

**Leckie & Leckie Secondary Maths Dictionary
Teachers' Resources**

**Answers to Problems
in the Worksheets**

Answers to Problems in the Worksheets

Worksheet 1

A

- 1 This dictionary tells you the meaning of words used in mathematics.
- 4 (a) to understand the meaning of words.
(b) how to spell words.
(c) the part of speech of each word.
(d) information about different words.

B

- 1 to break up, or separate, into factors.
- 2 Fahrenheit.
- 3 in the fraction $\frac{2}{3}$, the denominator is 3.
- 4 a noun.
- 5 radii.
- 6 $\sqrt[3]{}$.
- 7 handling data.
- 8 exponent, index, power.

Worksheet 2

A

- 1 cube.
- 2 cuboid.
- 3 cylinder.
- 4 dodecahedron.
- 5 icosahedron.
- 6 polyhedron.
- 7 prism.
- 8 pyramid.

B

- 1 consumer → conclude – continuous data.
- 2 change → centre of enlargement – charge.
- 3 prism → previously – probable.
- 4 cross-section → cosine – cube.
- 5 plane → pie chart – plot.
- 6 pi → per – pictograph.
- 7 concave → complement – concentric.
- 8 predict → portion – pressure.

Worksheet 3

A

- 1 rhombus.
- 2 equal.
- 3 Celsius.
- 4 intercept.
- 5 likely.
- 6 probability.

B

- 1 average.
- 2 category.
- 3 fifty-fifty.
- 4 milligram.
- 5 trapezium.

C

Shape, space and measure

- 1 pint.
 - 2 plan.
 - 3 plane.
 - 4 polygon.
 - 5 polyhedron.
- #### Handling data
- 1 examine.
 - 2 example.
 - 3 exception.
 - 4 exhaustive.
 - 5 experiment.

Worksheet 4

A

- 1 nearly correct but not exact.
- 2 a thousand million.
- 3 to use numbers to work out values.
- 4 a reduction.
- 5 they are the same.
- 6 facts or data.
- 7 a pair of numbers with a particular total.
- 8 a set of 2 things.

B

- 1 **Addition** is combining quantities together, whereas **subtraction** is finding the difference between 2 quantities.
- 2 The **greatest** means the largest amount, but the **least** means the smallest amount.
- 3 A **cardinal** number is a number that shows quantity but not order and an **ordinal** number describes a position in a number sequence.
- 4 **Negative** means a number less than zero, whereas **positive** means a number greater than zero.

Answers to Problems in the Worksheets (continued)

- 5 A **factor** is a whole number that exactly divides another whole number, but a **multiple** is when one number multiplies another.
- 6 A **digit** is any of the 10 numerals from 0 to 9 and an **integer** is any whole number.

C

- 1 triangle 3
- 2 tetrahedron 4
- 3 pentagon or pentahedron 5
- 4 hexagon 6
- 5 heptagon 7
- 6 octagon 8
- 7 nonagon 9
- 8 decagon 10

Worksheet 5

A

- 1 top.
- 2 bottom.
- 3 smaller.
- 4 larger.
- 5 (any example)

B

- 1 **addition**: find the lowest common denominator, change to equivalent fractions and add.
- 2 **subtraction**: find the lowest common denominator, change to equivalent fractions and take away.
- 3 **multiplication**: the product of the numerators over the product of the denominators.
- 4 **division**: turn second fraction upside down and multiply.

C

- 1 half.
- 2 quarter.
- 3 two fifths.
- 4 three quarters.
- 5 third.
- 6 half.
- 7 two sevenths.
- 8 one twelfth.

Worksheet 6

A

- 1 the number of times a number is multiplied by itself.
- 2 multiply it by itself.
- 3 the product of 3 equal numbers.
- 4 $\sqrt{\quad}$.
- 5 3.
- 6 4.
- 7 square.
- 8 cube.

B

- 1 indices.
- 2 exponent, power.
- 3 $a^5, a^2, a^6, a^{-2}, a^3, 1, \sqrt{a}$.

C

- 1 1:4 1 out of 5.
- 2 1:5 1 out of 6.
- 3 1:3 1 out of 4.
- 4 1:15 1 out of 16.

