Surface Area and Volume

Day 1 - Surface Area of Prisms

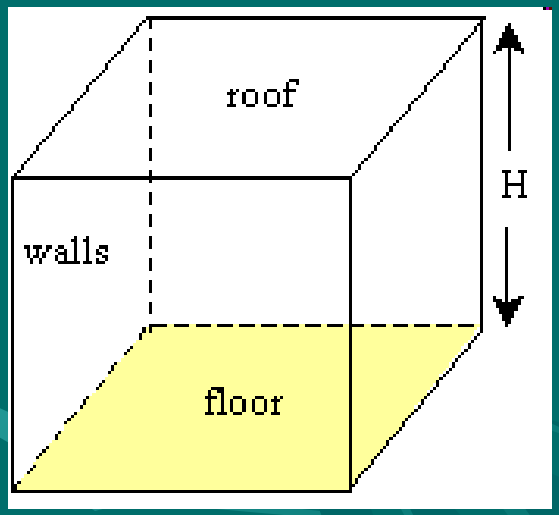
Surface Area = The total area of the surface of a three-dimensional object

(Or think of it as the amount of paper you'll need to wrap the shape.)

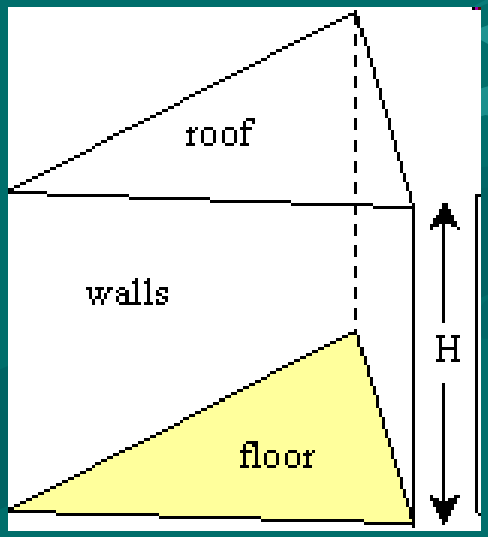
Prism = A solid object that has two identical ends and all flat sides.

We will start with 2 prisms – a rectangular prism and a triangular prism.

Rectangular Prism

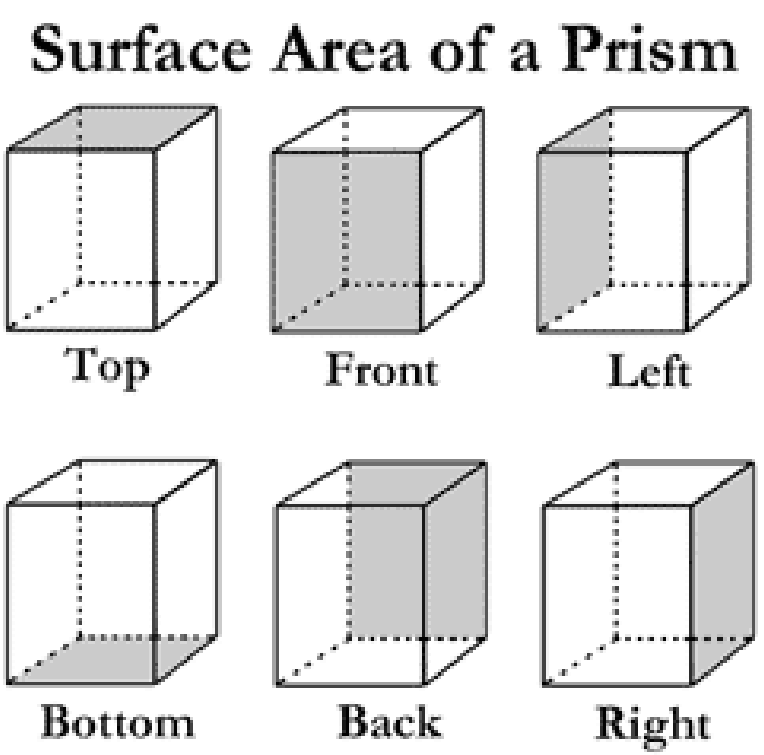


Triangular Prism



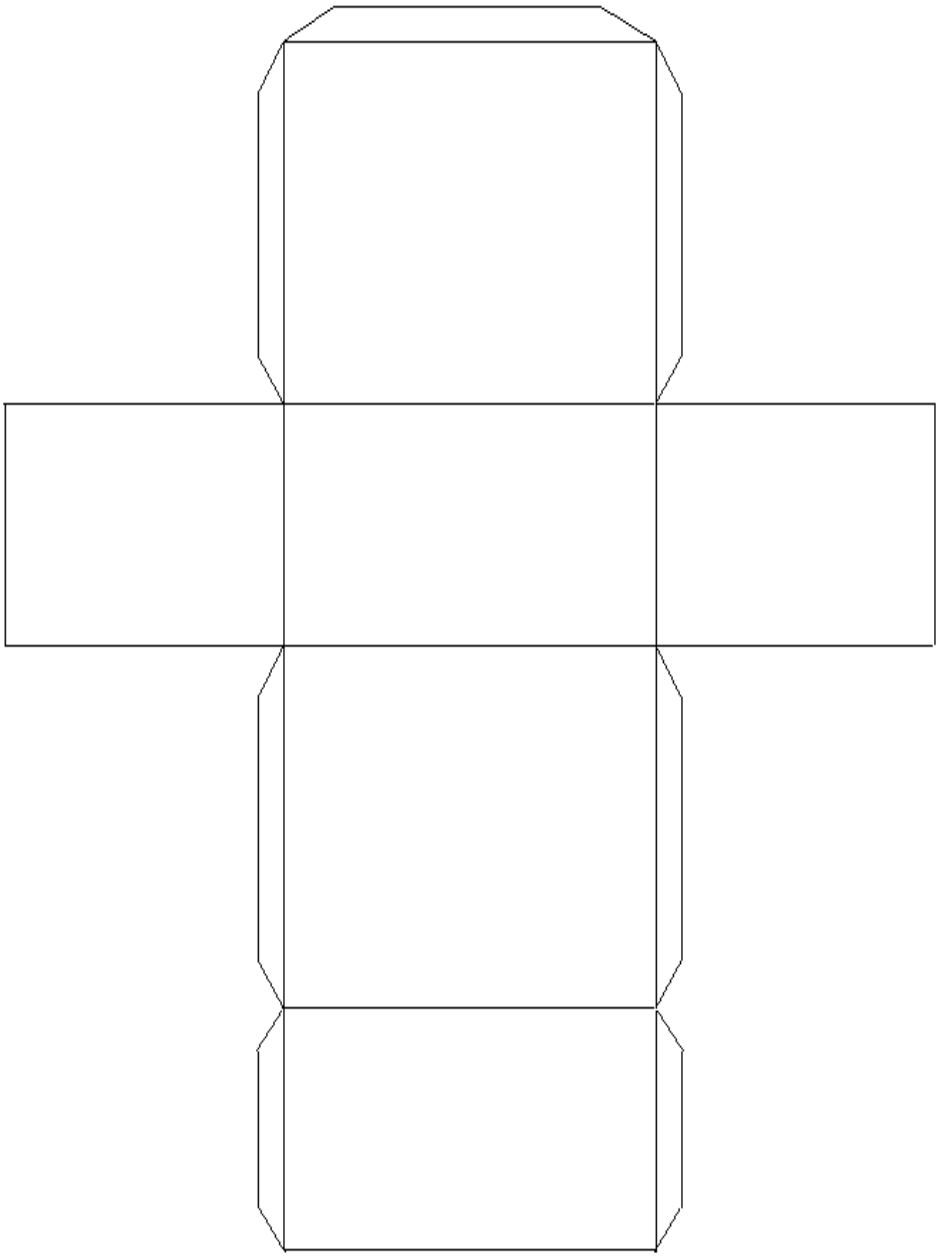
Surface Area (SA) of a Rectangular Prism

of sides)

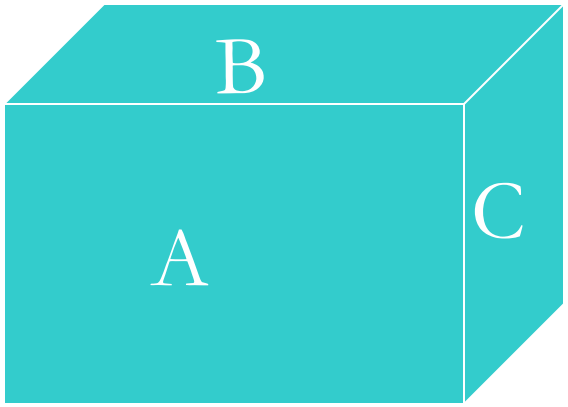


Rectangular Prism

Prism net - unfolded



Rectangular Prism



ach of the faces.

