formulae in this resource book after you have removed and re-located all the sticky-labels.

We hope you will enjoy using "Sticky Maths Facts" sticky-labels.

Please remember that "Sticky Maths Facts" sticky-labels are not allowed in the exam hall during Department of Education and Skills exams.

Number: Computation and Operations

Addition:
To get the total or sum. To join two or more numbers together to get one number.

Cubed:
To raise a number to the power of three. Example: “4 cubed” is written as $4^3 = 4 \times 4 \times 4 = 64$

Difference:
The result got by subtracting one number or quantity from another.

Division:
To separate into equal groups. To subdivide into equal groupings.

Double:
Multiply by two. Twice as much.

Estimate:
A rough calculation or approximation.

Evalute:
Work it out! Do the calculations to find the answer.

Flow chart:
A diagram showing the order of the steps to be taken to solve a problem.

Inverse operation:
The reverse operation. Examples: Addition is the inverse of subtraction. Division is the inverse of multiplication.

Mental calculation:
Calculating the exact answer in your head without using pen and paper or calculator.

Minus:
To subtract. To take one quantity or number away from another. To find the difference.

Multiplication:
To find the product. A shorter way of adding a set of equal numbers together.
Example: $5 + 5 + 5 + 5 + 5 = 5 \times 5$

Power of (a number):
The number of times a base number or quantity is to be multiplied by itself. Example: “5 to the power of 3” is written as $5^3 = 5 \times 5 \times 5 = 125$

Product:
The result when two (or more) numbers are multiplied together.

Rounding off:
A way of approximating an answer or number.

Squared:
To raise a number to the power of two. Example: “4 squared” is written as $4^2 = 4 \times 4 = 16$

Square root:
A number that when multiplied by itself gives the original number.

Subtraction:
To take one number from another. To get the difference.

Sum:
The addition of numbers together. The total or whole amount.

Take away:
To subtract. To take one quantity or number away from another.

Total:
The sum or whole amount. The total is got by addition.

Number: Structure and Properties

Average:
The total of all scores or items ÷ by how many scores or items there were.

Decrease:
To get smaller in size or number.

Denominator:
The bottom number of a fraction. The number below the line in a fraction.

Equation:
A mathematical statement that contains an = sign to show that two expressions are equal.

Factor:
A whole number which divides exactly into another number (with no remainder).

Finite:
Countable. Is not infinite. Does not go on forever.

Formula:
A general equation or rule.

Function:
A relation between two sets called the domain and range in which each member of the domain is related to precisely one member of the range.

Highest common factor (hcf):
The largest number that divides evenly into two or more numbers.

Improper fraction:
A fraction whose numerator (number on top line) is greater than its denominator (number on bottom line).

Inequality:
A mathematical sentence that compares two unequal expressions using one of these symbols: $< > \leq \geq \neq$

Least common multiple (lcm):
The smallest number that is a common multiple of two or more numbers.

Mixed number:
A number written as a whole number with a fraction.

Multiple:
The product of a whole number and any other whole number.

Natural number:
A whole number, from 1 to infinity. These numbers are used for counting.

Numerator:
The top number of a fraction. The number above the line in a fraction.

Prime number:
A number that has exactly two factors, 1 and the number itself.

Proportion:
A comparison between a part and the whole.

Ratio:
A comparison of two amounts, measures or numbers.

Recurring decimal:
A decimal which has repeating digits or a repeating pattern of digits.
Example: $\frac{1}{3} = 0{\cdot}3333....$

Square Root:
A number that when multiplied by itself gives the original number.

Measures and Measurement

Acute angle:
An angle that measures between 0º and 90º.

Angle:
The measure of the space between two straight lines that extend from a common point.

Area:
The size of space a surface takes up.

Capacity:
The amount a container can hold.

Circumference:
The distance around the outer edge of a circle.

Complementary angles:
Two angles whose sum is 90°.

Degree:
A unit for measuring the size of angles.

Dimensions:
The lengths of the sides of a shape. Refers to length, breadth and height.

Interval:
(1) The distance between two points.
(2) The amount of time that has passed between two events.

Mass:
A measure of the amount of matter in an object.

Minute:
A unit of time. There are 60 minutes in one hour. There are 60 seconds in one minute.

Obtuse angle:
An angle that is greater than 90° and less than 180°.

Opposite angles:
Angles that are vertically opposite.

Perimeter:
The distance around the boundary of a shape.