Worksheet 7

A

Roman numerals are a number system used by the ancient Romans.

- 1 2002.
- 2 CCCL.
- 3 XI.
- 4 35.
- 5 525.
- 6 DCVI.
- 7 MCL.

B

- 1 ascending, descending.
- 2 root, power.
- 3 profit, loss.
- 4 true, false.
- 5 reciprocal, palindrome.

Answers to Problems in the Worksheets (continued)

C

- 1 addition.
- 2 subtraction.
- 3 division.
- 4 multiplication.
- 5 less than.
- 6 greater than or equal to.
- 7 equals.
- 8 square root.

Worksheet 8

A

- 1 point, fraction.
- 2 point, place.
- 3 recurring.
- 4 terminating.

B

- 1 fraction \rightarrow decimal: divide numerator by denominator.
- 2 decimal \rightarrow fraction: numerator is decimal without decimal point; denominator is 10^n where n is number of decimal places in original number.
- 3 decimal \rightarrow percentage: multiply by 100.
- 4 percentage \rightarrow decimal: divide by 100.
- 5 fraction \rightarrow percentage: multiply by 100.
- 6 percentage \rightarrow fraction: percentage over 100.

C

- 1 15.023.
- 2 1.5.
- 3 0.15.
- 4 130.5.
- 5 1005.

Worksheet 9

A

- 1 inverse proportion.
- 2 decrease.
- 3 exponent, index, power.
- 4 direct proportion.
- 5 exponent, index.
- 6 exact.
- 7 cube root, square root.

B

- 1 ratio.
- 2 cube.
- 3 0.
- 4 direct.

C

- 1 cardinal, factor, multiple, ordinal.
- 2 cancel, lowest terms.
- 3 point, recurring.
- 4 VAT.
- 5 direct, inverse.
- 6 index. root.

Worksheet 10

A

cube, day, equals, greatest, infinity, interior, least, line, linear, long, negative, nine, oval, radial, reciprocal, regular, scale, zero.

B

- 1 false
- 2 true.
- 3 true.
- 4 true.
- 5 false.

C

- 1 estimate.
- 2 raise.
- 3 find.
- 4 simplify.
- 5 calculate.
- 6 complete.
- 7 define.
- 8 prove.

Worksheet 11

A

- 1 three quarters.
- 2 sixty six and two thirds.
- 3 Value Added Tax.
- 4 hundred.
- 5 denominator.

Answers to Problems in the Worksheets (continued)

B

An **increase** is an enlargement or addition.

A **decrease** is a reduction.

- 1 decrease.
- 2 increase.
- 3 increase.
- 4 decrease.
- 5 increase.
- 6 decrease.
- 7 increase.
- 8 decrease.

C

$$\frac{1}{4} = 0.25$$

$$33\frac{1}{3}\% = \frac{1}{3}$$

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

$$0.125 = \frac{1}{8}$$

$$\frac{2}{3} = 0.666\dots$$

$$40\% = 0.4$$

$$\frac{1}{9} = 0.111\dots$$

$$100\% = 1$$

Worksheet 12

A

- 1 true.
- 2 false.
- 3 true.
- 4 false.
- 5 true.
- 6 false.

B

- 1 of one to the other remains the same.
- 2 that the value of one quantity increases as the other decreases.
- 3 6.
- 4 compares.
- 5 similar.

Worksheet 13

A

- 1 collection of terms following a rule or pattern.
- 2 17, 21.
- 3 n th term.
- 4 continuous or following in order.
- 5 to create.
- 6 limited.

B

- 1 seven times n .
- 2 five times n plus one.
- 3 ten times n minus one.
- 4 fifty minus ten times n .
- 5 four times n plus one.
- 6 two times n minus one.
- 7 three times n plus two.
- 8 five times n .

Worksheet 14

A

- 1 a letter in an algebraic expression or equation.
- 2 a quantity that can take a range of values.
- 3 that an expression does not have 2 statements which are equal.
- 4 an equation used to find quantities when given certain values.
- 5 symbols used to show items that are treated together.
- 6 result.
- 7 by substituting numbers and calculating.
- 8 part of an expression, equation or sequence.

