SURFACE AREA OF A TRIANGULAR PRISM

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

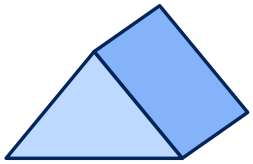
A triangular prism has 5 faces:
2 triangles (the ends) and 3 rectangles.

Surface area = the areas of all 5 faces added.

Triangle area = ½ × base × height



1 Count the faces of this triangular prism.



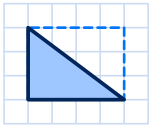
Number of triangles ☐

Number of rectangles ☐

Total number of faces ☐

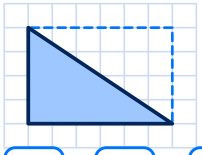
2 Each square is 1 cm. Each triangle is half of a rectangle. Find its area.

a)



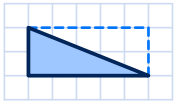
½ × ☐ × ☐ = ☐

b)



½ × ☐ × ☐ = ☐

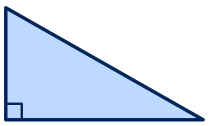
c)



½ × ☐ × ☐ = ☐

3 Find the area of each shape.

a)



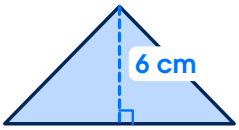
Area = ☐ cm²

b)



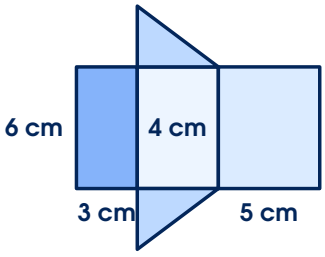
Area = ☐ cm²

c)



Area = ☐ cm²

4 This is the net of a triangular prism. Find the area of each face, then the total.



Each triangle (2 of them): ½ × 4 × 3 = ☐ cm²

Rectangle: 3 × 6 = ☐ cm²

Rectangle: 4 × 6 = ☐ cm²

Rectangle: 5 × 6 = ☐ cm²

Surface area = ☐ cm²

SURFACE AREA OF A TRIANGULAR PRISM

SUPPORT

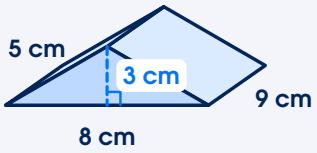
NAME _____ CLASS _____ DATE _____

KEY IDEA

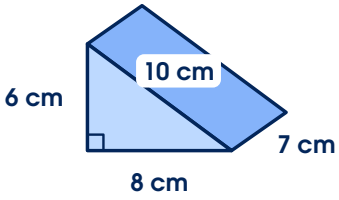
Surface area = 2 triangles + 3 rectangles

2 triangles	2 × ½ × 8 × 3 = 24
base rectangle	8 × 9 = 72
2 sloping rectangles	2 × 5 × 9 = 90

Surface area = 24 + 72 + 90 = 186 cm²



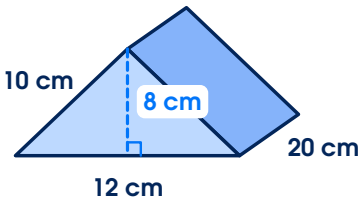
1 Complete the table to find the surface area of this prism.



Surface area = ____ cm²

FACES	CALCULATION	AREA
2 triangles		
bottom rectangle		
upright rectangle		
sloping rectangle		

2 Find the surface area. Use the height for the triangles, the slant side for the rectangles.



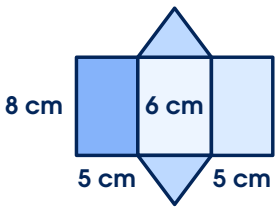
Each triangle: ½ × ____ × ____ = ____

Each sloping rectangle: ____ × ____ = ____

Base rectangle: ____ × ____ = ____

Surface area = ____ cm²

3 This is the net of a triangular prism. Find its surface area.



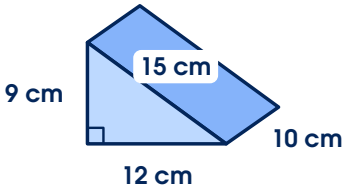
Each triangle: ½ × 6 × 4 = ____

Middle rectangle: 6 × 8 = ____

Each outer rectangle: 5 × 8 = ____

Surface area = ____ cm²

4 Work out the surface area of this prism.



Triangles: 2 × ½ × 12 × 9 = ____

Rectangles: 9 × 10 + 12 × 10 + 15 × 10 = ____

Surface area = ____ cm²

SURFACE AREA OF A TRIANGULAR PRISM

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

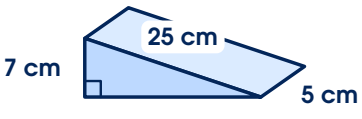
Surface area = 2 triangles + 3 rectangles (each rectangle = a side of the triangle × the length)

Use the perpendicular height for the triangles and the slant sides for the rectangles.

FLUENCY

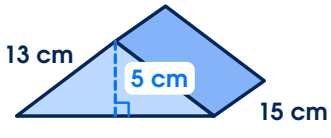
1 Work out the surface area of each prism.

a)



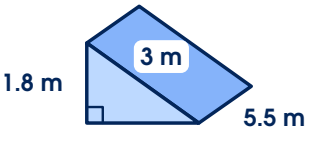
_____ cm²

b)



_____ cm²

c)



_____ m²

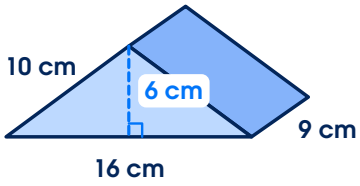
2 A prism is 11 cm long. Its cross-section is an isosceles triangle: base 10 cm, sloping sides 13 cm, perpendicular height 12 cm. Sketch its net and find its surface area.

sketch the net

Surface area _____ cm²

REASONING

3 This prism has an isosceles triangle cross-section.

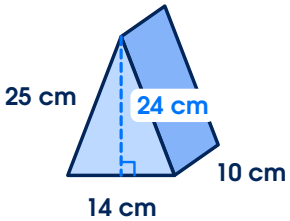


a) Which two rectangles are identical? Why?