Reflex angle:
An angle that is greater than 180° but less than 360°.

Right angle:
An angle which measures 90º.

Straight angle:
An angle which measures 180º.

Supplementary angles:
Two angles whose sum is 180°.

Total surface area:
The total area of all the faces (and curved surfaces) of a solid figure.

Volume:
The amount of space occupied by a 3-dimensional object.

Year:
A unit of time. There are 365 days in one year. There are 12 months in one year.

Space and Properties of Space

Axis (axes):
A reference line (or pair of lines) from which distances are measured on a coordinate grid.

Clockwise:
In the same direction as the rotation of the hands of a clock.

Collinear:
A set of points lying in a straight line.

Coordinate grid:
A 2-dimensional grid in which location is described by its distances from the X and Y axes.

Coordinates:
An ordered pair of numbers that gives the location of a point in a coordinate grid.

Coplanar:
In the same plane.

Congruent:
Having exactly the same size and shape.

Counter-clockwise:
In a direction opposite to the direction that the hands of a clock rotate.

Horizontal:
Parallel to the horizon.

Intersect:
To cross over one another.

Mid-point:
The middle point of a line segment.

Origin:
The intersection of the X-axis and the Y-axis in a coordinate plane. Its coordinates are (0,0).

Parallel lines:
Lines that never meet no matter how far they are extended.

Perpendicular:
Forming right angles.

Perpendicular bisector:
A line that divides a line segment in half and meets the segment at right angles.

Plane:
A flat surface. A plane extends indefinitely in all directions.

Point:
An exact location in space.

Quadrant:
(1) Any of the four sections of a coordinate grid that are separated by the X and Y axes. (2) A quarter of a circle or its circumference.

Vertical:
Perpendicular to the horizon.

X-axis:
The horizontal axis of the graph.

Y-axis:
The vertical axis of the graph.

Shape and Properties of Shape

Arc:
A part of the circumference of a circle.

Chord:
A straight line joining any two points on the circumference of a circle.

Circle:
A shape bounded by a continuous line which is always the same distance from the centre.

Circumference:
The distance around the outer edge of a circle.

Cube:
A solid shape with six square faces which are all equal in size.

Diameter:
A chord that passes through the centre of a circle.

Equilateral triangle:
A triangle that has three equal sides and three equal angles.

Hypotenuse:
The longest side in a right-angled triangle. The hypotenuse is always opposite the right angle.

Isosceles triangle:
A triangle that has two equal sides and two equal angles.

Line segment:
A part of a straight line.

Parallelogram:
A four-sided shape whose opposite sides are equal and parallel.

Perpendicular:
At right angles.

Pythagoras' theorem:
In any right angled triangle, the area of the square on the hypotenuse is equal to the sum of the areas of the squares on the other two sides.

Radius:
The distance from the centre of a circle to any point on its circumference. Half the length of the diameter.

Right angled triangle:
A triangle that has an interior angle of 90°.

Scalene triangle:
A triangle where no two sides or angles are equal in measure.

Sector:
A part of a circle enclosed by an arc and two radii.

Segment:
A part of a circle cut off by a chord.

Tangent:
A straight line that touches a circle at one point only.

Triangle:
A polygon with 3 angles and 3 sides.

Vertical:
At right angles to the horizon.

Data, Data Handling and Probability

Bar chart:
A graph that uses parallel bars of equal width to display information.

Column:
Items arranged in a vertical line.

Data:
Numerical information that is used in statistics.

Frequency:
(1) The number of times a particular item appears in a set of data.
(2) The number of times that an event has occurred.

Graph:
A drawing that shows a relationship between sets of data.

Mean:
The average of a number of different amounts. To calculate the mean: sum of numbers ÷ number of numbers.

Median:
When numbers are arranged from least to greatest, the middle number is the median.

Mode:
The number that occurs most often in a set of numbers.

Pie chart:
A circular diagram which is used to display data as sectors or sections of a circle (360°).

Range:
The difference between the greatest and the least value in a set of data.

Certain event:
An event that will definitely happen. A certain event has a probability of one.

Chance:
The likelihood that a particular outcome will happen.

Equally likely:
Events that have the same chance or probability.

Event:
A possible outcome. Something that may happen.

Favourable outcome:
In probability, the outcome you are interested in measuring.

Impossible event:
An event that will definitely not happen. An event with a probability of zero.

Odds:
The ratio of favourable outcomes to unfavourable outcomes.

Outcome:
One of the possible results in a probability experiment.