B

- 1 five minus a number.
- 2 add a number to one.
- 3 take away three from a number doubled.
- 4 twice a number taken away from six.
- 5 divide a number by three.
- 6 add one to a number and multiply by four.
- 7 square a number.
- 8 cube a number and double it.

C

- 1 subtraction.
- 2 multiplication.
- 3 multiply out brackets.
- 4 division.
- 5 factorise.
- 6 square root.
- 7 square.
- 8 addition.

Answers to Problems in the Worksheets (continued)

Worksheet 15

A

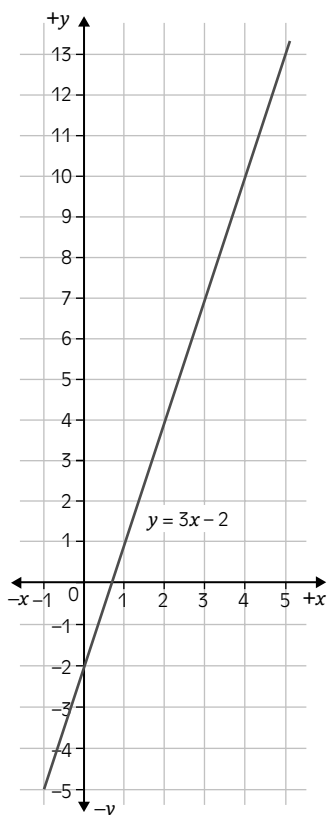
- 1 illustrating a relationship between variables.
- 2 the horizontal or vertical line on a graph from which coordinates are measured.
- 3 point where the x-axis and y-axis cross, with coordinates (0, 0).
- 4 pairs of numbers giving the position of a point on a graph or grid. They are given in the form (x, y).
- 5 to mark their position on graph paper.
- 6 point where a line crosses an axis on a graph.

B

- 1 straight-line. 5 $m = 6, c = 1.$
- 2 gradient. 6 $m = 2, c = -5.$
- 3 gradient. 7 $m = -1, c = 3.$
- 4 intercept.

C

x	-1	0	1	2	3	4	5
3x	-3	0	3	6	9	12	15
-2	-2	-2	-2	-2	-2	-2	-2
y	-5	-2	1	4	7	10	13



Worksheet 16

A

- 1 French mathematician.
- 2 to calculate probabilities.
- 3

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1
1 9 36 84 126 126 84 36 9 1
- 4 1, 2, 4, 8, 16, 32, 64, 128, 256, 512.
- 5 the sum of each row is a power of 2.

B

- 1 Italian mathematician.
- 2 each number is found by adding the 2 previous numbers.
- 3 1, 1, 2, 3, 5, 8, 13, 21, 34, 55.

C

- A code is information translated into words, letters or numbers.
- 1 consecutive.
 - 2 finite.
 - 3 9 14 3 18 5 1 19 5.
 - 4 16 1 20 20 5 18 14.

Worksheet 17

A

A **solution** is the result to a problem.

- 1 Let the numbers be m and n.
 $m + n = 14$ ①
 $m - n = 2$ ②
 ① + ② $2m = 16$
 $m = 8, n = 6.$
- 2 Let length be l and width be w.
 $l = 2w$
 perimeter = $2l + 2w = 4w + 2w = 6w = 66$
 $w = 11$ metres.

B

- 1 $x = 6.$
- 2 $y = 30.$
- 3 $a = 5.$
- 4 $b = 5.$
- 5 $y = 0.$

Answers to Problems in the Worksheets (continued)

Worksheet 18

A

gradient

$$= (\text{vertical distance}) \div (\text{horizontal distance})$$

line with a positive ratio:



line with a negative ratio:



B

See Dictionary entries.

Worksheet 19

A

square.

1 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.

2

1	2	3	4	5	n
1 ²	2 ²	3 ²	4 ²	5 ²	n ²
3	6	11	18	27	
2+1 ²	2+2 ²	2+3 ²	2+4 ²	2+5 ²	2+n ²

3 1, 8, 27, 64, 125, 216, 343, 512, 729, 1000.

4 ascending.

B

1 difference.

2 consecutive.

3 sequence.

4 term.

5 difference, terms, sequence, square.

