

Matthie Recalculation Path

Geometry and Measurement I Teacher Guide and Keys

Use the student's response as evidence to investigate. Confirm the likely misconception, reteach the smallest gap, and use a fresh item before moving forward.

GM1-C01-Q1 Route Finder

Chapter 1 Measurement Foundations Length Units and Estimation

Student item

1. Which is longer: 1 metre or 1 centimetre?

Correct response

1 m is longer.

Likely wrong response

1 cm is longer, or they are the same.

Misconception to confirm

Not yet having a secure sense of the relative size of metric units.

Teaching route and fresh recheck

Compare a metre stick and a centimetre side by side before starting the chapter.

GM1-C01-Q2 Tripwire

Chapter 1 Measurement Foundations Length Units and Estimation

Student item

1. A string begins at the 7.5 cm mark and ends at the 19.2 cm mark on a ruler. A student says the string is 19.2 cm long. Is the student correct? Find the actual length.

Correct response

No. $19.2 \text{ cm} - 7.5 \text{ cm} = 11.7 \text{ cm}$. The string is 11.7 cm long.

Likely wrong response

19.2 cm.

Misconception to confirm

Using the end mark as the length instead of checking where the object begins.

Teaching route and fresh recheck

Re-teach with a ruler diagram, marking the start and end points and modeling the subtraction before assigning independent practice.

GM1-C01-Q3 Confirmation

Chapter 1 Measurement Foundations Length Units and Estimation

Student item

1. Convert 2.6 m to centimetres.

Correct response

260 cm ($2.6 \times 100 = 260$).

Likely wrong response

26 cm (multiplies by 10) or 0.026 cm (divides by 100).

Misconception to confirm

Using the wrong conversion factor. 1 m = 100 cm, so metres to centimetres multiplies by 100.

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C01-Q4 Road Test

Chapter 1 Measurement Foundations Length Units and Estimation

Student item

1. A rope is 6 metres long. Write the measurement with its number and unit.

Correct response

6 m (a complete measurement has a number and a unit).

Likely wrong response

6 (the number without a unit).

Misconception to confirm

Treating the number alone as a complete measurement. A measurement needs a number and a unit.

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C02-Q1 Route Finder

Chapter 2 Geometry Language Points Lines Angles Polygons and Solids

Student item

1. A triangle is drawn flat on a piece of paper. Is it 2-D or 3-D?

Correct response

2-D

Likely wrong response

3-D, because it can be drawn thick or bold.

Misconception to confirm

Not yet distinguishing a flat drawing from an object that takes up space.

Teaching route and fresh recheck

Compare a flat picture to a real object side by side before starting the chapter.

GM1-C02-Q2 Tripwire

Chapter 2 Geometry Language Points Lines Angles Polygons and Solids

Student item

1. A shape has four straight sides, but one corner is rounded instead of coming to a sharp point. A student says it is a quadrilateral because it has four sides. Is the student correct? Explain.

Correct response

No. A polygon must be made only of straight sides meeting at sharp corners. A rounded corner means the shape does not meet the definition, so it cannot be called a quadrilateral.

Likely wrong response

Yes, it is a quadrilateral because it has four sides.

Misconception to confirm

Believing that counting the number of straight sides is enough to name a polygon, without checking that every corner is a sharp vertex and the whole boundary is straight.

Teaching route and fresh recheck

Return to the polygon definition (closed, 2-D, made only of straight sides) and have the student trace the rounded corner to see where it breaks the definition.

GM1-C02-Q3 Confirmation

Chapter 2 Geometry Language Points Lines Angles Polygons and Solids

Student item

1. A figure extends forever in both directions with no endpoints. Name the figure.

Correct response

A line.

Likely wrong response

A line segment or a ray.

Misconception to confirm

Confusing line, ray, and line segment. A line has no endpoints, a ray has one, and a segment has two.

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C02-Q4 Road Test

Chapter 2 Geometry Language Points Lines Angles Polygons and Solids

Student item

1. A figure has two endpoints. Name it.

Correct response

A line segment.

Likely wrong response

A line or a ray.

Misconception to confirm

Confusing line, ray, and line segment by their endpoints.