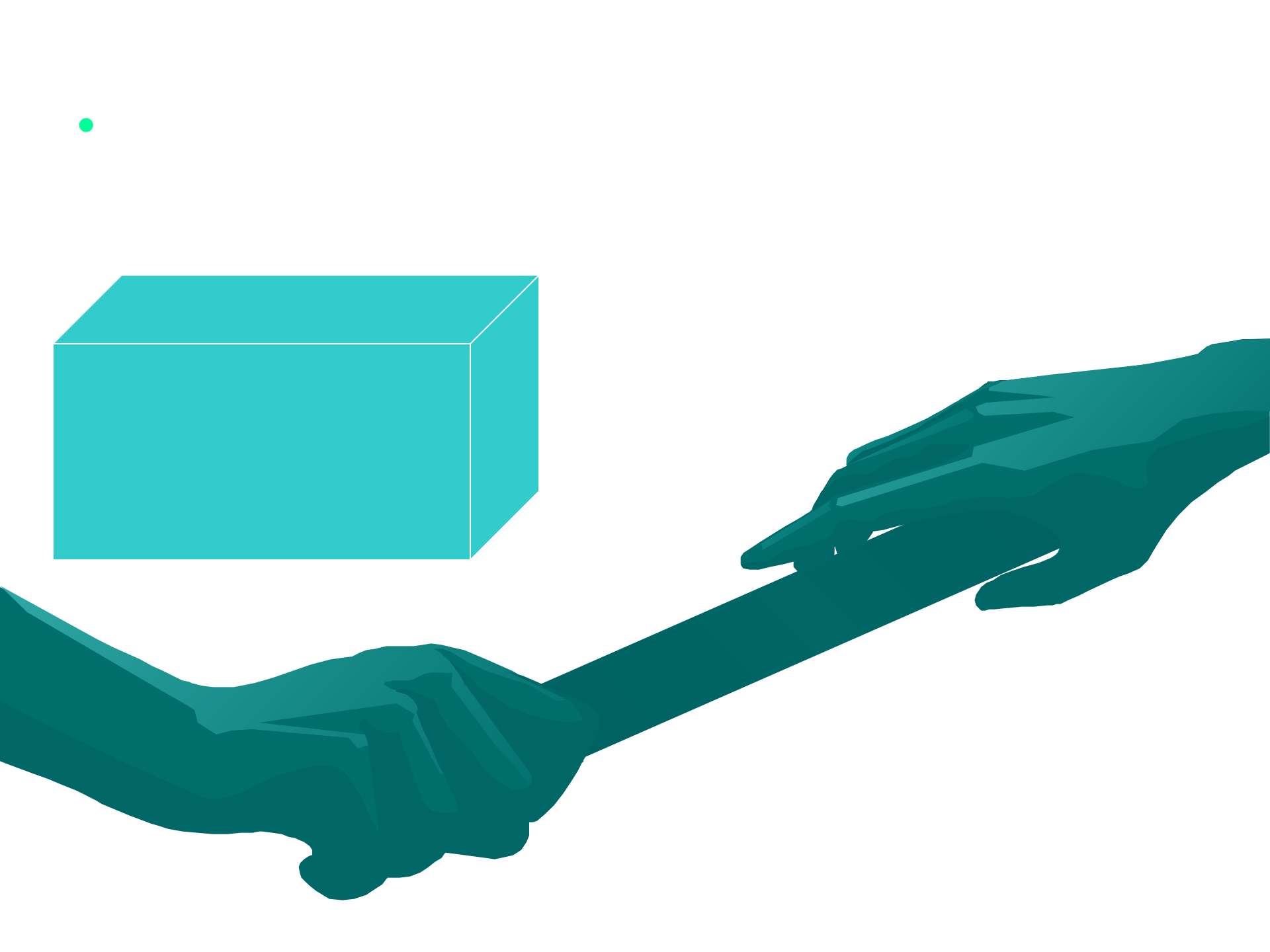
any of the faces have the
area?

If so,

B = 2 = 60

C = 4 x 6 = 24 x 2 = 48

148 in^2



$SA = 2lw + 2lh + 2wh$

$SA = 2\ (10 \times 5) + 2\ (10 \times 6) + 2\ (5 \times 6)$

$= 2\ (50) + 2(60) + 2(30)$

$= 100 + 120 + 60$

$= 280$ units squared

Practice

SA = 2lw + 2lh + 2wh

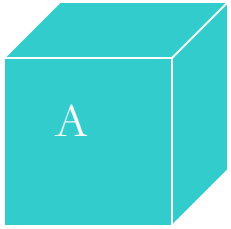
= 2(22 x 10) + 2(22 x 12) + 2(10 x 12)

= 2(220) + 2(264) + 2(120)

