Name & Surname: _____ Class: _____ Date: _____

Triangle Area Builders

Compose, decompose, and solve.

About 45 minutes Level ★★★☆☆

Area of a Triangle

Two copies of any triangle fit together to make a parallelogram with the same **base** and **height**.

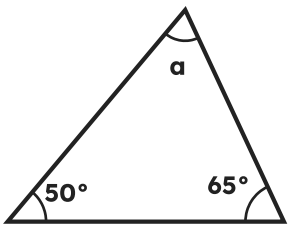
- Pick one side as the base.
- Find the perpendicular height from the base to the opposite corner.
- Multiply, then halve: Area = $\frac{1}{2}$ x base x height.
- Example: base 8 in, height 5 in gives $\frac{1}{2}$ x 8 x 5 = 20 in².

Task A

/4

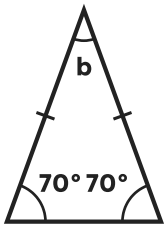
Find the missing angle in each diagram. Show your subtraction.

1



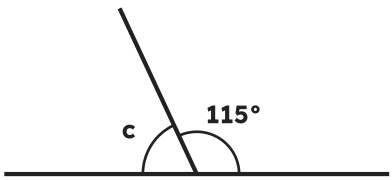
a = _____ °

2



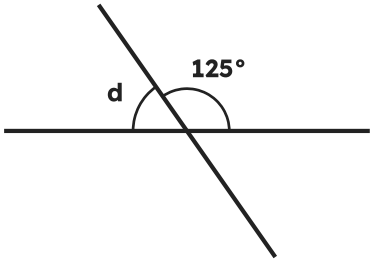
b = _____ °

3



c = _____ °

4



d = _____ °

The diagrams are drawn to size.

Created with LessonDino.com · AI lesson planner with checkable sources

Triangles First

Practice finding the area of right and other triangles.

Key words

base: the side you measure along

perpendicular height: straight distance from base at a right angle

area: space inside a flat shape

compose: put shapes together

decompose: split a shape apart

Task B

/12

Find each area. Use $\frac{1}{2}$ x base x height and include square units.

WARM UP

1 Work out the **area** of a right triangle with legs 6 in and 4 in.

Answer: _____

2 Work out the **area** of a triangle with base 10 in and height 5 in.

Answer: _____

3 Work out the **area** of a triangle with base 8 in and height 7 in.

Answer: _____

4 Work out the **area** of a triangle with base 12 ft and height 9 ft.

Answer: _____

PRACTICE

5 A rectangle is 9 in by 4 in. It is cut in half along a diagonal. Work out the **area** of each triangle.

Answer: _____

6 A triangle has **area** 30 in² and base 10 in. Work out its height.

Answer: _____

7 An obtuse triangle has base 14 in and perpendicular **height** 6 in. Work out its area.

Answer: _____

8 Explain how you know you must use the perpendicular **height**, not the slanted side.

Answer: _____

PROBLEM SOLVING

9 A triangular garden bed has base 12 ft and **height** 8 ft. Work out its area.

Answer: _____

10 A triangular sail has base 6 ft and **height** 10 ft. How many square feet of cloth does it need?

Answer: _____

11 A triangular flag has base 18 in and **height** 12 in. Work out its area.

Answer: _____

12 A student says a triangle with base 10 in and height 6 in keeps the same **area** when the top corner slides sideways. Explain how you know she is right.

Answer: _____

Created with LessonDino.com · AI lesson planner with checkable sources

Spot the Mistake

Find the wrong step and fix the area.

Task C

/6

Study each student's work. Find the wrong step and explain the mistake.



Student A

Work out the **area** of a triangle with base 10 in and height 6 in.

1. Area = $\frac{1}{2}$ x base x height
2. = 10 x 6
3. = 60 in²

The mistake is in step: _____

What went wrong?

.....

Correct answer: _____



Student B

Work out the **area** of a triangle with base 8 in, perpendicular height 5 in, and slanted side 6 in.

1. Area = $\frac{1}{2}$ x 8 x 6
2. = 24
3. So the answer is 24 in²

The mistake is in step: _____

What went wrong?

.....

Correct answer: _____



Student C

Find the **area** of a parallelogram with base 7 in and height 4 in by adding two triangles.

1. Triangle 1 = $\frac{1}{2}$ x 7 x 4 = 14 in²
2. Triangle 2 = 14 in²
3. Total = 28 in

The mistake is in step: _____

What went wrong?

.....

Correct answer: _____

Created with LessonDino.com · AI lesson planner with checkable sources

Bigger Shapes Same Idea

Compose and decompose quadrilaterals and polygons to find area.

Task D

/12

Compose into rectangles or decompose into triangles to find each area.

WARM UP

1. Work out the **area** of a parallelogram with base 9 in and height 5 in.

Answer: _____

2. Work out the **area** of a rectangle that is 7 ft by 4 ft.

Answer: _____

3. Work out the **area** of a triangle with base 16 in and height 3 in.

Answer: _____

4. Work out the **area** of a square with side 6 in.

Answer: _____

PRACTICE

5. A trapezoid is split into two triangles with bases 10 in and 6 in, both with **height** 4 in. Work out its area.

Answer: _____

6. An L-shape is a 10 in by 8 in rectangle with a 4 in by 3 in rectangle cut out. Work out its **area**.

Answer: _____

7. A parallelogram has **area** 48 ft² and height 6 ft. Work out its base.

Answer: _____

8. Explain how you know a parallelogram with base 12 in and height 5 in has the same **area** as a 12 in by 5 in rectangle.