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C03-Q1 Route Finder

Chapter 3 Perimeter and Area Foundations

Student item

1. A shape has four sides measuring 3 cm, 4 cm, 3 cm, and 4 cm. What is the total distance around it?

Correct response

14 cm

Likely wrong response

12 cm (multiplying 3×4 instead of adding all four sides)

Misconception to confirm

Reaching for multiplication instead of simply adding every side.

Teaching route and fresh recheck

Review adding several numbers together before starting the chapter.

GM1-C03-Q2 Tripwire

Chapter 3 Perimeter and Area Foundations

Student item

1. A rectangle is 14 m by 5 m. A student says the area is 38 m^2 . Is the student correct? Find the actual area.

Correct response

No. The student found the perimeter ($2 \times (14 + 5) = 38 \text{ m}$), not the area. The actual area is $14 \times 5 = 70 \text{ m}^2$.

Likely wrong response

Yes, 38 m^2 is correct.

Misconception to confirm

Computing perimeter and mislabeling the result as area, or confusing which formula answers which question.

Teaching route and fresh recheck

Have the student name which measurement is being asked for before selecting a formula, then redo the calculation with the area formula.

GM1-C03-Q3 Confirmation

Chapter 3 Perimeter and Area Foundations

Student item

1. A frame is 16 cm by 9 cm. Find the border length.

Correct response

50 cm ($2 \times 16 + 2 \times 9 = 50$).

Likely wrong response

144 cm² (multiplies 16×9 , finding area instead of the border length).

Misconception to confirm

Finding area when the question asks for the distance around (perimeter).

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C03-Q4 Road Test

Chapter 3 Perimeter and Area Foundations

Student item

1. A ribbon goes around a poster. Should you find perimeter or area?

Correct response

Perimeter.

Likely wrong response

Area.

Misconception to confirm

Choosing area when the task describes going around the edge of a shape.

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C04-Q1 Route Finder

Chapter 4 Area of Parallelograms Triangles and Trapezoids

Student item

1. What does it mean for two lines to be perpendicular?

Correct response

Perpendicular means meeting at 90°.

Likely wrong response

It means the lines are the same length.

Misconception to confirm

Not yet connecting the word perpendicular to a specific 90° angle.

Teaching route and fresh recheck

Review right angles with a corner of paper or a set square before starting the chapter.

GM1-C04-Q2 Tripwire

Chapter 4 Area of Parallelograms Triangles and Trapezoids

Student item

1. A trapezoid has bases 5 cm and 11 cm, with height 4 cm. A student uses only the 5 cm base and writes $(5 \times 4) \div 2 = 10 \text{ cm}^2$ for the area. Is the student correct? Find the actual area.

Correct response

No. The student used only one base. A trapezoid needs both bases added together: $((5 + 11) \times 4) \div 2 = 32 \text{ cm}^2$.

Likely wrong response

10 cm^2 (using only the 5 cm base).

Misconception to confirm

Treating a trapezoid like a triangle or parallelogram and using only one side length as though it were the full base measurement.

Teaching route and fresh recheck

Have the student identify both parallel sides on a diagram before selecting any formula, then redo the calculation with both bases.

GM1-C04-Q3 Confirmation

Chapter 4 Area of Parallelograms Triangles and Trapezoids

Student item

1. Parallelogram: $b = 14 \text{ cm}$, $h = 7 \text{ cm}$. Find area.

Correct response

98 cm^2 ($A = bh = 14 \times 7$).

Likely wrong response

49 cm^2 (halves the product as if the shape were a triangle).

Misconception to confirm

Applying the triangle formula to a parallelogram instead of $A = bh$.

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C04-Q4 Road Test

Chapter 4 Area of Parallelograms Triangles and Trapezoids

Student item

1. Parallelogram: $b = 7$ cm, $h = 4$ cm. Find area.

Correct response

28 cm^2 ($A = bh = 7 \times 4$).

Likely wrong response

14 cm^2 (halves the product as if the shape were a triangle).

Misconception to confirm

Applying the triangle formula to a parallelogram instead of $A = bh$.

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C05-Q1 Route Finder

Chapter 5 Composite 2D Shapes

Student item

1. Two rectangles have areas 25 cm^2 and 15 cm^2 . Find their combined area.

Correct response

40 cm^2

Likely wrong response

10 cm^2 (subtracting instead of adding)

Misconception to confirm

Not yet recognizing that combining two included regions means adding them.