= 440 + 528 + 240

= 1208 ft squared

CUBE



A

of the

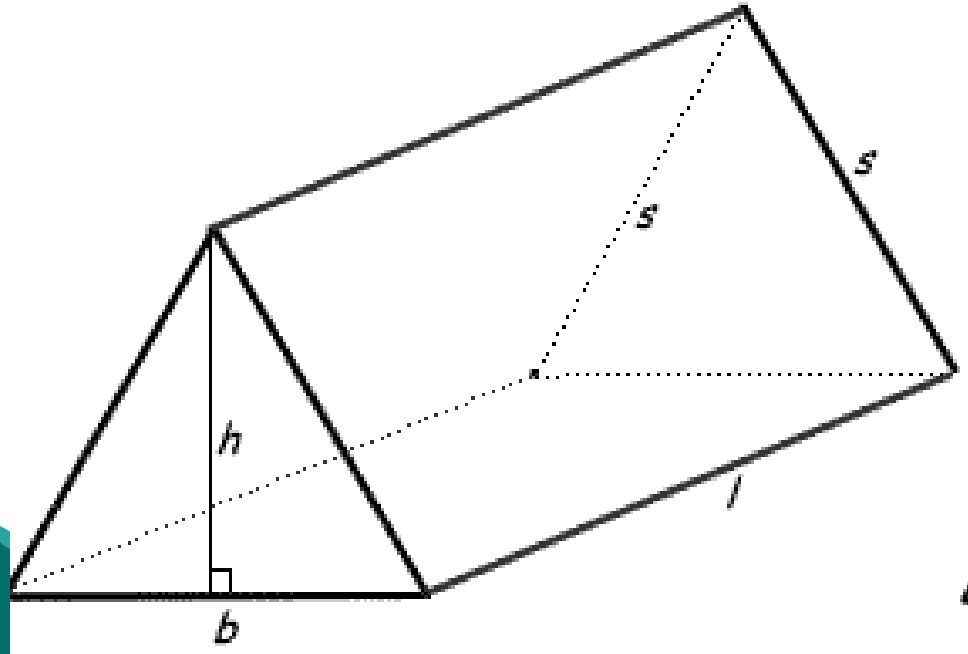
4 x 4 = 16

Take

X 6

96

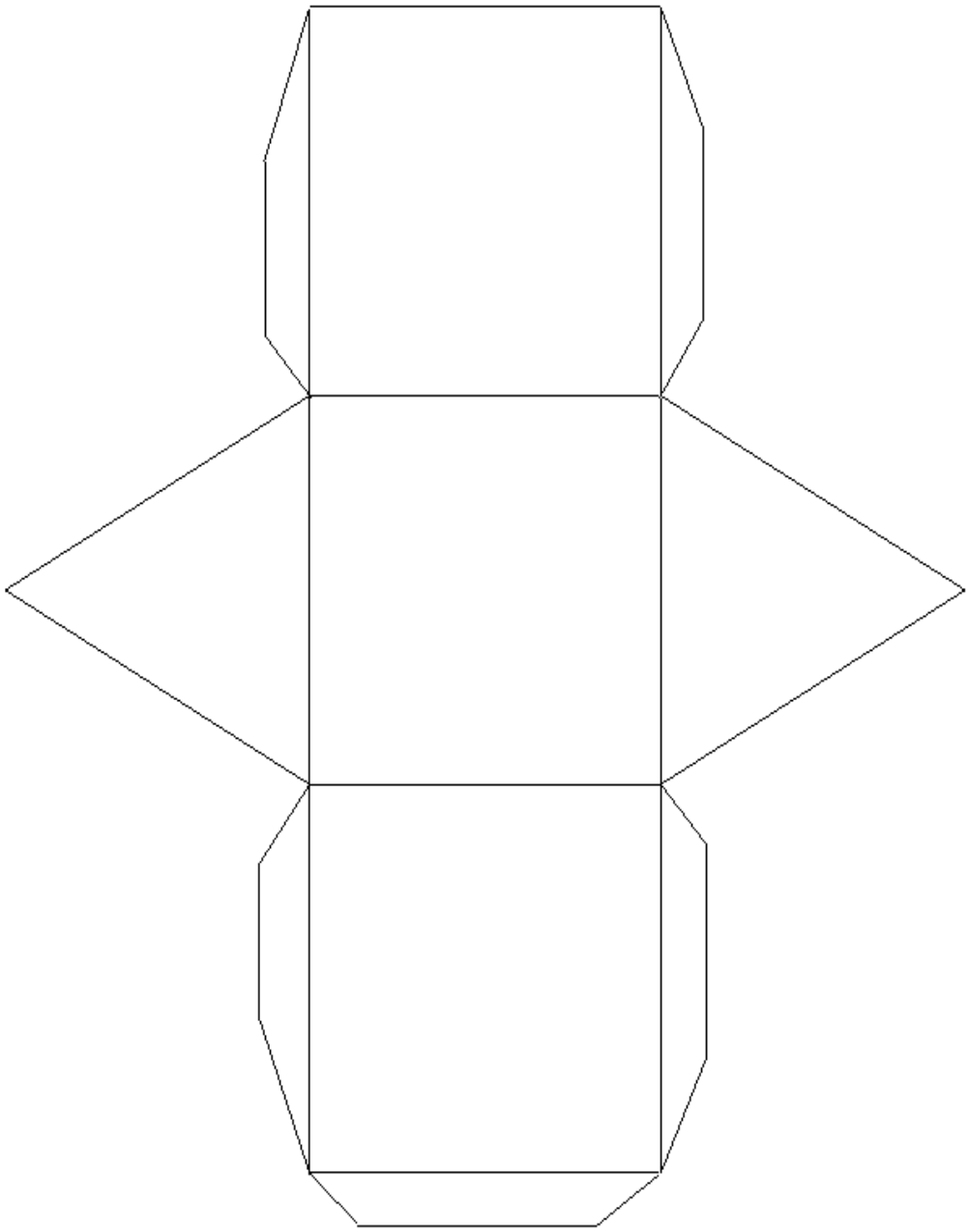
Surface Area of a Triangular Prism



sides
ectangular)

Unfolded net of a triangular prism

Triangular prism



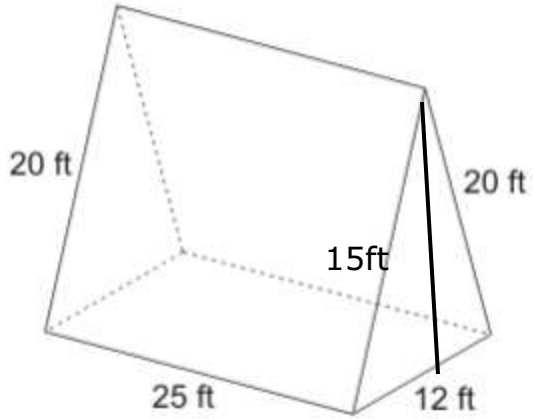
2(area of triangle) + Area of rectangles

Area Triangles = ½ (b x h)

= ½ (12 x 15)

= ½ (180)

= 90



Area Rect. 1 = b x h

= 12 x 25

= 300

Area Rect. 2 = 25 x 20

= 500

SA = 90 + 90 + 300 + 500 + 500

SA = 1480 ft squared

TRIANGULAR PRISM

5

r prism

Find the surface area. Start by finding the area of the triangle.

4 x 3/2 = 6

x 2= 12

How many triangles were there?

2

5 x 10 = 50 = front

4 x 10 = 40 = back

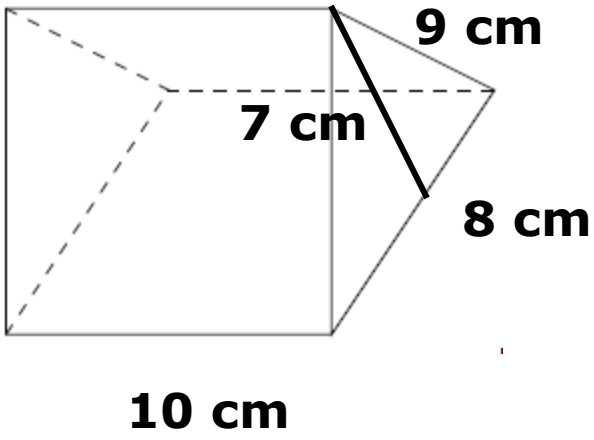
3 x 10 = 30 = bottom

Find the area of the 3 rectangles.

What is the final SA?

SA = 132 m^2

Practice



Triangles = ½ (b x h)

= ½ (8 x 7)

= ½ (56)