Answer: _____

PROBLEM SOLVING

9. A walkway is a parallelogram with base 15 ft and **height** 4 ft. One bag of gravel covers 30 ft². How many bags are needed?

Answer: _____

10. A kite is made from two identical triangles, each with base 10 in and **height** 6 in. Work out the total area.

Answer: _____

11. A floor tile splits into a 12 in by 12 in square and a 12 in by 6 in rectangle. Work out its **area**.

Answer: _____

12. A triangular sign has base 8 ft and **height** 5 ft. Paint costs $3 for every 10 ft². Work out the cost for one coat.

Answer: _____

Created with LessonDino.com · AI lesson planner with checkable sources

Put It Together

Order the steps, then find area and perimeter.

Task E

Example done for you

/4

Number these steps in order to find the area by decomposing.

- [ ] Work out the area of each piece with base x height or $\frac{1}{2}$ x base x height.
- [1] Look at the polygon and split it into rectangles and triangles.
- [ ] Choose a base and perpendicular height for each small piece.
- [ ] Add all the smaller areas together.
- [ ] Write the total with square units, like in².

Created with LessonDino.com · AI lesson planner with checkable sources

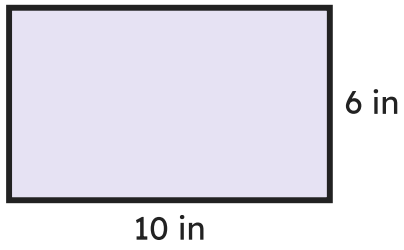
Triangle Area Builders

Task F

/5

Work out the area or perimeter of each shape. For the L-shape, decompose into rectangles.

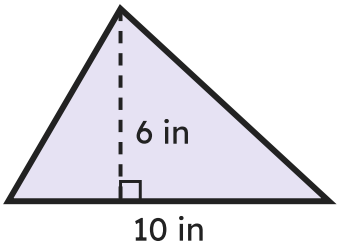
1



Area: _____ **in²**

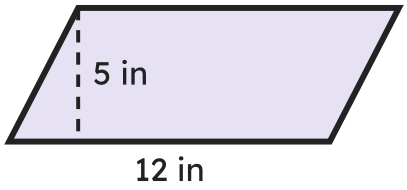
Perimeter: _____ **in**

2



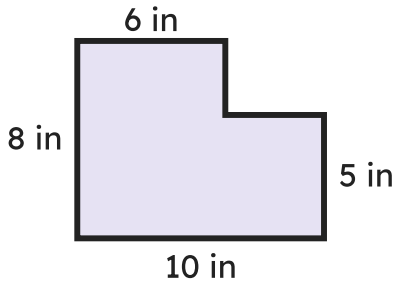
Area: _____ **in²**

3



Area: _____ **in²**

4



Area: _____ **in²**

How did I do?

Circle a face for each line.

I can find the area of any triangle with $\frac{1}{2}$ x base x height.

I can compose into rectangles and decompose polygons to find area.

I can solve real-world area problems with triangles and polygons.

Created with LessonDino.com · AI lesson planner with checkable sources

Answer sheet: Triangle Area Builders

Task A

a = 65° (angles in a triangle add up to 180°)

b = 40° (the two base angles are equal, and the angles add up to 180°)

c = 65° (angles on a straight line add up to 180°)

d = 55° (angles on a straight line add up to 180°)

Task B

1. 12 in²
2. 25 in²
3. 28 in²
4. 54 ft²
5. 18 in²
6. 6 in
7. 42 in²
8. Only the right-angle distance gives the rectangle the triangle is half of, so base x height works only with the perpendicular height.
9. 48 ft²
10. 30 ft²
11. 108 in²
12. Sliding along a line parallel to the base keeps the perpendicular height the same, so $\frac{1}{2}$ x base x height does not change.

Task C

1. Step 2 is wrong: They wrote the formula but left out the $\frac{1}{2}$ when they substituted. You must multiply and then halve. Correct answer: 30 in²
2. Step 1 is wrong: They used the slanted side instead of the perpendicular height. The height must be at a right angle to the base. Correct answer: 20 in²
3. Step 3 is wrong: The number is right but the units are wrong. Area must be in square units. Correct answer: 28 in²

Task D

1. 45 in²
2. 28 ft²
3. 24 in²
4. 36 in²
5. 32 in²
6. 68 in²
7. 8 ft
8. Both are made from two triangles with the same base and height, so both have area base x height.
9. 2 bags
10. 60 in²
11. 216 in²
12. $6

Task E

1. Look at the polygon and split it into rectangles and triangles. 2. Choose a base and perpendicular height for each small piece. 3. Work out the area of each piece with base x height or $\frac{1}{2}$ x base x height. 4. Add all the smaller areas together. 5. Write the total with square units, like in².

Task F

1. area = 60 in², perimeter = 32 in
2. area = 30 in²
3. area = 60 in²
4. area = 68 in²

Pictures: Microsoft Fluent Emoji (MIT); Characters: Open Peeps by Pablo Stanley (CC0)

Created with LessonDino.com · AI lesson planner with checkable sources