Probability:
The measure of how likely an event is. Its value lies between 0 (impossible event) and 1 (certain event).

Random selection:
A chance pick from a number of items.

Tree diagram:
A diagram shaped like a tree. Helps in showing possible outcomes of an event.

Patterns, Symmetries and Basic Algebra

Arithmetic progression:
A sequence (series) of numbers in which there is a common difference between any two adjacent elements of the sequence. Example:
2, 4, 6, 8 ……

Consecutive:
Numbers that follow each other in an unbroken sequence.

Half turn:
A rotation of 180º about a point.

Line of symmetry:
A line that divides a figure into two halves that are mirror images of each other.

Line symmetry:
If a figure can be folded along a line so that the two halves match exactly, then the figure has line symmetry.

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A figure that can be turned exactly 180º about a point and fit exactly onto itself has point symmetry.

Quarter turn:
A rotation of 90º about a point.

Reflection (flip):
A transformation creating a mirror image of a figure on the opposite side of a line.

Repeating decimal:
A decimal which has repeating digits or a repeating pattern of digits.
Example: $\frac{1}{3} = 0{\cdot}3333....$

Revolution:
A rotation of 360º about a point.

Rotation (turn):
A transformation in which a figure is turned a given angle and direction around a point.

Sequence (Series):
A set of numbers arranged in a special order or pattern.

Symmetry:
An object is symmetrical when one half is a mirror image of the other half.

Transformation:
A rule for moving every point in a figure to a new location.

Translation:
A transformation that slides a figure a given distance in a given direction.

Turn centre:
The point around which a figure is rotated.

Algebra:
An area of mathematics where numbers are represented by letters.

Equation:
A mathematical sentence that contains an = sign to show that two expressions are equal.

Expression:
A combination of signs, variables, numbers and symbols that represents a mathematical relationship.
Example: $3x + 2y$

Inequality:
A mathematical sentence that compares two unequal expressions using one of these symbols: $< > \leq \geq \neq$

Variable:
A letter used to represent an unknown number. Anything that does not have a fixed value.

Key Measurement Formulae

Perimeter of a rectangle:
$2l + 2w$
(l: length)(w: width)

Perimeter of a square:
$4s$ (s: length of side)

Circumference of a circle:
$2\pi r$ or πd
($\pi : \frac{22}{7}$ or 3·14)(r: radius)
(d: diameter)

Perimeter of a triangle:
$s1 + s2 + s3$
(s1: length of one side)
(s2: length of another side)
(s3: length of third side)

Perimeter of a quadrilateral:
$s1 + s2 + s3 + s4$
(s1: length of one side)
(s2: length of another side)
(s3: length of third side)
(s4: length of fourth side)

Perimeter of a parallelogram:
$s1 + s2 + s3 + s4$
(s1: length of one side)
(s2: length of another side)
(s3: length of third side)
(s4: length of fourth side)

Area of a triangle:
$\frac{1}{2}bh$
(b: length of base)
(h: length of the perpendicular line segment from the base to the opposite vertex)

Area of a rectangle:
lb
(l: length)
(b: breadth)

Area of a square:
s^2
(s: length of a side)

Area of a parallelogram:
bh
(b: length of base)
(h: length of the perpendicular line segment from the base to the opposite vertex)

Area of a disc:
πr^2
($\pi : \frac{22}{7}$ or 3·14)
(r: radius)

Surface area of a rectangular prism:
$2lw + 2lh + 2wh$
(l: length)
(w: width)
(h: height)

Surface area of a cube:
$6s^2$
(s: length of a side)

Curved surface area of a cylinder:
$2\pi rh$
($\pi : \frac{22}{7}$ or 3·14)
(r: radius)
(h: height)

Total surface area of a cylinder:
$2\pi rh + 2\pi r^2$
($\pi : \frac{22}{7}$ or 3·14)
(r: radius)(h: height)

Curved surface area of a sphere:
$4\pi r^2$
($\pi : \frac{22}{7}$ or 3·14)
(r: radius)

Volume of a rectangular prism:
lwh
(l: length)
(w: width)
(h: height)

Volume of a cube:
s^3
(s: length of a side)

Volume of a cylinder:
πr^2h ($\pi : \frac{22}{7}$ or 3·14)
(r: radius)
(h: height)

Volume of a sphere:
$\frac{4}{3}\pi r^3$
($\pi : \frac{22}{7}$ or 3·14)(r: radius)

Key units of measurement:
Length: Metre (m)
Area: Square metre (m^2)
Volume: Cubic metre (m^3)

Appendix

Number: Computation and Operations

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Square root:
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Number: Structure and Properties

Average:
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The bottom number of a fraction. The number below the line in a fraction.