= 28 cm

Rectangle 1 = 10 x 8

= 80 cm

Rectangle 2 = 9 x 10

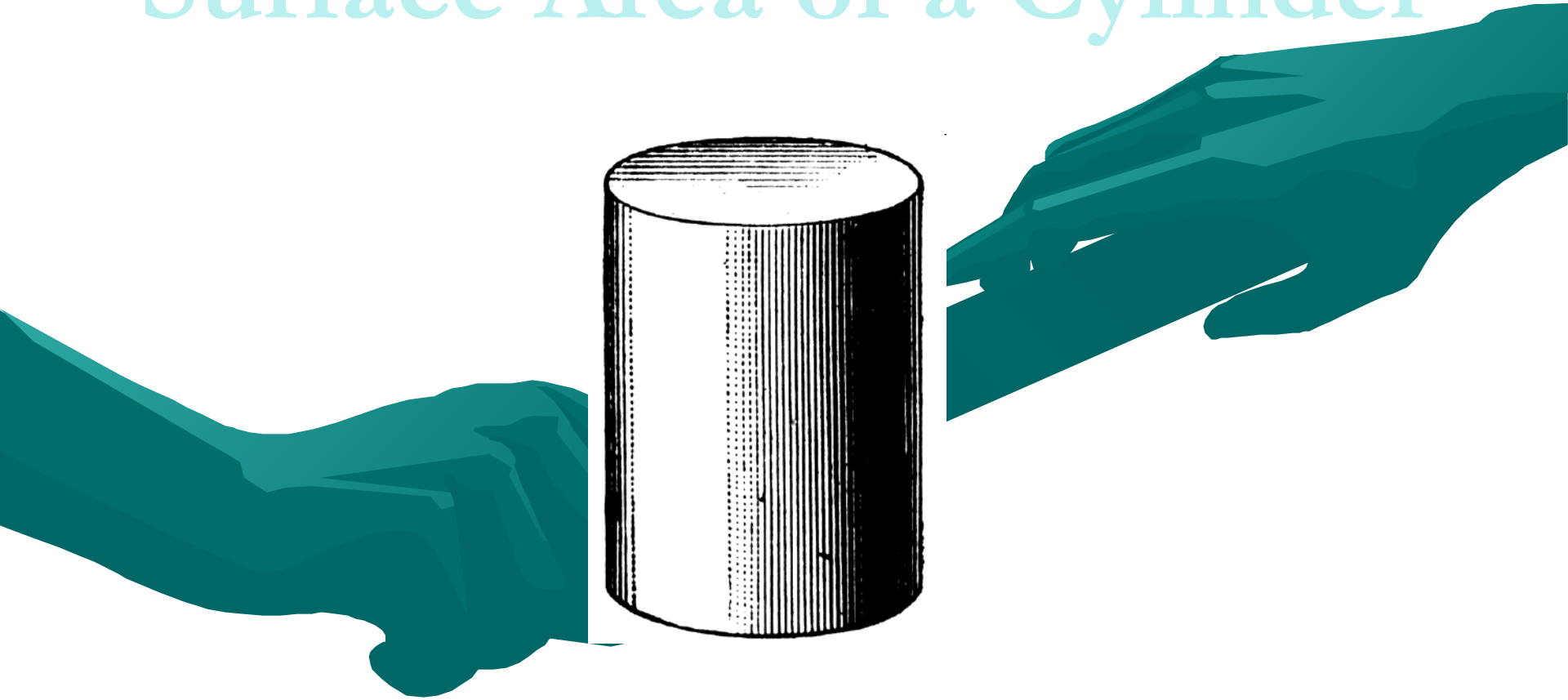
= 90 cm

<u>Add them all up</u>

SA = 28 + 28 + 80 + 90 + 90

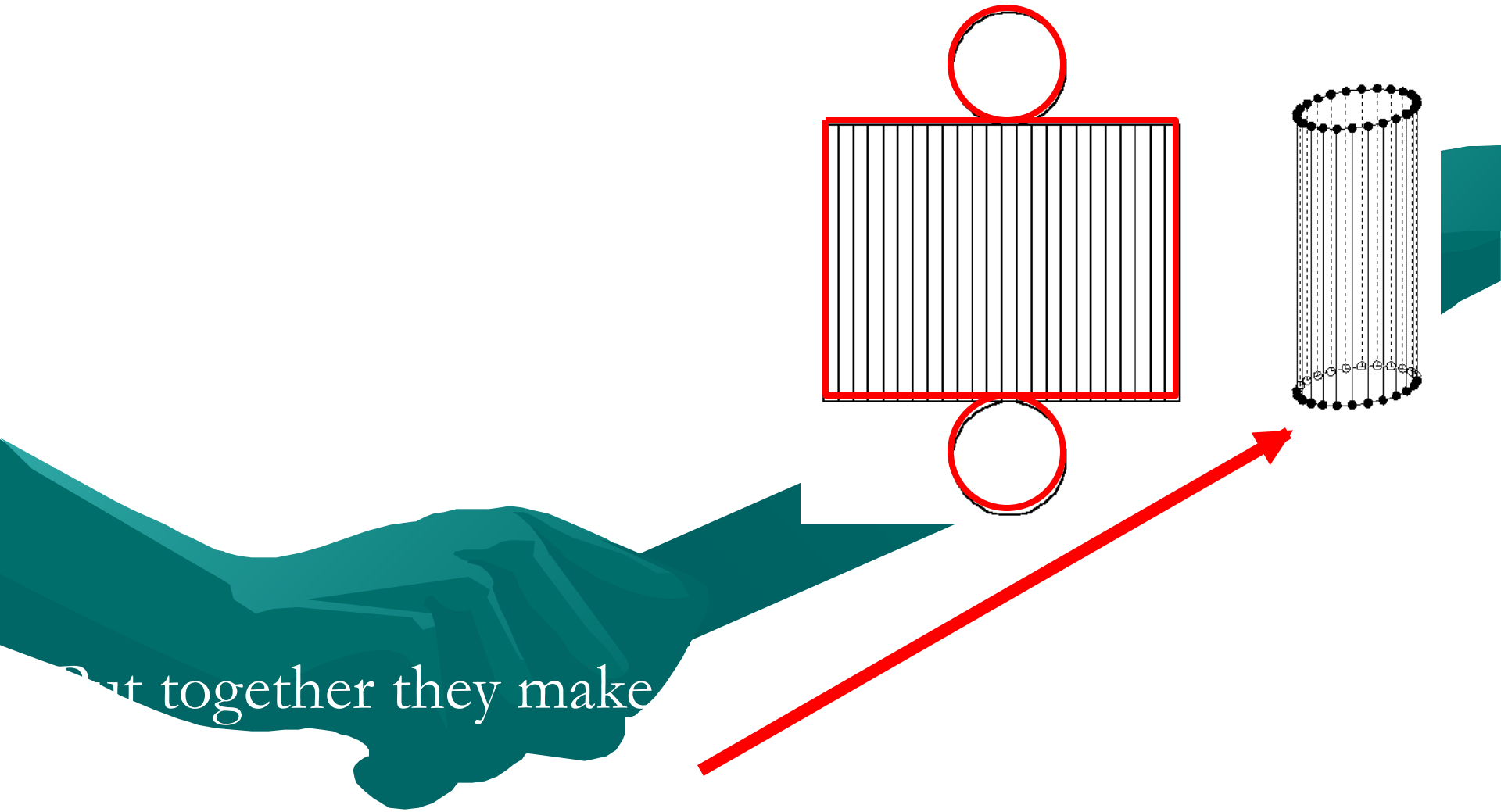
SA = 316 cm squared

Surface Area of a Cylinder



Review

Parts of a cylinder



t together they make

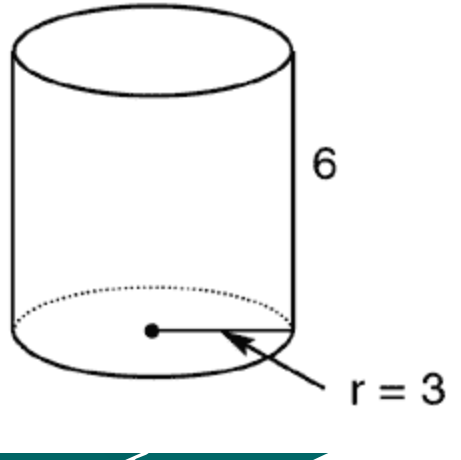
The Soup Can

The [illegible] and the lab[illegible]are related

The circumference of the [illegible]

[illegible]same as the length [illegible]

