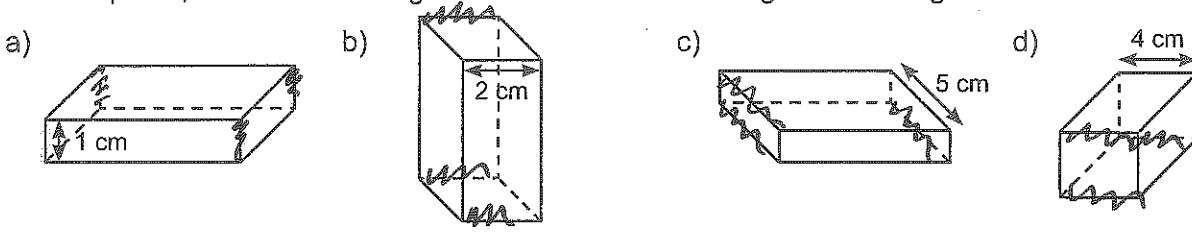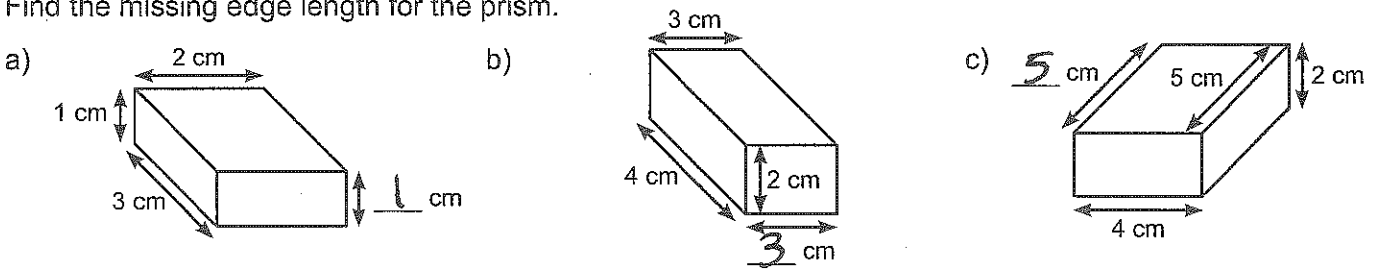Note: Pictures are not drawn to scale.

1. In each prism, shade all the edges that have the same length as the edge marked.

a)
1 cm

b)
2 cm

c)
5 cm

d)
4 cm

2. Find the missing edge length for the prism.

a)
2 cm
1 cm
3 cm
$\underline{1}$ cm

b)
3 cm
4 cm
2 cm
$\underline{3}$ cm

c)
$\underline{5}$ cm
5 cm
2 cm
4 cm

3. Shade the face that has the same area as the shaded face.

a)

b)

c)
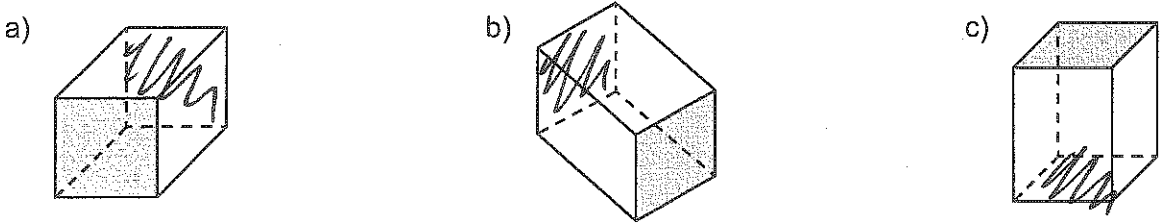
4. The area of each visible face is given. What is the area of each hidden face?

a)
top 12 cm²
right 8 cm²
front 6 cm²

back ___ $6 cm^2$ ___
bottom ___ $12 cm^2$ ___
left ___ $8 cm^2$ ___

b)
top 6 cm²
left 10 cm²
front 15 cm²

back ___ $15 cm^2$ ___
bottom ___ $6 cm^2$ ___
right ___ $10 cm^2$ ___

c)
top 18 m²
right 6 m²
front 12 m²

back ___ $12 m^2$ ___
bottom ___ $18 m^2$ ___
left ___ $6 m^2$ ___

5. Write the area of each visible face directly on the face. Then double each area to find the total area of each pair of congruent faces.