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Example: $\frac{1}{3} = 0{\cdot}3333....$

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A number that when multiplied by itself gives the original number.

Measures and Measurement

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An angle that measures between 0º and 90º.

Angle:
The measure of the space between two straight lines that extend from a common point.

Area:
The size of space a surface takes up.

Capacity:
The amount a container can hold.

Circumference:
The distance around the outer edge of a circle.

Complementary angles:
Two angles whose sum is 90°.

Degree:
A unit for measuring the size of angles.

Dimensions:
The lengths of the sides of a shape. Refers to length, breadth and height.

Interval:
(1) The distance between two points.
(2) The amount of time that has passed between two events.

Mass:
A measure of the amount of matter in an object.

Minute:
A unit of time. There are 60 minutes in one hour. There are 60 seconds in one minute.

Obtuse angle:
An angle that is greater than 90° and less than 180°.

Opposite angles:
Angles that are vertically opposite.

Perimeter:
The distance around the boundary of a shape.

Reflex angle:
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Right angle:
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The total area of all the faces (and curved surfaces) of a solid figure.

Volume:
The amount of space occupied by a 3-dimensional object.

Year:
A unit of time. There are 365 days in one year. There are 12 months in one year.

Space and Properties of Space

Axis (axes):
A reference line (or pair of lines) from which distances are measured on a coordinate grid.

Clockwise:
In the same direction as the rotation of the hands of a clock.

Collinear:
A set of points lying in a straight line.

Coordinate grid:
A 2-dimensional grid in which location is described by its distances from the X and Y axes.

Coordinates:
An ordered pair of numbers that gives the location of a point in a coordinate grid.

Coplanar:
In the same plane.

Congruent:
Having exactly the same size and shape.

Counter-clockwise:
In a direction opposite to the direction that the hands of a clock rotate.

Horizontal:
Parallel to the horizon.

Intersect:
To cross over one another.

Mid-point:
The middle point of a line segment.

Origin:
The intersection of the X-axis and the Y-axis in a coordinate plane. Its coordinates are (0,0).

Parallel lines:
Lines that never meet no matter how far they are extended.

Perpendicular:
Forming right angles.

Perpendicular bisector:
A line that divides a line segment in half and meets the segment at right angles.

Plane:
A flat surface. A plane extends indefinitely in all directions.

Point:
An exact location in space.

Quadrant:
(1) Any of the four sections of a coordinate grid that are separated by the X and Y axes. (2) A quarter of a circle or its circumference.

Vertical:
Perpendicular to the horizon.

X-axis:
The horizontal axis of the graph.

Y-axis:
The vertical axis of the graph.

Shape and Properties of Shape

Arc:
A part of the circumference of a circle.

Chord:
A straight line joining any two points on the circumference of a circle.

Circle:
A shape bounded by a continuous line which is always the same distance from the centre.

Circumference:
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Cube:
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Equilateral triangle:
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Hypotenuse:
The longest side in a right-angled triangle. The hypotenuse is always opposite the right angle.

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A part of a straight line.

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Pythagoras' theorem:
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The distance from the centre of a circle to any point on its circumference. Half the length of the diameter.

Right angled triangle:
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Scalene triangle:
A triangle where no two sides or angles are equal in measure.

Sector:
A part of a circle enclosed by an arc and two radii.

Segment:
A part of a circle cut off by a chord.

Tangent:
A straight line that touches a circle at one point only.

Triangle:
A polygon with 3 angles and 3 sides.

Vertical:
At right angles to the horizon.

Data, Data Handling and Probability

Bar chart:
A graph that uses parallel bars of equal width to display information.

Column:
Items arranged in a vertical line.

Data:
Numerical information that is used in statistics.

Frequency:
(1) The number of times a particular item appears in a set of data.
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Graph:
A drawing that shows a relationship between sets of data.

Mean:
The average of a number of different amounts. To calculate the mean: sum of numbers ÷ number of numbers.

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Favourable outcome:
In probability, the outcome you are interested in measuring.

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An event that will definitely not happen. An event with a probability of zero.

Odds:
The ratio of favourable outcomes to unfavourable outcomes.