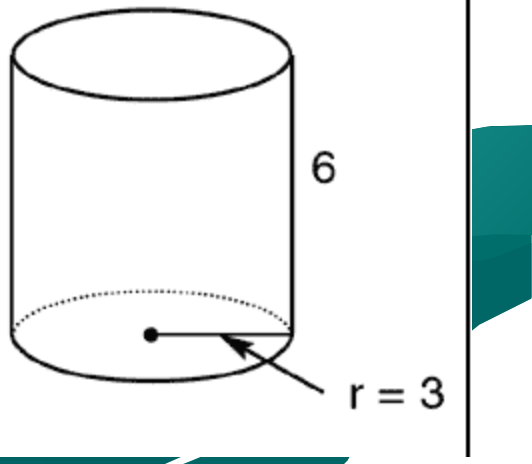
Area of the Circles



But there are 2 of them so

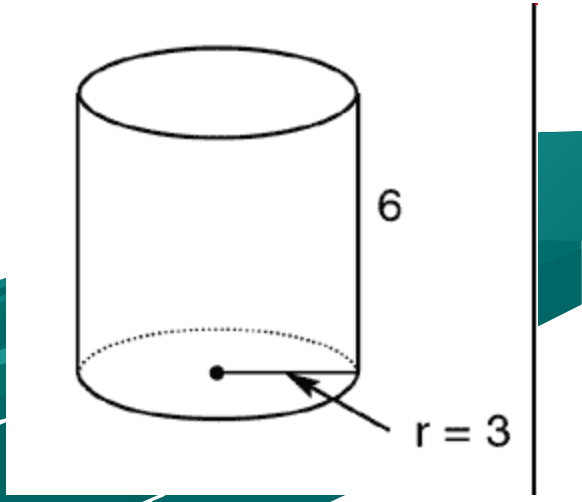
28.26 x 2 = 56.52 units sq

The Rectangle



Notice that the base is the same as the distance the circle (or the

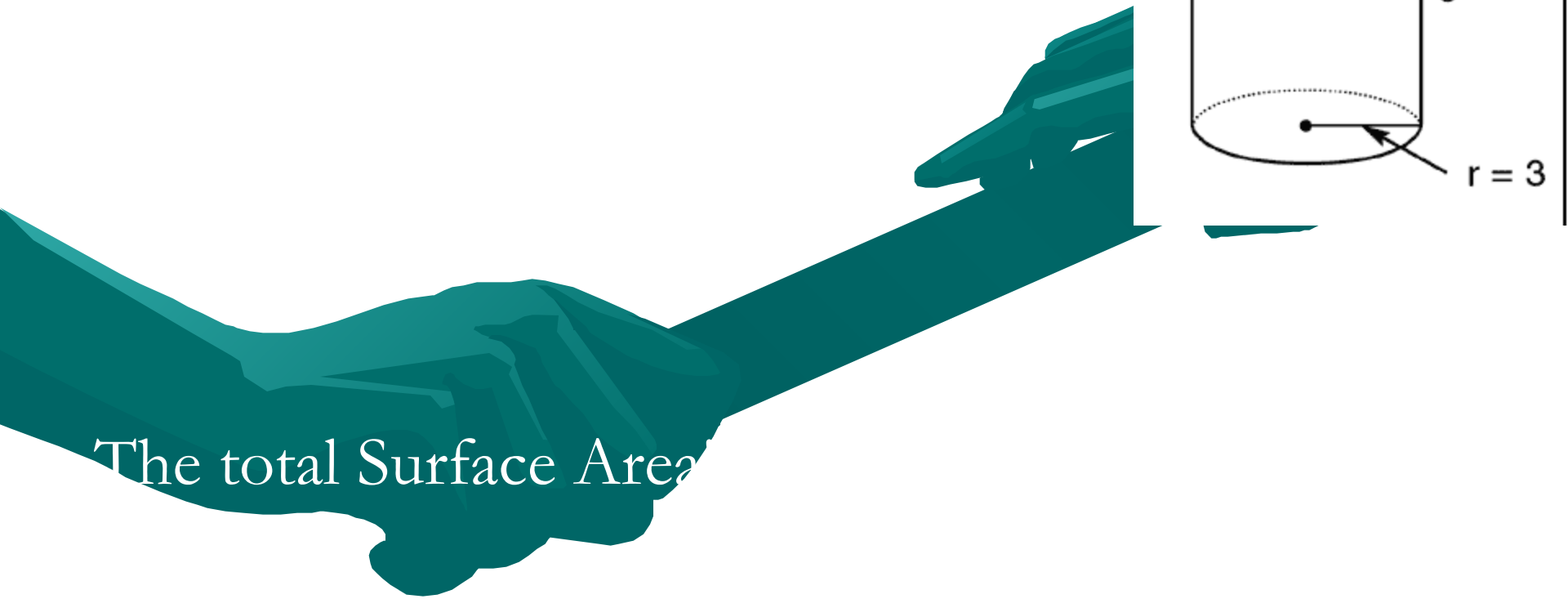
Find Circumference



= 18.84 x 6 (the height giv

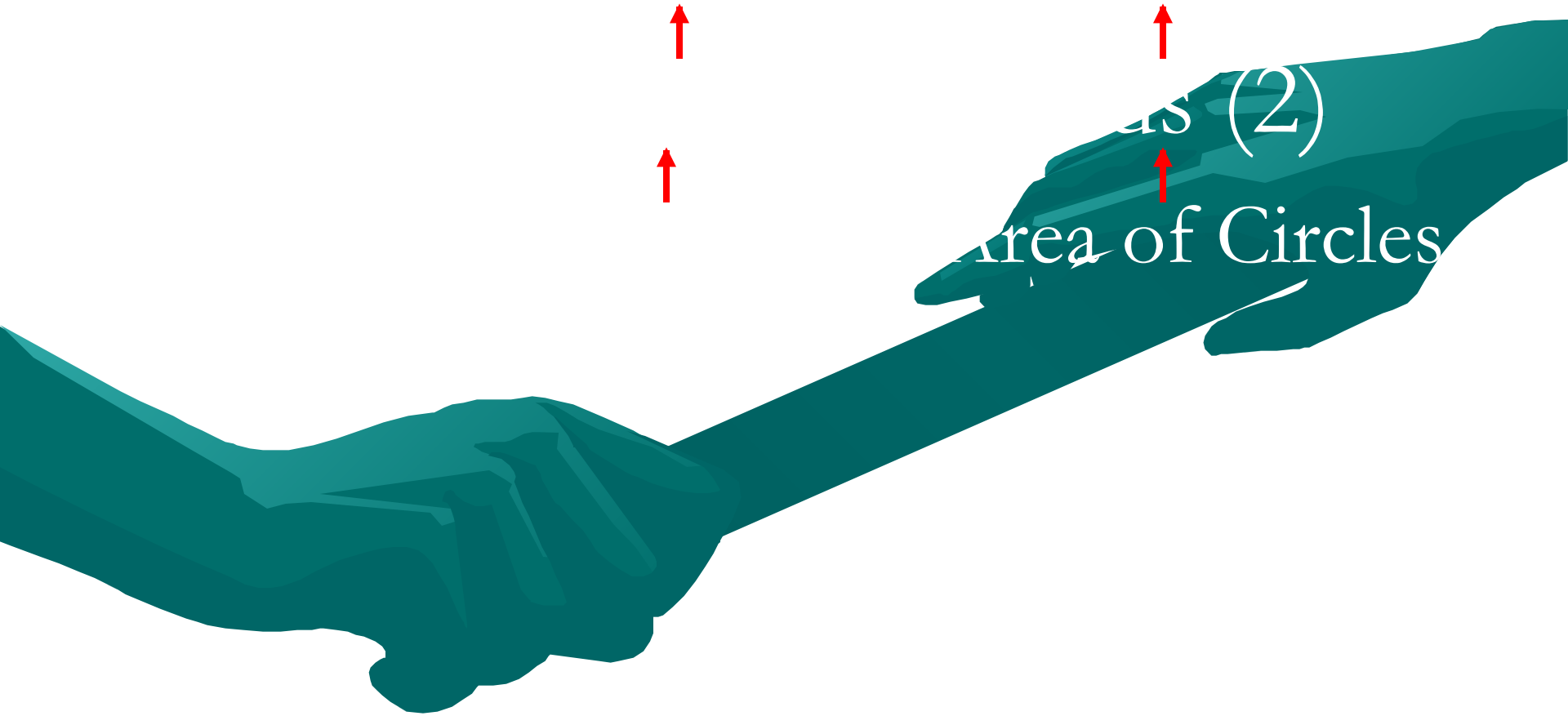
= 113.04 units squar

Add them together



The total Surface Area

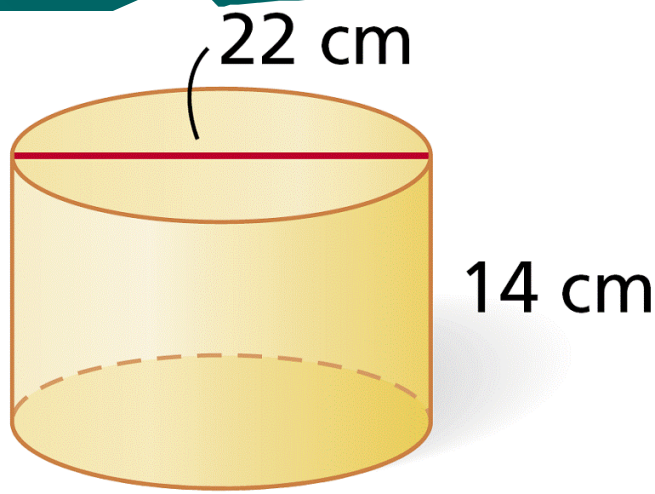
Formula



Practice

Be sure you know the difference between a radius and a diameter!

$= 1127 \text{ cm}^2$



More Practice!

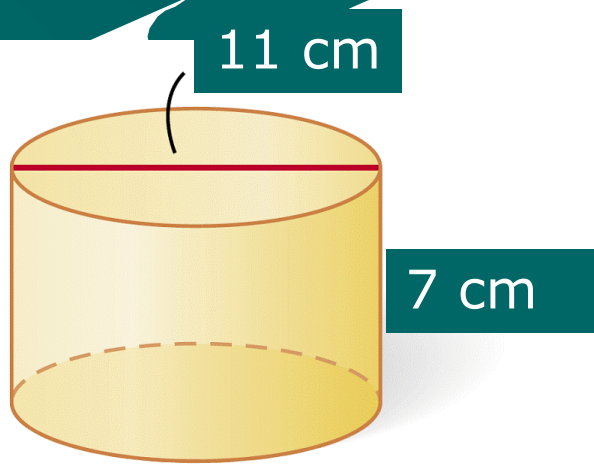
.25)