Teaching route and fresh recheck

Review adding two given areas together before starting the chapter.

GM1-C05-Q2 Tripwire

Chapter 5 Composite 2D Shapes

Student item

1. A rectangular park is 20 m by 12 m. A 7 m by 4 m pond sits inside it. A student adds the two areas together to find the total park space. Is the student correct? Find the actual play space.

Correct response

No. Subtract: $20 \times 12 - 7 \times 4 = 212 \text{ m}^2$.

Likely wrong response

268 m² (adding 240 + 28 instead of subtracting).

Misconception to confirm

Treating every composite-area problem as addition without checking whether the smaller region is included or removed.

Teaching route and fresh recheck

Have the student shade the pond and ask whether it is part of the walkable play space before choosing an operation.

GM1-C05-Q3 Confirmation

Chapter 5 Composite 2D Shapes

Student item

1. A rectangle has area 42 cm² and a triangle has area 15 cm². Find total.

Correct response

57 cm² (42 + 15).

Likely wrong response

27 cm² (subtracts the triangle instead of adding it).

Misconception to confirm

Subtracting a region that is part of the composite shape instead of adding it.

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C05-Q4 Road Test

Chapter 5 Composite 2D Shapes

Student item

1. Two included areas are 24 cm² and 17 cm². Find total.

Correct response

41 cm² (24 + 17).

Likely wrong response

7 cm² (subtracts instead of adding).

Misconception to confirm

Subtracting a region that belongs to the shape instead of adding it.

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C06-Q1 Route Finder

Chapter 6 Circles I Radius Diameter Circumference and Pi

Student item

1. Multiply 3.14 by 4.

Correct response

12.56

Likely wrong response

7.14 (adding instead of multiplying)

Misconception to confirm

Confusing multiplication with addition when a decimal is involved.

Teaching route and fresh recheck

Review multiplying a decimal by a whole number before starting the chapter.

GM1-C06-Q2 Tripwire

Chapter 6 Circles I Radius Diameter Circumference and Pi

Student item

1. A circular lid has a radius of 9 cm. A student writes $C = 3.14(9) = 28.26$ cm. Is the student correct? Explain how it can be determined without guessing. Then find the correct circumference.

Correct response

The student is not correct. The 9 cm measurement is the radius, not the diameter. The diameter is 18 cm. $C = 3.14(18) = 56.52$ cm.

Likely wrong response

Yes, 28.26 cm is correct.

Misconception to confirm

Substituting the radius directly into $C = \pi d$ without first doubling it to get the diameter.

Teaching route and fresh recheck

Have the student write 'r =' next to the given measurement before choosing a formula, then convert to diameter before using $C = \pi d$.

GM1-C06-Q3 Confirmation

Chapter 6 Circles I Radius Diameter Circumference and Pi

Student item

1. A circle has a radius of 14 cm. Find its diameter.

Correct response

28 cm ($d = 2r = 2 \times 14$).

Likely wrong response

7 cm (halves the radius).

Misconception to confirm

Reversing the radius and diameter relationship. The diameter is twice the radius.

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C06-Q4 Road Test

Chapter 6 Circles I Radius Diameter Circumference and Pi

Student item

1. A circle has a radius of 9 cm. Find its diameter.

Correct response

18 cm ($d = 2r = 2 \times 9$).

Likely wrong response

4.5 cm (halves the radius).

Misconception to confirm

Reversing the radius and diameter relationship.

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C07-Q1 Route Finder

Chapter 7 Circles II Area and Circular Composite Shapes

Student item

1. Square the number 6.

Correct response

36

Likely wrong response

12 (doubling instead of squaring)

Misconception to confirm

Confusing squaring a number with doubling it.

Teaching route and fresh recheck

Review what squaring a number means before starting the chapter.

GM1-C07-Q2 Tripwire

Chapter 7 Circles II Area and Circular Composite Shapes

Student item

1. A circular coaster has a diameter of 16 cm. A student writes $A = 3.14 \times 16^2 = 803.84 \text{ cm}^2$. Is the student correct? Explain how it can be determined without fully solving the problem first. Then find the correct area.

Correct response

Not correct. The 16 cm measurement is the diameter, not the radius. The radius is 8 cm. Correct area is 200.96 cm^2 .