Outcome:
One of the possible results in a probability experiment.

Probability:
The measure of how likely an event is. Its value lies between 0 (impossible event) and 1 (certain event).

Random selection:
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Tree diagram:
A diagram shaped like a tree. Helps in showing possible outcomes of an event.

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Arithmetic progression:
A sequence (series) of numbers in which there is a common difference between any two adjacent elements of the sequence. Example:
2, 4, 6, 8 ……

Consecutive:
Numbers that follow each other in an unbroken sequence.

Half turn:
A rotation of 180º about a point.

Line of symmetry:
A line that divides a figure into two halves that are mirror images of each other.

Line symmetry:
If a figure can be folded along a line so that the two halves match exactly, then the figure has line symmetry.

Point (central) symmetry:
A figure that can be turned exactly 180º about a point and fit exactly onto itself has point symmetry.

Quarter turn:
A rotation of 90º about a point.

Reflection (flip):
A transformation creating a mirror image of a figure on the opposite side of a line.

Repeating decimal:
A decimal which has repeating digits or a repeating pattern of digits.
Example: $\frac{1}{3} = 0{\cdot}3333....$

Revolution:
A rotation of 360º about a point.

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Sequence (Series):
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Symmetry:
An object is symmetrical when one half is a mirror image of the other half.

Transformation:
A rule for moving every point in a figure to a new location.

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A transformation that slides a figure a given distance in a given direction.

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The point around which a figure is rotated.

Algebra:
An area of mathematics where numbers are represented by letters.

Equation:
A mathematical sentence that contains an = sign to show that two expressions are equal.

Expression:
A combination of signs, variables, numbers and symbols that represents a mathematical relationship.
Example: $3x + 2y$

Inequality:
A mathematical sentence that compares two unequal expressions using one of these symbols: $< > \leq \geq \neq$

Variable:
A letter used to represent an unknown number. Anything that does not have a fixed value.

Key Measurement Formulae

Perimeter of a rectangle:
$2l + 2w$
(l: length)(w: width)

Perimeter of a square:
$4s$ (s: length of side)

Circumference of a circle:
$2\pi r$ or πd
($\pi : \frac{22}{7}$ or 3·14)(r: radius)
(d: diameter)

Perimeter of a triangle:
$s1 + s2 + s3$
(s1: length of one side)
(s2: length of another side)
(s3: length of third side)

Perimeter of a quadrilateral:
$s1 + s2 + s3 + s4$
(s1: length of one side)
(s2: length of another side)
(s3: length of third side)
(s4: length of fourth side)

Perimeter of a parallelogram:
$s1 + s2 + s3 + s4$
(s1: length of one side)
(s2: length of another side)
(s3: length of third side)
(s4: length of fourth side)

Area of a triangle:
$\frac{1}{2}bh$
(b: length of base)
(h: length of the perpendicular line segment from the base to the opposite vertex)

Area of a rectangle:
lb
(l: length)
(b: breadth)

Area of a square:
s^2
(s: length of a side)

Area of a parallelogram:
bh
(b: length of base)
(h: length of the perpendicular line segment from the base to the opposite vertex)

Area of a disc:
πr^2
($\pi : \frac{22}{7}$ or 3·14)
(r: radius)

Surface area of a rectangular prism:
$2lw + 2lh + 2wh$
(l: length)
(w: width)
(h: height)

Surface area of a cube:
$6s^2$
(s: length of a side)

Curved surface area of a cylinder:
$2\pi rh$
($\pi : \frac{22}{7}$ or 3·14)
(r: radius)
(h: height)

Total surface area of a cylinder:
$2\pi rh + 2\pi r^2$
($\pi : \frac{22}{7}$ or 3·14)
(r: radius)(h: height)

Curved surface area of a sphere:
$4\pi r^2$
($\pi : \frac{22}{7}$ or 3·14)
(r: radius)

Volume of a rectangular prism:
lwh
(l: length)
(w: width)
(h: height)

Volume of a cube:
s^3
(s: length of a side)

Volume of a cylinder:
πr^2h ($\pi : \frac{22}{7}$ or 3 1·4)
(r: radius)
(h: height)

Volume of a sphere:
$\frac{4}{3}\pi r^3$
($\pi : \frac{22}{7}$ or 3·14)(r: radius)

Key units of measurement:
Length: Metre (m)
Area: Square metre (m^2)
Volume: Cubic metre (m^3)

Sticky Maths Facts

Junior Certificate School Programme