5 cm
top
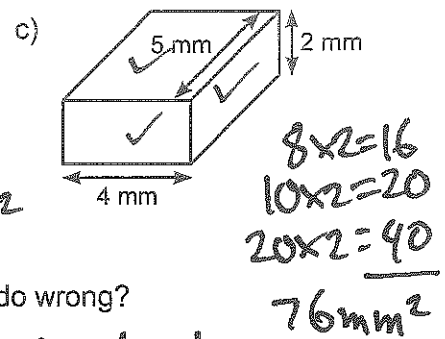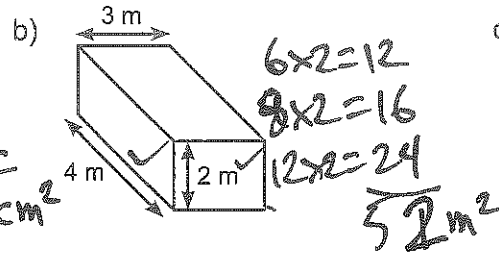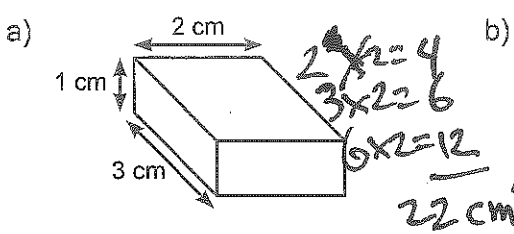right
2 cm
front 6 cm²
3 cm
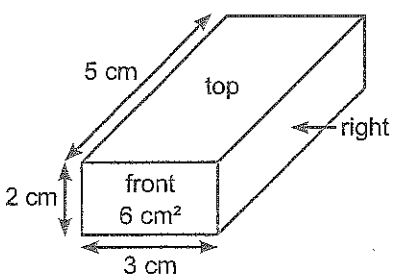
| front | + | back | = | 6 cm² × 2 | = | 12 cm² |
| top | + | bottom | = | $15 cm^2 \times 2$ | = | $30 cm^2$ |
| $\underline{left}$ | + | $\underline{right}$ | = | $10 cm^2 \times 2$ | = | $20 cm^2$ |

The surface area of a 3-D shape is the total area of all the faces of the shape.