Worksheet 20

A

1 an equation used to find quantities when given certain values.

2 formulae or formulas.

3 Fahrenheit and Celsius are named after scientists.

4 $C = \frac{5}{9}(F - 32)$.

5 28°C (28 is the reverse of 82).

B

1 An **equation** is a mathematical statement showing things that are equal, whereas an **inequality** is a statement showing two quantities that are not equal.

2 A **linear expression** has unknowns to maximum power 1, but a **quadratic expression** has unknowns to maximum power 2.

3 The **square** of n means the product of 2 equal numbers, whereas the **cube** of n means the product of 3 equal numbers.

4 A **formula** is an equation used to find quantities, but a **function** is a relationship between variables.

5 A **factor** is a whole number that exactly divides another, but a **common factor** is a factor that is the same for two or more numbers.

C

1 occurring at the same time.

2 a mathematical statement showing things that are equal.

3 because 2 equations are solved at the same time

4 Let A be Alisha's mother's age and a be Alisha's age.

$$A + 3 = 2(a + 3) \Rightarrow A - 2a = 3 \quad \textcircled{1}$$

$$(A + 10) - (a + 10) = 18 \Rightarrow A - a = 18 \quad \textcircled{2}$$

$$\textcircled{2} - \textcircled{1} \Rightarrow a = 15$$

\therefore Alisha is 15 years old.

Worksheet 21

A

1 A parabola is drawn using a quadratic function.

2 See entry for maximum point.

3 A quadratic function is a relationship between 2 variables and a cubic function is a relationship between 3 variables.

4 See entry for minimum point.

B

Number of words beginning with **cube** = 10.

List A = cubic curve, cubic equation, cubic expression, cubic function.

List B = cube, cube root, cubic centimetre, cubic metre, cubic millimetre, cuboid.

The connection between all these words is 3.

C

1 symbols.

2 solving.

3 solutions.

4 values.

Answers to Problems in the Worksheets (continued)

Worksheet 22

B

- 1 acute triangle: three acute angles.
- 2 equilateral triangle: three equal sides.
- 3 isosceles triangle: two equal sides.
- 4 obtuse triangle: one obtuse angle.
- 5 right-angled triangle: one right angle.
- 6 scalene triangle: three different sides.

C

- 1 a surface which can be folded into a solid.
- 2 cube, cuboid, tetrahedron.

Worksheet 23

A

- 1 4, right angles.
- 2 2, parallel.
- 3 4, equal.
- 4 2, adjacent.
- 5 1, parallel.
- 6 1, equal.
- 7 2, equal, adjacent.
- 8 2, opposite, equal, parallel.

B

- 1 cube: 6.
- 2 cuboid: 6.
- 3 tetrahedron: 4.
- 4 pentahedron: 5.
- 5 decahedron: 10.
- 6 dodecahedron: 12.
- 7 icosahedron: 20.

C

- 1 height.
- 2 concave.
- 3 horizontal.
- 4 cylinder.
- 5 prism.
- 6 reflection.

Worksheet 24

A

- 2 A cube is a solid figure with 6 square faces but a cuboid is a solid shape that has 6 rectangular faces.
- 3 A kilometre is a measurement of length and a kilogram is a measurement of weight.

4 A millilitre is a measurement of capacity and a millimetre is a measurement of length.

5 A minute is a measurement of time and a millennium is a period of 1000 years.

6 A prism is a 3D shape with a uniform cross-section and a pyramid is a solid shape with triangular faces meeting at a vertex.

B

- 1 length, breadth.
- 2 volume, height.
- 3 triangular.
- 4 sphere.
- 5 right angles.
- 6 vertices.

C

- 1 millimetre: mm.
- 2 gram: g.
- 3 centilitre: cl.
- 4 square kilometre: km².
- 5 litre: l.
- 6 square centimetre: cm².
- 7 minute: min.
- 8 kilogram: kg.

Worksheet 25

B

- 1 32°.
- 2 segments of 2.4 cm.
- 3 midpoint.
- 4 perpendicular, congruent.

