NOMBRE: _____

P.A.T Prep

Areas / Areas from Volume/
Problems that combine Area and Perfect Squares

+ −
÷ ✕

KEEP
CALM
AND
DO THE
MATH

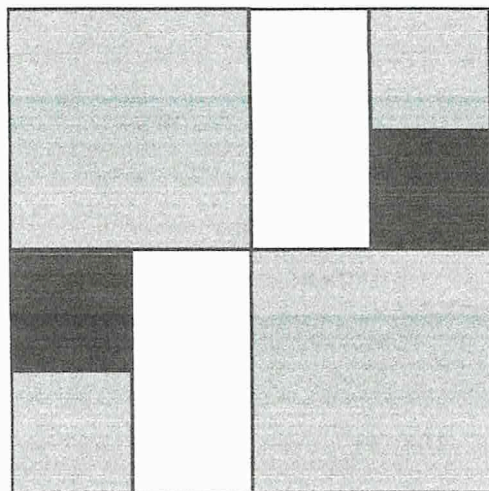St. Brendan School
Mr. Martínez

The diagram shown below is a square and has a perimeter of 8 cm.

From Perimeter

Numerical Response ✓

4. What is the **total** area of the white rectangles and the black squares?

Answer: _____ cm^2

(Record your answer in the numerical-response section on the answer sheet.)

✓ When a square piece of paper is folded in half, the resulting figure has a perimeter of 24 cm.

Numerical Response

4. The **area** of the square piece of paper before it is folded is _____ cm^2.

(Record your answer in the numerical-response section on the answer sheet.)

✓

13. If the side length of a cube is tripled, then the surface area of the cube will increase by a factor of

:Strategy
- Actually try it out
· START with side length of 1,
then up it to 3

A. 6

B. 9

C. 12

D. 27

AREAS FROM VOLUME

- Use volume to find side length
- EVERY P.A.T I've studied has 1 problem with the volume of a cube
  - This is good news ...

If Volume = 8
Side length = 2

$V = base \times height \times width$

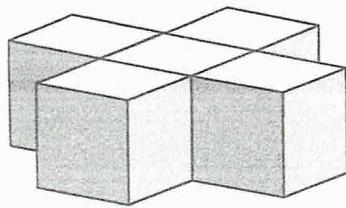But since cubes have equal lengths, then

$(V = side\ length^3)$

$V = 8$, then $\dfrac{2}{2}\ \dfrac{}{2}$ side length = $\underline{\underline{2}}$

The following 3-D object is composed of identical cubes. The volume of each cube is 8 cm³.

14. What is the **total** surface area of the 3-D object shown above?

A. 120 cm²

B. 100 cm²

C. 88 cm²

D. 72 cm²

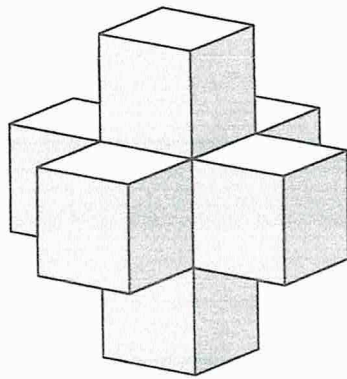STRATEGY: · Draw 6 views:
Front, back, top, bottom, Right, left
· add all faces

If side length is 2, then you must multiply total faces × 2!

CAREFUL

The following 3-D object is composed of identical cubes. The volume of the 3-D object is 56 cm^3.

○ Volume is
  Cumulative: ?

  56 cm^3 is
  the sum of all
  Volumes

$$\frac{56 \text{ cm}^3}{7 \text{ cubes}} = 8 \text{ cm}^3 \text{ per cube}$$

✓

13. The surface area of the 3-D object above is
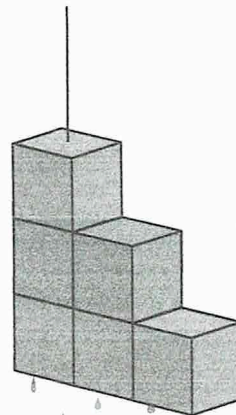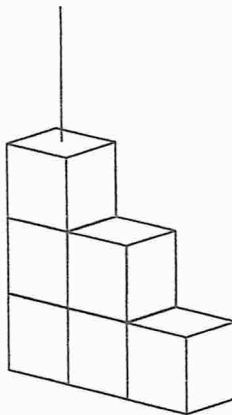
A. 30 cm^2