6. Calculate the surface area of the prism.

a) 2 cm, 1 cm, 3 cm

$2 \times 2 = 4$
$3 \times 2 = 6$
$6 \times 2 = 12$
$\overline{22 \, cm^2}$

b) 3 m, 4 m, 2 m

$6 \times 2 = 12$
$8 \times 2 = 16$
$12 \times 2 = 24$
$\overline{52 \, m^2}$

c) 5 mm, 2 mm, 4 mm

$8 \times 2 = 16$
$10 \times 2 = 20$
$20 \times 2 = 40$
$\overline{76 \, mm^2}$

7. Miki calculates the surface area of the prism to be 40 cm². What did she do wrong?

4 cm, 3 cm, 4 cm — 16 top, front 12, right 12

$16 \times 2 = 32$
$12 \times 2 = 24$
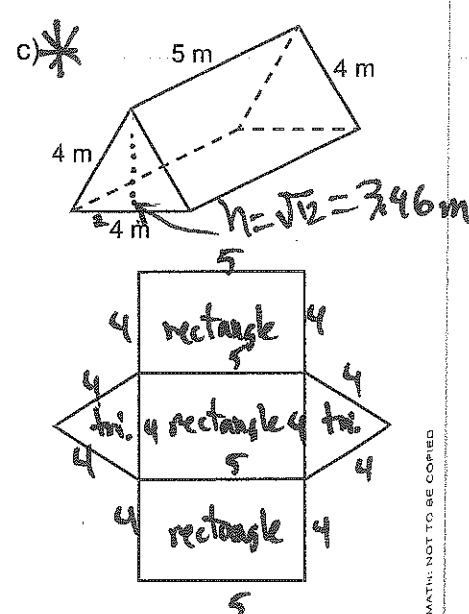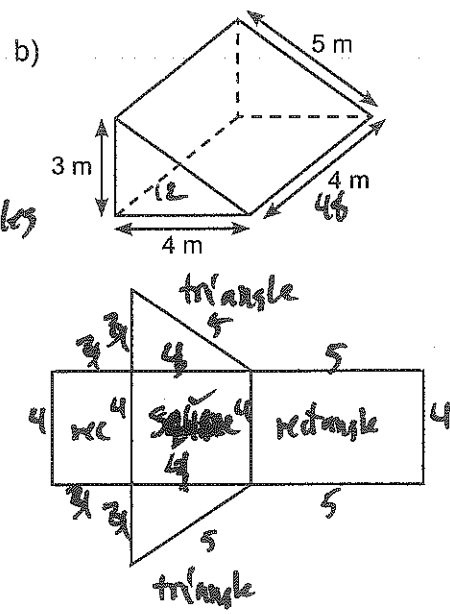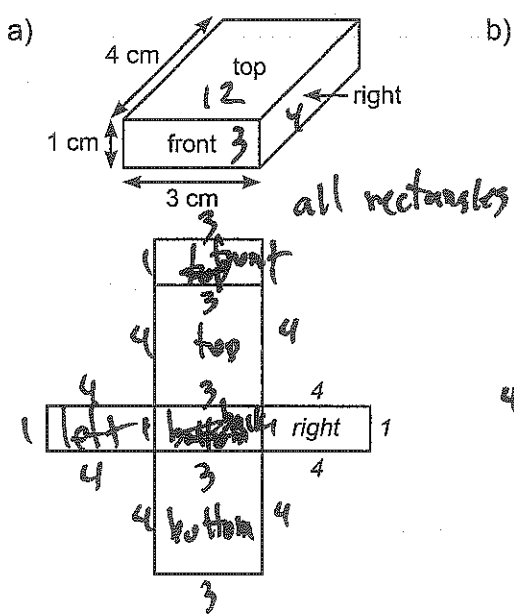$12 \times 2 = 24$
$\overline{80 \, cm^2}$
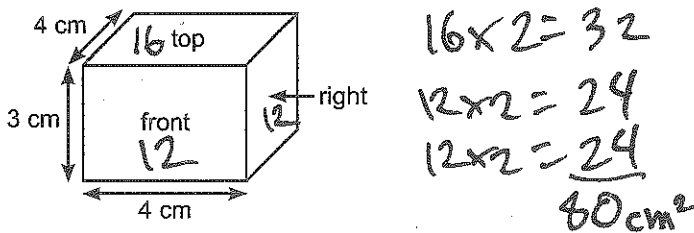
She didn't double the surface area to account for the congruent faces.

8. a) Alexandra says that she needs to find the area of only two faces of this prism to calculate the surface area. Is she correct? Explain.

Yes. The base is a square, so the 4 faces will be congruent.

b) What is the surface area of the prism?

$(40 + 40 + 64) \times 2 = 288 \, cm^2$

8 cm, 5 cm, 8 cm — 64, 40, 40
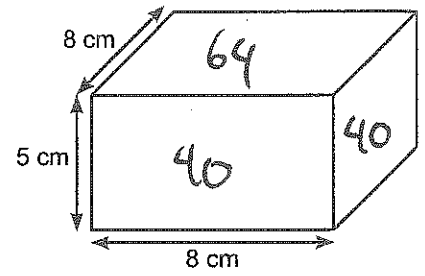
9. Write the name of each face of the prism on the net, then mark the length of each edge on the net.

a) 4 cm, 1 cm, 3 cm — top 12, right 4, front 3

all rectangles

front, top, left, right, bottom

b) 5 m, 3 m, 4 m, 4 m

triangle, rec, square, rectangle, triangle

c) 5 m, 4 m, 4 m, 4 m

$h = \sqrt{12} = 3.46 \, m$
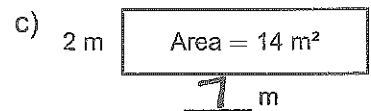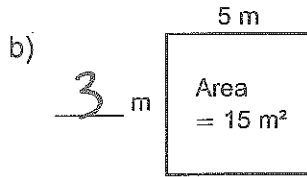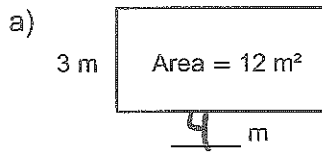
rectangle, tri. rectangle tri., rectangle

10. Find the surface area of each prism from Question 9. Include the units.

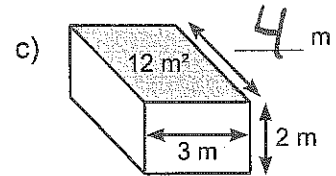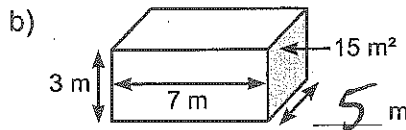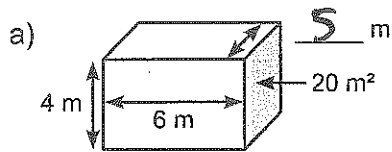a) $38 \, cm^2$

b) $48 + 12 = 60 \, m^2$

c) $\approx 79.86 \, m^2$

How is the surface area of a prism related to the area of its net? Explain.