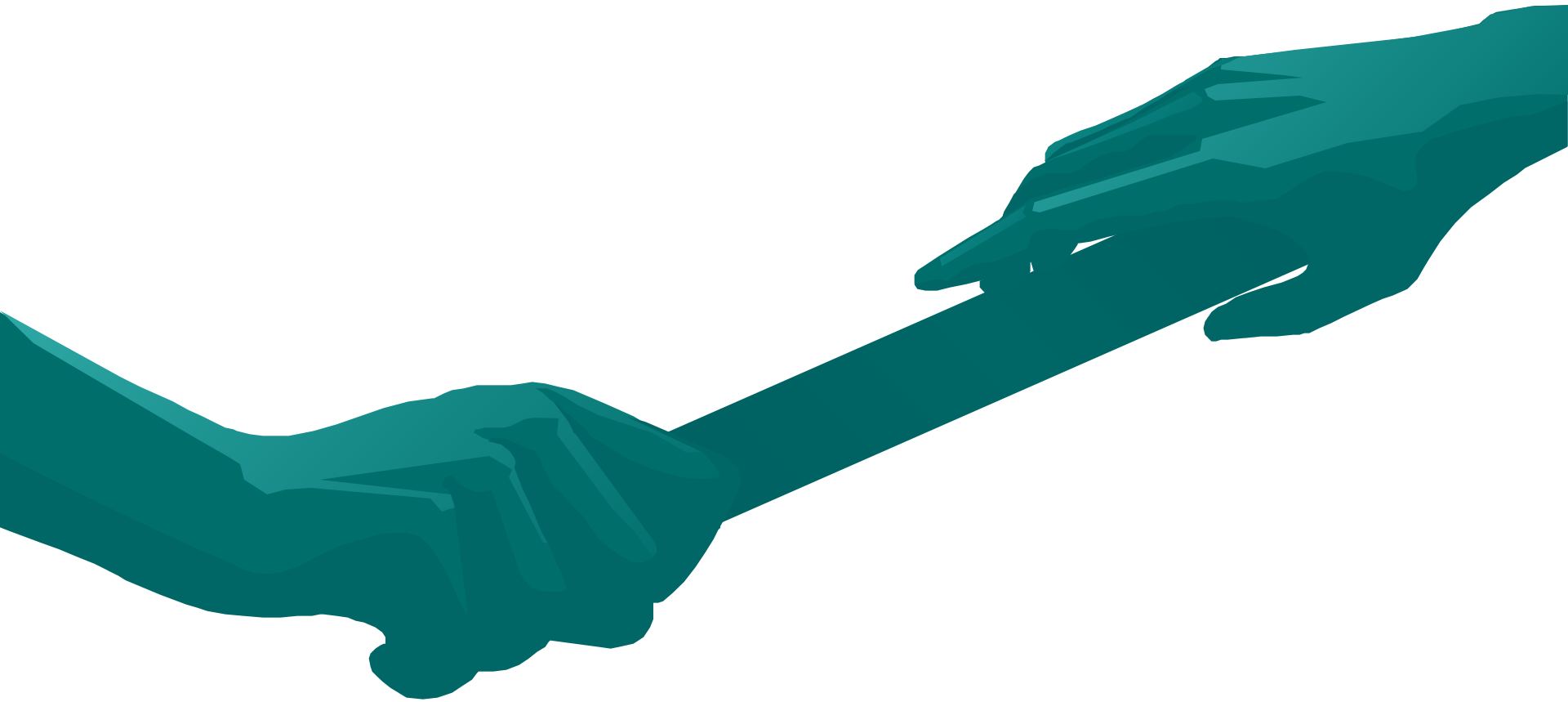
94.99)

8.27)

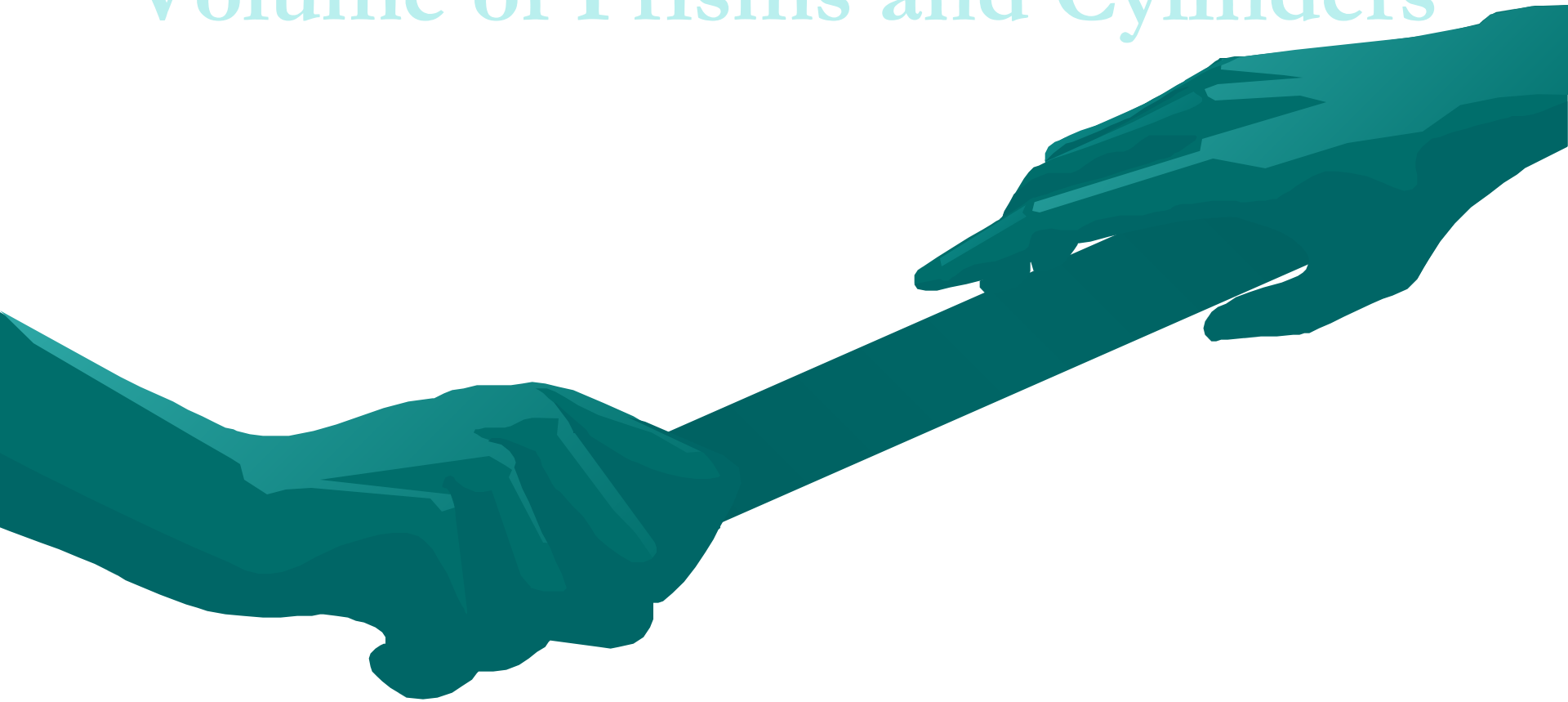
= (241.78) + (596.54)

= 838.32 cm²



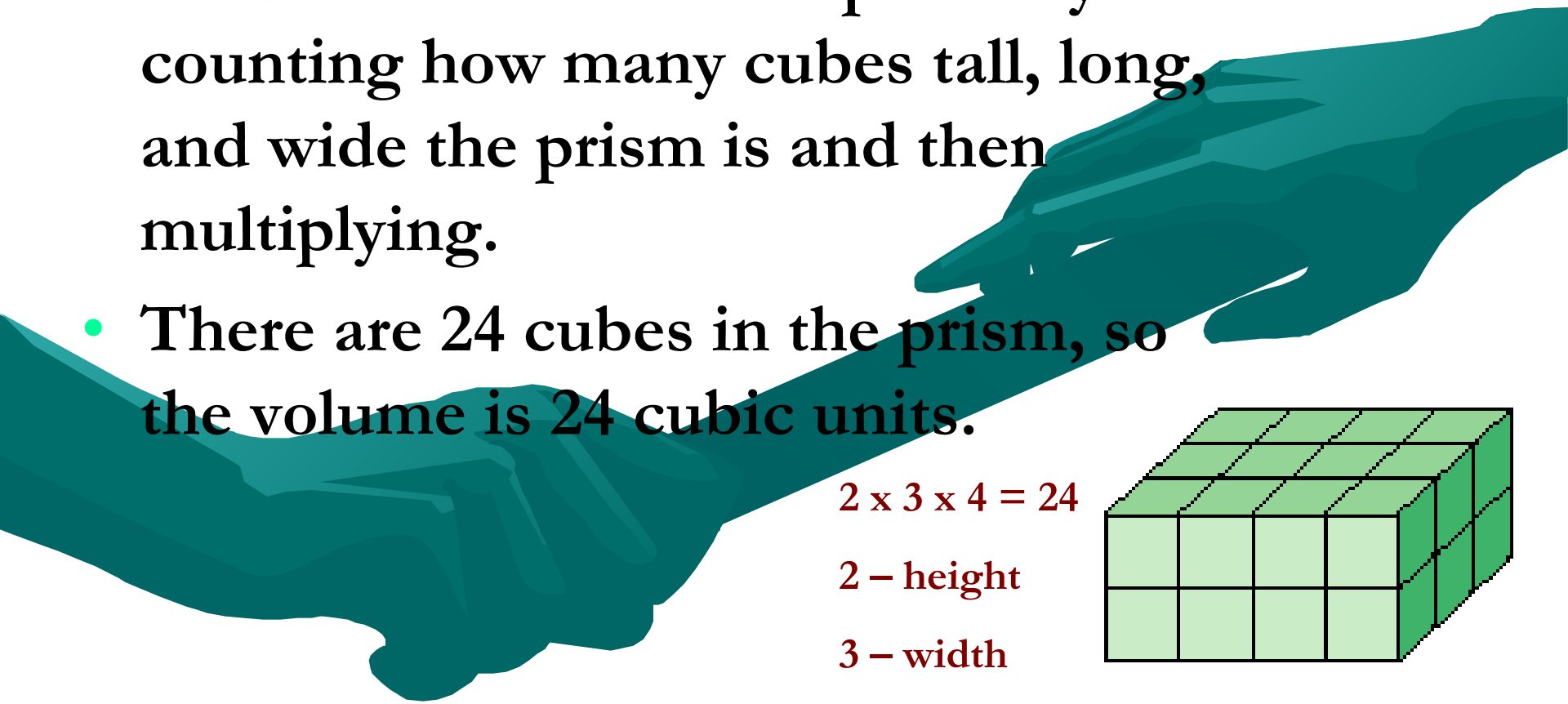


Volume of Prisms and Cylinders



Volume

- The number of cubic units needed to fill the shape.
  Find the volume of this prism by counting how many cubes tall, long, and wide the prism is and then multiplying.
- There are 24 cubes in the prism, so the volume is 24 cubic units.