C

- 1
E
Q
A C U T E
A
L
- 2
R
U
S C A L E N E
E
R
- 3
I
M
S H A P E
G
E

Answers to Problems in the Worksheets (continued)

Worksheet 26

A

- 1 quadrilateral: 4.
- 2 pentagon: 5.
- 3 hexagon: 6.
- 4 heptagon: 7.
- 5 octagon: 8.
- 6 nonagon: 9.
- 7 decagon: 10.
- 8 dodecagon: 12.

B

- 1 A pentagon has five vertices.
- 2 A tessellation is a pattern of polygons.
- 3 A kite has a pair of opposite equal angles.
- 4 A delta shape is almost a quadrilateral.
- 5 A rhombus has two pairs of parallel sides.
- 6 A solid has three dimensions.
- 7 A diagonal joins two vertices of a shape.
- 8 The interior angle and exterior angle of a polygon are supplementary.

C

See Dictionary entries.

Worksheet 27

A

- 1 degrees.
- 2 hectares.
- 3 weight.
- 4 seconds, minutes, hours.
- 5 feet.
- 6 365, 52, 12.

B

- 1 feet.
- 2 clockwise, north.
- 3 metres.
- 4 minutes.
- 5 millilitre.
- 6 hectares.

C

- 1 cubic millimetre: mm^3 .
- 2 ounce: oz.
- 3 pound: lb.
- 4 foot: ft.
- 5 cubic centimetre: cm^3 .
- 6 pint: pt.

7 cubic metre: m^3 .

8 gallon: gal.

Worksheet 28

A

See Dictionary entries.

B

- 1 In a right-angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.

C

1 $\frac{\text{opposite}}{\text{hypotenuse}}$

2 $\frac{\text{adjacent}}{\text{hypotenuse}}$

3 $\frac{\text{opposite}}{\text{adjacent}}$

D

1 $DE^2 = DF^2 + EF^2 \Rightarrow DE^2 = 4^2 + 3^2 = 16 + 9 = 25$
 $\therefore DE = \sqrt{25} = 5 \text{ cm.}$

2 $\frac{YZ}{XY} = \sin X \Rightarrow YZ = 8.5 \times \sin 73^\circ = 8.1 \text{ cm}$

3 $QR^2 + QP^2 = PR^2 \Rightarrow QR^2 = PR^2 - QP^2 = 18^2 - 14^2 = 324 - 196 = 128$

$\therefore QR = \sqrt{128} = 11.3 \text{ cm.}$

Worksheet 29

A

- 1 a transformation of a figure by a given scale factor.
- 2 the image seen in a mirror, or that produced by reflecting an object in an axis of symmetry.
- 3 symmetry giving the number of positions a shape can take, when rotated, and still look the same.
- 4 a transformation in which every point of a shape moves the same distance and direction as specified by a vector.

B

- 1 ruler.
- 2 pencil.
- 3 compasses.
- 4 protractor.
- 5 pen.
- 6 rubber.
- 7 set square.
- 8 sharpener.

Answers to Problems in the Worksheets (continued)

C

A circle is a round shape. The distance from the centre to the circumference is the radius. The diameter is twice the radius. A chord is a straight line joining the ends of an arc. It divides the circle into a major segment and a minor segment. The circumference of a circle is found from the formula $C = 2\pi r$.

Worksheet 30

A

- 1 triangle.
- 2 square.
- 3 circle.
- 4 circle.
- 5 rectangle.

B

- 1 distance, time.
- 2 mass, volume.
- 3 force, area.
- 4 gallon, litres, kilometre.

C

area, base, bearing, breadth, density, distance, force, height, length, mass, perimeter, pressure, speed, surface, time, vertex, volume, width.

Worksheet 31

A

- 1 data.
- 2 collecting data for statistical analysis.
- 3 it is a sheet of questions used to collect data.
- 4 test or trial.
- 5 a collection of data used for analysis.
- 6 arranging information in rows and columns.
- 7 count by making marks.
- 8 number of times that something happens.

B

An **average** value is the normal or standard amount or value.

- 1 mean: an average value found by dividing the sum of a set of quantities by the number of quantities.
- 2 median: the middle item in an ascending sequence of items.
- 3 mode: the most frequent value.