All faces of the net added together have the same surface of the prism.

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Measurement 8-16

**11.** Find the missing length.

a)

3 m | Area = 12 m²

_4_ m

b)

5 m

_3_ m | Area = 15 m²

c)

2 m | Area = 14 m²

_7_ m

**12.** Find the missing edge length.

a)

_5_ m

4 m / 6 m / 20 m²

b)

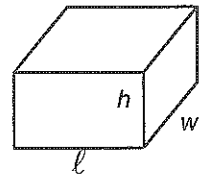15 m²

3 m / 7 m / _5_ m

c)

12 m² / _4_ m

3 m / 2 m

**13.** Edges *a*, *b*, and *c* have lengths that are whole numbers. The surface area of each face is written directly on the face. What are some possible lengths for edges *a*, *b*, and *c*? (Hint: Why can edge *a* not be 4 m long?)
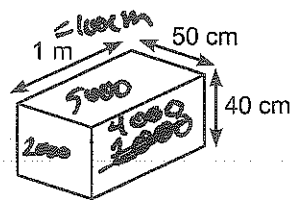
a / b / 18 m² / 6 m² / 12 m²
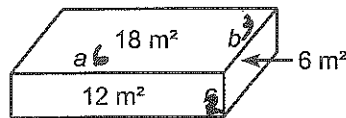
**14.** Write a formula for the surface area of the prism using the length ($\ell$), width (*w*), and height (*h*).
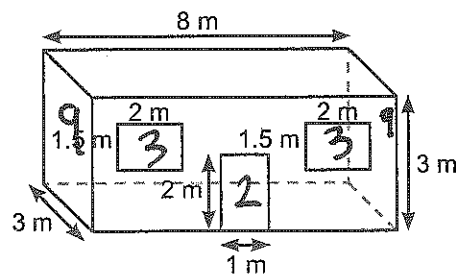
$$2\ell w + 2\ell h + 2wh$$

or

$$2(\ell w + \ell h + wh)$$

h / w / $\ell$

**15.** Calculate the surface area of the prism. Be careful with the units!

$$11000 \times 2$$
$$= 22\,000\ cm^2$$
$$or\ 2.2\ m^2$$

1 m / 50 cm / 40 cm

5000 / 4000 / 1000 / 2000

**16.** It costs $0.40 per square metre to paint a room. How much would it cost to paint the walls of this room (not including the door and windows)?

Don't include the floor or ceiling

$$18 + 24 + 16 = 58\ m^2$$
$$58 \times 0.4 = \$27.20$$
to paint the room

8 m

9 / 1.5 m / 2 m / 3 / 1.5 m / 2 m / 3 / 3 m

2 m / 2

3 m / 1 m

**17.** Look at the prism at right. It is not drawn to scale.
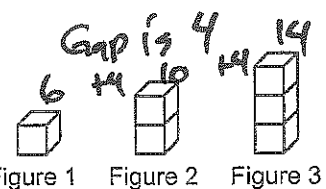
a) Draw a better sketch.

b) Find the volume and surface area of this prism.
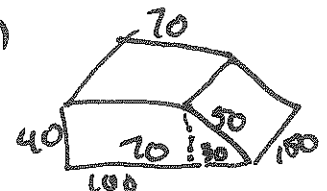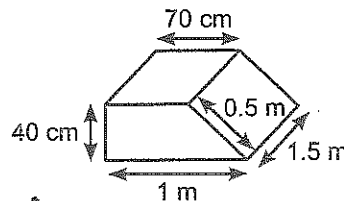
Volume = 510 000 cm³ or 0.51 m³   SA = 45 800 cm² or 4.58 m²

70 cm / 0.5 m / 40 cm / 1.5 m / 1 m

70 / 40 / 20 / 50 / 180 / 100

**18.** a) Write a rule that tells you how to calculate the surface area of the figures from the figure number. (Each cube has length, width, and height 1 cm.)

$$(4n + 2)\ cm^2$$

b) Use your rule to predict the surface area of the 20th figure. 82 cm²

Gap is 4

6 / 14 / 10 / 14 / 14

Figure 1 / Figure 2 / Figure 3