2 x 3 x 4 = 24

2 – height

3 – width

4 – length

Formula for Prisms

VOLUME OF A PRISM

Try It

$V = Bh$

Find area of the base

$= (8 \times 4) \times 3$

$= (32) \times 3$

Multiply it by the height

$= \underline{96 \text{ ft}^3}$

Practice

12 cm

10 cm

22 cm

$V = Bh$

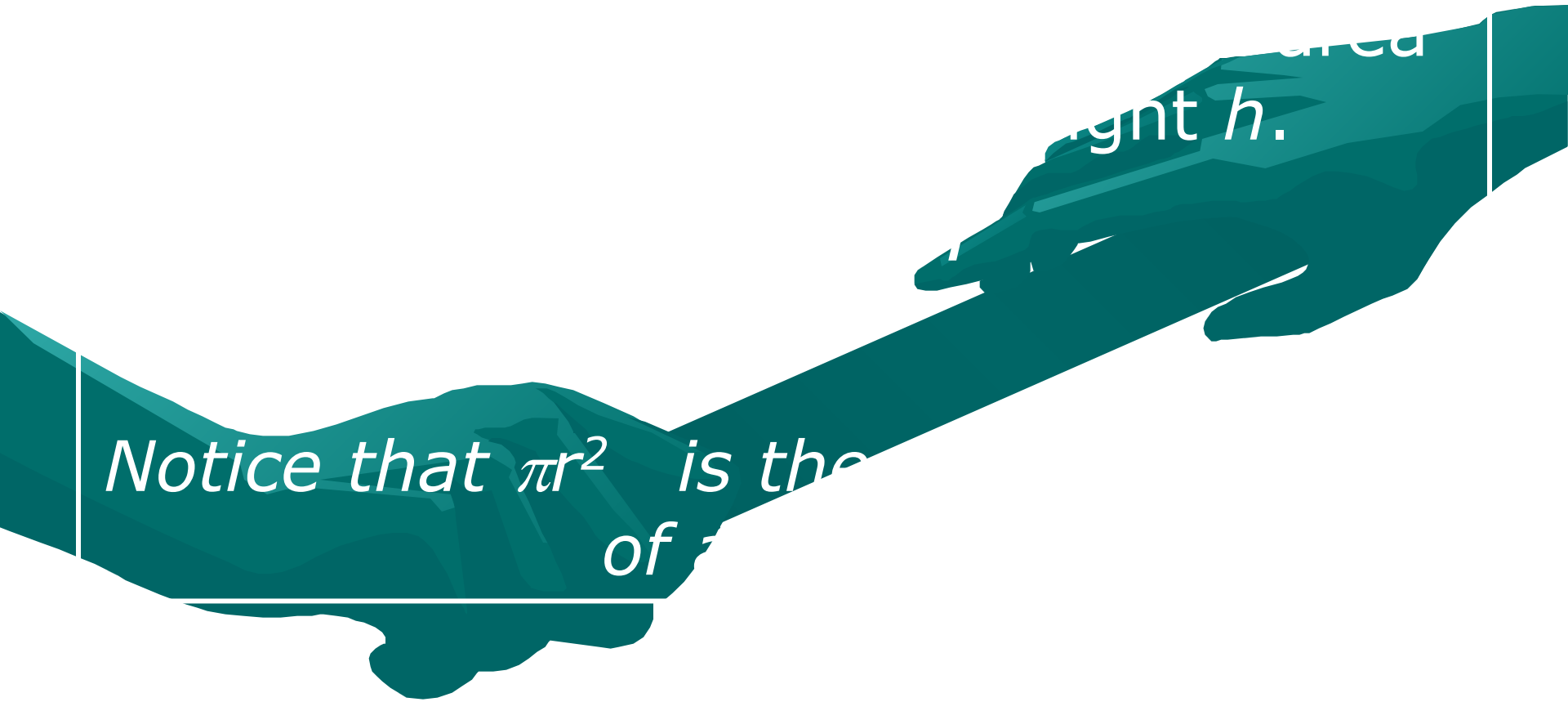
$= (22 \times 10) \times 12$

$= (220) \times 12$

$= \underline{2640 \text{ cm}^3}$

Cylinders

VOLUME OF A CYLINDER

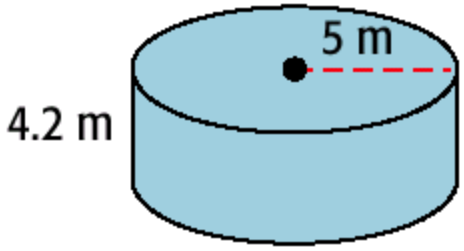


ght h.

Notice that πr^2 is the

of

Try It



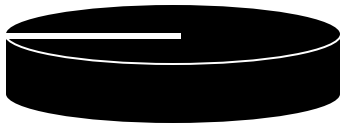
$V = \pi r^2 h$

The radius of the cylinder is 5 m, and the height is 4.2 m

$V = 3.14 \cdot 5^2 \cdot 4.2$ Substitute the values you know.

$V = \underline{329.7}$

Practice



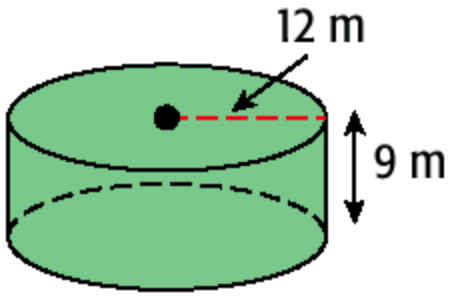
$V = \pi r^2 h$ Start with the formula

$V = 3.14 \times 13^2 \times 7$ Substitute what you know

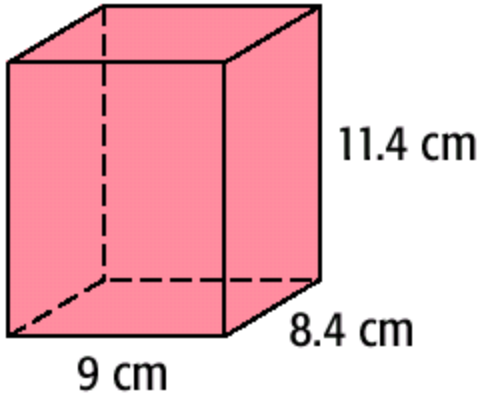
$= 3.14 \times 169 \times 7$ Solve using order of Ops.