Likely wrong response

Yes, 803.84 cm^2 is correct.

Misconception to confirm

Substituting the diameter directly into $A = \pi r^2$ without first dividing by 2 to find the radius.

Teaching route and fresh recheck

Have the student write 'd =' next to the given measurement, convert to radius, then square the radius before multiplying by π .

GM1-C07-Q3 Confirmation

Chapter 7 Circles II Area and Circular Composite Shapes

Student item

1. Find the area of a circle with radius 9 cm.

Correct response

254.34 cm^2 ($A = \pi r^2 \approx 3.14 \times 9^2 = 3.14 \times 81$).

Likely wrong response

56.52 cm^2 (uses $2\pi r$, the circumference formula).

Misconception to confirm

Mixing up the area and circumference formulas.

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C07-Q4 Road Test

Chapter 7 Circles II Area and Circular Composite Shapes

Student item

1. Find the area of a circle with radius 3 cm.

Correct response

28.26 cm^2 ($A = \pi r^2 \approx 3.14 \times 3^2$).

Likely wrong response

18.84 cm^2 (uses $2\pi r$, the circumference formula).

Misconception to confirm

Mixing up the area and circumference formulas.

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C08-Q1 Route Finder

Chapter 8 Measuring Drawing and Classifying Angles

Student item

1. What angle measure makes a right angle?

Correct response

90°

Likely wrong response

180° or another benchmark

Misconception to confirm

Right-angle benchmark is not secure.

Teaching route and fresh recheck

Use a square corner and connect one quarter-turn to 90°.

GM1-C08-Q2 Tripwire

Chapter 8 Measuring Drawing and Classifying Angles

Student item

An angle clearly looks acute. A student reads the protractor and writes 128°. Is the answer reasonable? Explain.

Correct response

No. An acute angle must be less than 90°, so 128° cannot be reasonable. The student should check the baseline and reread the protractor scale that begins at 0° on that side.

Likely wrong response

Yes, 128° is what the protractor shows.

Misconception to confirm

Reading the protractor scale that does not start at 0° on the aligned baseline, and not checking the result against how the angle looks.

Teaching route and fresh recheck

Return to the Chapter 8 representation, confirm the misconception, then use a fresh check.

GM1-C08-Q3 Confirmation

Chapter 8 Measuring Drawing and Classifying Angles

Student item

1. Classify 118° .

Correct response

Obtuse (between 90° and 180°).

Likely wrong response

Acute.

Misconception to confirm

Classifying from a misread protractor scale or from how the drawing looks instead of comparing the measure with 90° .

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C08-Q4 Road Test

Chapter 8 Measuring Drawing and Classifying Angles

Student item

1. Classify an angle of 25° .

Correct response

Acute (less than 90°).

Likely wrong response

Obtuse (reads the other protractor scale as 155°).

Misconception to confirm

Reading the wrong protractor scale or classifying without comparing the measure with 90° .

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C09-Q1 Route Finder

Chapter 9 Angle Relationships

Student item

1. What do angles on a straight line add to?

Correct response

180°

Likely wrong response

90° or 360°

Misconception to confirm

Straight-line total is not secure.

Teaching route and fresh recheck

Use a straight line as a half-turn and label it 180° .

GM1-C09-Q2 Tripwire

Chapter 9 Angle Relationships

Student item

Two parallel lines are cut by a transversal. One co-interior angle is 124° . A student says, ‘The other angle must also be 124° because the lines are parallel.’ Is the student correct? Explain.

Correct response

No. Co-interior angles on parallel lines are supplementary, so the other angle is $180^\circ - 124^\circ = 56^\circ$.

Likely wrong response

Yes, the other angle is 124° .

Misconception to confirm

Treating co-interior angles as equal instead of supplementary.

Teaching route and fresh recheck

Return to the Chapter 9 representation, confirm the misconception, then use a fresh check.

GM1-C09-Q3 Confirmation

Chapter 9 Angle Relationships

Student item

1. Find the supplement of 63° .

Correct response

117° ($180^\circ - 63^\circ$).

Likely wrong response

27° (finds the complement, $90^\circ - 63^\circ$).

Misconception to confirm

Confusing supplementary angles (sum 180°) with complementary angles (sum 90°).