B. 60 cm^2

C. 120 cm^2

D. 144 cm^2

18. If the painted object is separated into individual cubes, then the total area of the **unpainted** surfaces will be

A 3-D object made of 2 cm × 2 cm × 2 cm cubes is dipped in paint.
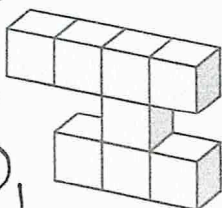
Unpainted Object   **Painted Object**

A. 12 cm^2

B. 24 cm^2
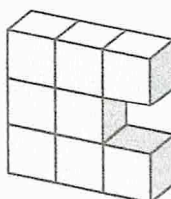
C. 32 cm^2

D. 48 cm^2

✓

✓

The three composite objects shown below are each constructed from 8 identical cubes.
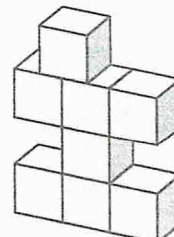
○ Since faces
  are the
  Same
  amount
  ⌣ then...

○ Difference
  must be
  overlaps

Object 1   Object 2   Object 3

A. Object 2 has a greater surface area than Object 1.

34. Which of the following statements correctly describes the relationship between the composite objects?

B. The surface areas of the three objects are the same

C. Object 3 has a greater surface area than both Object 1 and Object 2.

D. The surface area of Object 1 is equal to the surface area of Object 3.

The local movie theatre sells two sizes of popcorn. The large bag of popcorn is a scale enlargement of the small bag.
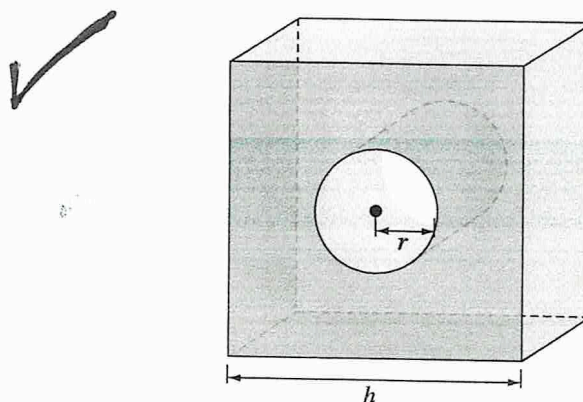
Large popcorn

Small popcorn

30 cm

37.5 cm

20 cm   10 cm

25 cm   12.5 cm
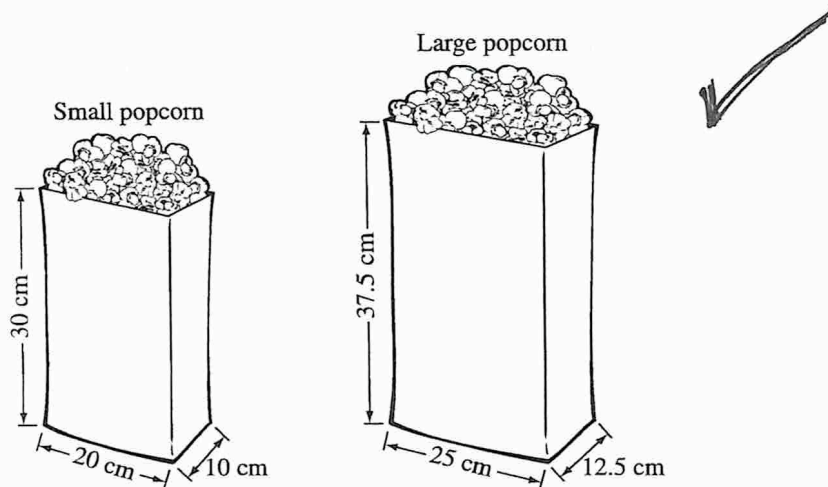
2. The difference between the exterior surface area of the large popcorn bag and the small popcorn bag is _____ cm².

(Record your answer in the numerical-response section on the answer sheet.)