.....

b) Surface area _____ cm²

4 Josh works out the surface area of this prism.



Josh's working:

Triangles 2 × ½ × 14 × 25 = 350 Rectangles 14 × 10 + 2 × 25 × 10 = 640

Surface area = 350 + 640 = 990 cm²

a) Explain Josh's mistake.

.....

b) Correct surface area _____ cm²

SURFACE AREA OF A TRIANGULAR PRISM

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

Give an example or a reason for each answer.

a) Doubling the length of a prism doubles its surface area. ALWAYS SOMETIMES NEVER

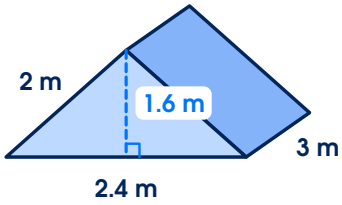
b) A triangular prism has three identical rectangular faces. ALWAYS SOMETIMES NEVER

c) The two triangular faces have the same area. ALWAYS SOMETIMES NEVER

d) The sloping rectangle is the largest face. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 A tent is a triangular prism. Fabric covers the ends, the sloping sides and the floor.

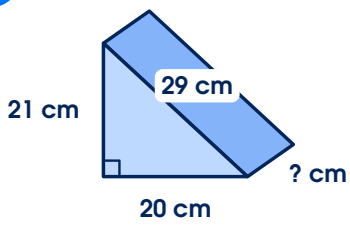


a) Area of fabric ____ m²

Fabric costs £6.50 per m². It is sold in whole square metres.

b) Cost of the fabric £ ____

3 Work out the length of this prism.

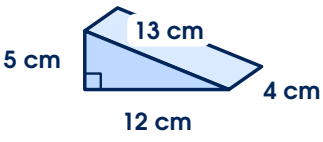


The surface area of the prism is 980 cm².

Length of the prism ____ cm

★ CHALLENGE FOR ALL

4 Here is a prism with a right-angled triangle cross-section.



a) Surface area of one prism ____ cm²

Two of these prisms are joined by sticking two identical faces together.

b) Smallest possible surface area ____ cm²

Say which faces you join and name the new solid.

SURFACE AREA OF A TRIANGULAR PRISM – ANSWERS

ANSWERS

BUILDING BLOCKS

1 2 triangles · 3 rectangles · 5 faces
2 a) ½ × 4 × 3 = 6 cm² b) ½ × 6 × 4 = 12 cm² c) ½ × 5 × 2 = 5 cm²
3 a) ½ × 8 × 5 = 20 cm² b) 7 × 3 = 21 cm² c) ½ × 10 × 6 = 30 cm²
4 each triangle 6 cm² · 18 cm² · 24 cm² · 30 cm² · surface area 6 + 6 + 18 + 24 + 30 = 84 cm²

SUPPORT

1 2 × ½ × 8 × 6 = 48 · 8 × 7 = 56 · 6 × 7 = 42 · 10 × 7 = 70 · total 216 cm²
2 ½ × 12 × 8 = 48 · 10 × 20 = 200 · 12 × 20 = 240 · 2 × 48 + 2 × 200 + 240 = 736 cm²
3 12 · 48 · 40 · 2 × 12 + 48 + 2 × 40 = 152 cm²
4 108 · 90 + 120 + 150 = 360 · 468 cm²

CORE

1 a) 2 × 84 + (7 + 24 + 25) × 5 = 168 + 280 = 448 cm² b) 2 × 60 + (24 + 13 + 13) × 15 = 120 + 750 = 870 cm² c) 2 × 2.16 + (1.8 + 2.4 + 3) × 5.5 = 4.32 + 39.6 = 43.92 m²
2 Net: two triangles and rectangles 10 × 11, 13 × 11, 13 × 11. 2 × 60 + 110 + 286 = 516 cm²
3 a) the two sloping rectangles (10 cm × 9 cm): the two sloping sides of an isosceles triangle are equal and the length is the same b) 2 × 48 + 16 × 9 + 2 × 10 × 9 = 96 + 144 + 180 = 420 cm²
4 a) He used the slant side (25 cm) as the height of the triangles; the perpendicular height is 24 cm. b) 2 × ½ × 14 × 24 = 336, 336 + 640 = 976 cm²

GREATER DEPTH

1 a) never (the triangles stay the same, so the total less than doubles) b) sometimes (only when the triangle is equilateral) c) always d) sometimes (the triangles or another rectangle can be larger)
2 a) 2 × ½ × 2.4 × 1.6 + 2 × 2 × 3 + 2.4 × 3 = 3.84 + 12 + 7.2 = 23.04 m² b) 24 m² × £6.50 = £156
3 triangles 2 × 210 = 420 · 980 – 420 = 560 · perimeter 20 + 21 + 29 = 70 · 560 ÷ 70 = 8 cm
4 a) 2 × 30 + (5 + 12 + 13) × 4 = 180 cm² b) 2 × 180 – 2 × 13 × 4 = 256 cm² c) the two 13 cm × 4 cm sloping faces; a 12 cm × 5 cm × 4 cm cuboid (2 × (60 + 48 + 20) = 256 ✓) if one is turned round (or a kite-based prism if one is flipped)