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C09-Q4 Road Test

Chapter 9 Angle Relationships

Student item

1. Two angles add to 90° . What is the name for this pair of angles?

Correct response

Complementary.

Likely wrong response

Supplementary.

Misconception to confirm

Confusing complementary angles (sum 90°) with supplementary angles (sum 180°).

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C10-Q1 Route Finder

Chapter 10 Triangles and Quadrilaterals

Student item

1. What do the angles inside a triangle add to?

Correct response

180°

Likely wrong response

360°

Misconception to confirm

Triangle and quadrilateral angle sums are being confused.

Teaching route and fresh recheck

Use a paper triangle and connect its three corners to a straight angle.

GM1-C10-Q2 Tripwire

Chapter 10 Triangles and Quadrilaterals

Student item

An isosceles triangle has a top angle of 40° . A student calculates $180^\circ - 40^\circ = 140^\circ$ and says each base angle is 140° . Is the student correct? Explain and find each base angle.

Correct response

No. The two equal base angles share the remaining 140° , so each base angle is $140^\circ \div 2 = 70^\circ$.

Likely wrong response

Yes, each base angle is 140° .

Misconception to confirm

Forgetting that the remaining 140° is shared equally by the two base angles.

Teaching route and fresh recheck

Return to the Chapter 10 representation, confirm the misconception, then use a fresh check.

GM1-C10-Q3 Confirmation

Chapter 10 Triangles and Quadrilaterals

Student item

1. A triangle has angles 52° , 61° , and x . Find x .

Correct response

67° ($180^\circ - 52^\circ - 61^\circ$).

Likely wrong response

113° (adds the two known angles and stops).

Misconception to confirm

Stopping after adding the known angles instead of subtracting their sum from 180° .

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C10-Q4 Road Test

Chapter 10 Triangles and Quadrilaterals

Student item

1. A triangle has angles 40° , 60° , and x . Find x .

Correct response

80° ($180^\circ - 40^\circ - 60^\circ$).

Likely wrong response

100° (adds the known angles and stops).

Misconception to confirm

Stopping after adding the known angles instead of subtracting their sum from 180° .

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.

GM1-C11-Q1 Route Finder

Chapter 11 Polygons and Interior Angle Sums

Student item

1. How many sides does a pentagon have?

Correct response

5

Likely wrong response

6 or another name/side count

Misconception to confirm

Polygon names and side counts are not secure.

Teaching route and fresh recheck

Count the straight sides and connect 5 sides to pentagon.

GM1-C11-Q2 Tripwire

Chapter 11 Polygons and Interior Angle Sums

Student item

A student says, 'A hexagon has 6 sides, so the interior angle sum is $6 \times 180^\circ = 1080^\circ$.' Is the student correct? Explain and find the correct interior angle sum.

Correct response

No. A hexagon can be divided into $6 - 2 = 4$ triangles, so the interior angle sum is $4 \times 180^\circ = 720^\circ$.

Likely wrong response

Yes, the sum is 1080° .

Misconception to confirm

Multiplying the number of sides by 180° instead of the number of triangles, $n - 2$.

Teaching route and fresh recheck

Return to the Chapter 11 representation, confirm the misconception, then use a fresh check.

GM1-C11-Q3 Confirmation

Chapter 11 Polygons and Interior Angle Sums

Student item

1. Find the interior angle sum of a heptagon.

Correct response

$900^\circ ((7 - 2) \times 180^\circ)$.

Likely wrong response

1260° (uses $7 \times 180^\circ$).

Misconception to confirm

Multiplying the number of sides by 180° instead of the number of triangles, $n - 2$.

Teaching route and fresh recheck

Ask the student to name the required measurement or relationship before recalculating, then recheck with new values.

GM1-C11-Q4 Road Test

Chapter 11 Polygons and Interior Angle Sums

Student item

1. Find the interior angle sum of a quadrilateral.

Correct response

$360^\circ ((4 - 2) \times 180^\circ)$.

Likely wrong response

720° (uses $4 \times 180^\circ$).

Misconception to confirm

Multiplying the number of sides by 180° instead of $n - 2$.

Teaching route and fresh recheck

Have the student explain why the method fits, solve a fresh item, and verify units or geometric meaning.