The 3-D object below is a **cube** with a right cylinder cut out.

r

h

13. Which expression represents the surface area of the 3-D object?

A. $6h^2 - 2\pi r^2 + 2\pi rh$

B. $4h^2 - 2\pi r^2 + 2\pi rh$

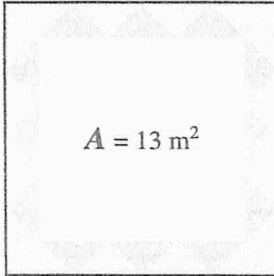C. $6h^2 + 2\pi r^2 - 2\pi rh$

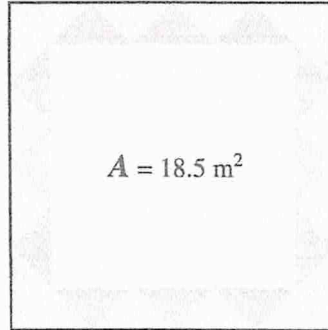D. $4h^2 + 2\pi r^2 - 2\pi rh$

PROBLEMS THAT COMBINE → AREAS + Perfect Squares ✓
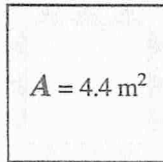
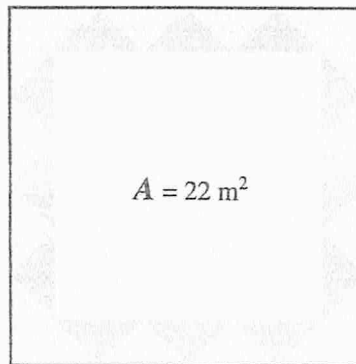The area, A, of four square carpets is shown below.

Carpet 1

$A = 13\ \text{m}^2$

Carpet 2

$A = 18.5\ \text{m}^2$

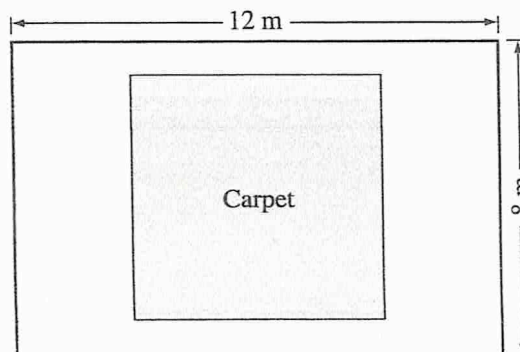**Carpet 3**

$A = 4.4\ \text{m}^2$

Carpet 4

$A = 22\ \text{m}^2$

2. Which carpet will cover the most floor area, without touching a wall, when it is laid flat in a square room that has a width of 4.5 m?

A. Carpet 1
B. Carpet 2
C. Carpet 3
D. Carpet 4

A square carpet covers 37.5% of the floor area of a rectangular room, as shown below.

← 12 m →

Carpet

8 m

✓

4. What is the side length of the carpet shown above?

A. 7 m
B. 6 m
C. 5 m
D. 4 m

Use the following information to answer numerical-response question 6.

Hi

Darren joins the rectangular prisms shown below to create a new rectangular prism that has the greatest possible surface area. He then paints all visible surfaces. After the paint dries, Darren separates the two prisms.
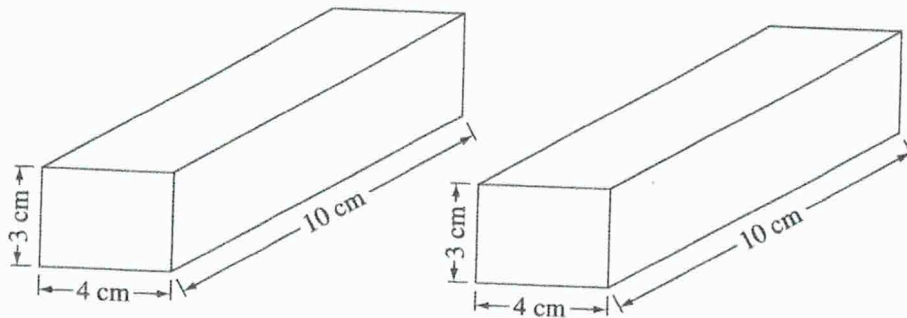
Numerical Response

6. The total area of both prisms that has **not** been painted is _____ cm².

(Record your answer in the numerical-response section on the answer sheet.)

27