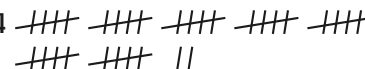
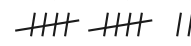
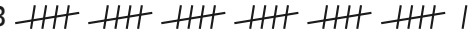
Worksheet 32

A

- 1 tally chart.
- 2 bar chart.
- 3 bar-line graph.
- 4 frequency table.
- 5 frequency chart.
- 6 frequency polygon.
- 7 pie-chart.
- 8 pictograph.

B

1–3 See Dictionary entry.

- 4 4 

8 

C

See Dictionary entries.

Worksheet 33

A

- 1 uncertain.
- 2 unlikely.
- 3 impossible.
- 4 unfair.
- 5 unbiased.

B

- 1 the chance it may happen.
- 2 fraction, decimal, percentage.
- 3 dividing the number of successful events by the total number of possible events
- 4 $P(\)$.
- 5 an ordered line numbered from 0 (the probability of an impossible event) to 1 (the probability of a certain event).
- 6 1.
- 7 0.

C

- 1 impossible.
- 2 likely.
- 3 certain.
- 4 unlikely.
- 5 unlikely.
- 6 certain.

Answers to Problems in the Worksheets (continued)

Worksheet 34

A

- 1 sample: a group of observations.
- 2 hypothesis: a theory tested by investigation.
- 3 discrete data: separate items or groups of data.
- 4 continuous: arranged in groups with no gaps.
- 5 grouped data: information organised in groups.
- 6 class interval: the limits of a group.

B

A primary source of data is collected to use for investigation, whereas a secondary source of data is found after collection by another person.

possible answers: CD-ROM, encyclopaedia, internet, newspaper, printed book, reference book, television.

Worksheet 35

A

- 1 distance–time graph.
- 2 line graph.
- 3 population pyramid.
- 4 scatter graph.
- 5 stem-and-leaf diagram.
- 6 two-way table.
- 7 pictograph.
- 8 pie-chart.

B

See relevant entries in the Dictionary.

C

- 1 pictograph.
- 2 pie-chart.
- 3 scatter graph.
- 4 distance–time graph.
- 5 population pyramid.

Worksheet 36

A

Chance is another word for probability.

- 1 impossible.
- 2 certain.
- 3 $0 < P < 0.5$.

4 0.5.

- 5 there is an equal chance of an event happening or not happening.

C

Experimental probability is found by the event being carried out many times.

Theoretical probability is found by dividing the number of particular outcomes that can happen by the number of possible outcomes.

1 $\frac{25}{49}$

2 $\frac{17}{49}$

3 $\frac{15}{49}$

4 $\frac{4}{49}$

Worksheet 37

A

See relevant entries in the Dictionary.

B

- 1 random: because each sample has an equal chance of being selected.
- 2 representative: because it accurately shows the general population being investigated.
- 3 biased: because biased means having a tendency towards some value or away from the normal.
- 4 population, ten, census.

C

- 1 encyclopaedia.
- 2 internet.
- 3 reference books.
- 4 CD-ROMs.
- 5 newspapers.
- 6 printed tables.

Worksheet 38

A

- 1 table.
- 2 graph, chart, diagram.
- 3 computer.
- 4 frequency polygon.
- 5 scatter graph.
- 6 line of best fit.
- 7 correlation.
- 8 cumulative frequency graph.

Answers to Problems in the Worksheets (continued)

B

- 1 to accumulate.
- 2 the number of times that something happens.
- 5 upper quartile – lower quartile.
- 6 a cumulative frequency curve in the shape of a shallow 's' or ogee.

Worksheet 39

A

- 1 events which cannot happen at the same time.
- 2 events that can happen together but do not depend on each other.
- 3 the probability of mutually exclusive events.
- 4 the probability of independent events.
- 5 'or' rule [11/13].
- 6 'and' rule [28/169].

B

- 1 estimating probabilities if they cannot be accurately calculated.
- 2 $\frac{\text{the number of times an event has occurred}}{\text{the total number of experiments}}$
- 3 5.
- 4 1000.

C

- 1 illustrating probabilities in diagram form. branches.

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tel: 01334 475656
fax: 01334 477392
email: enquiries@leckieandleckie.co.uk
website: www.leckieandleckie.co.uk

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