$= \underline{3714.62\ cm^3}$

Lesson Quiz



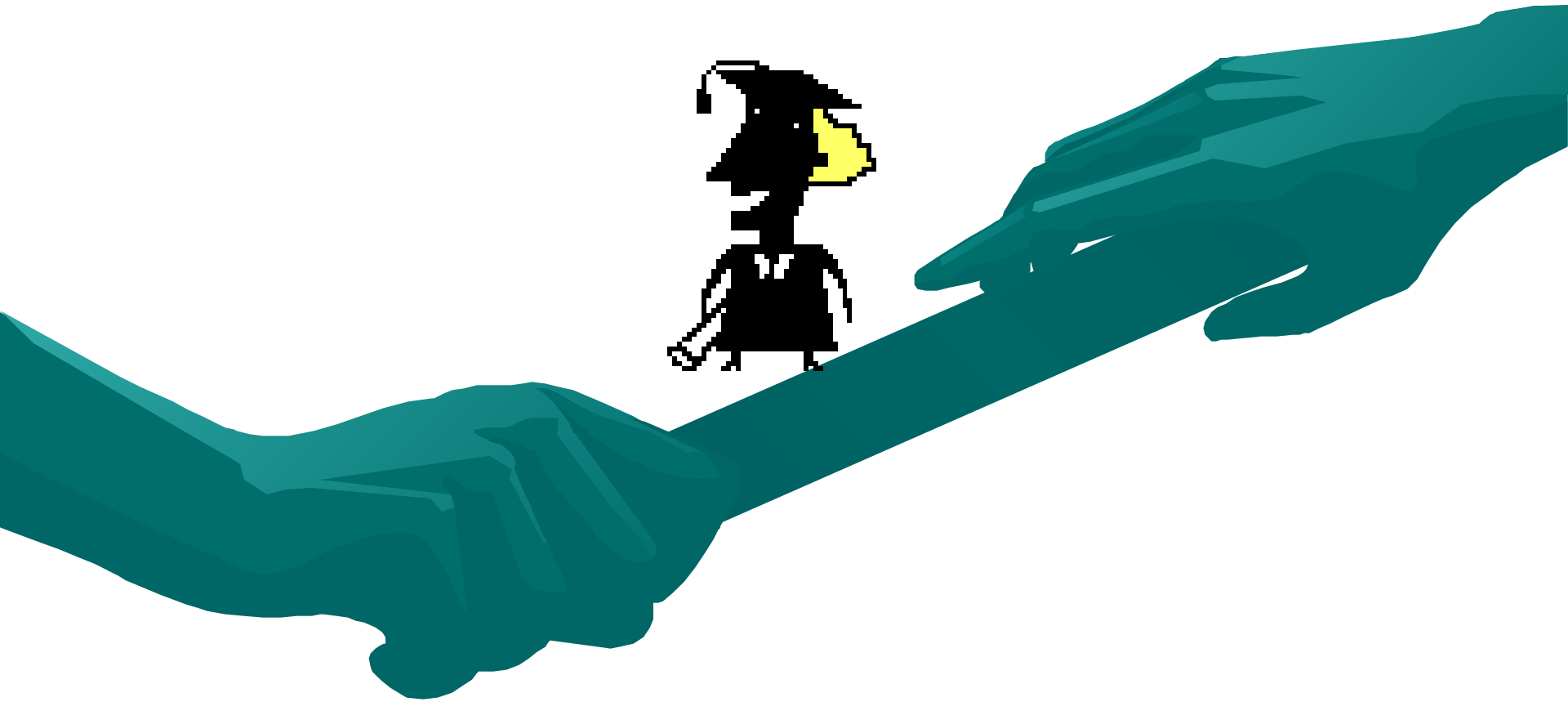
4,069.4 m^3



861.8 cm^3

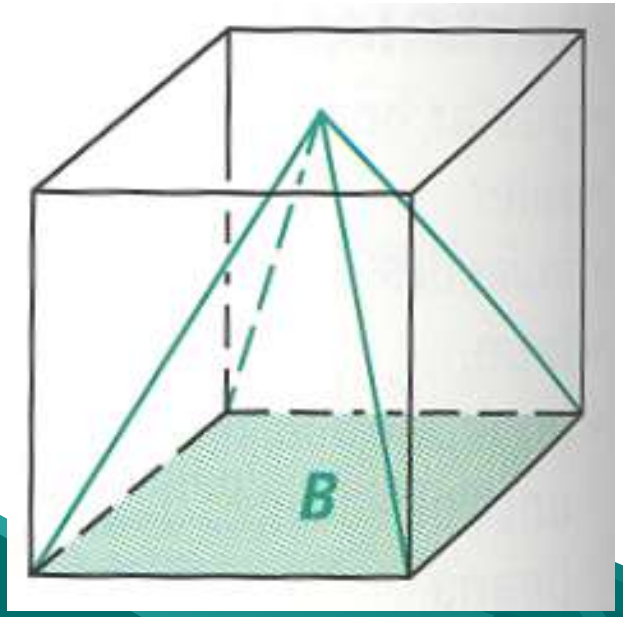
3. triangular prism: base area
312 ft^3

End of Day 4



Day 5

Volume of Pyramids



at Volume of a

l be less than that

h.

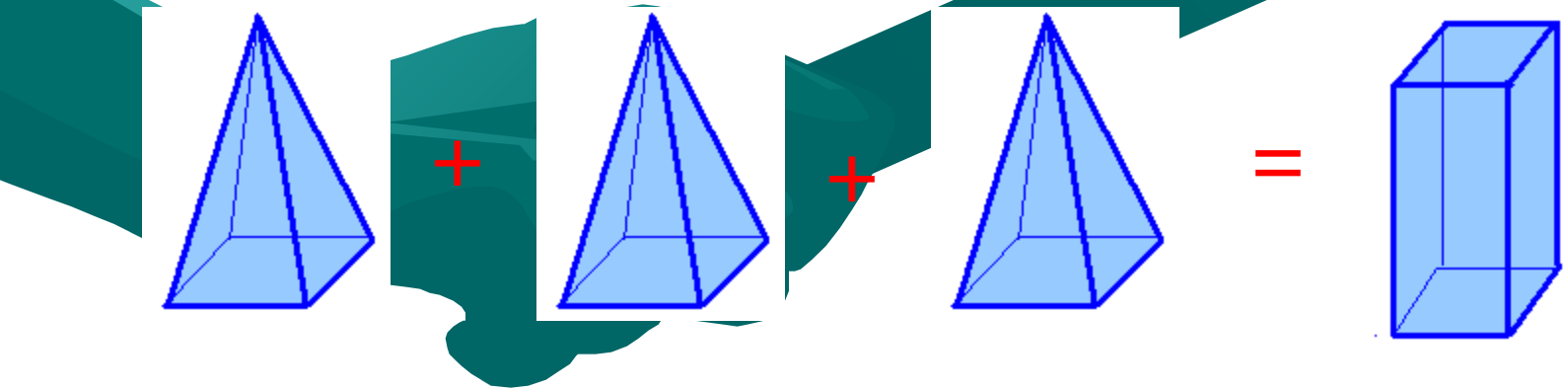
How muc

Volume of a Pyramid:

V = (1/3) Area of the Base x height

V = (1/3) Bh

Volume of a Pyramid = 1/3 x Volume of a Prism

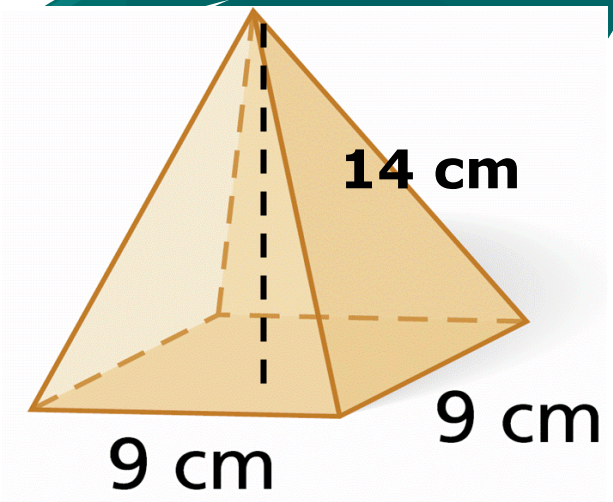


= 1/3 (9 x 9)(14)

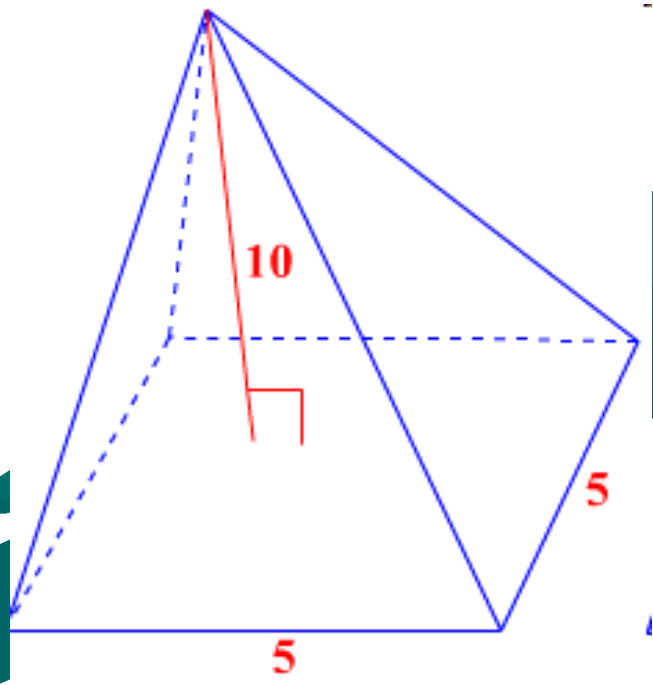
= 1/3 (81)(14)

= 1/3 (1134)

= 378 cm^3



Practice



55.33 units

Quiz

1.

2975 cm³

base edge leng

base de of 9 in

10 in.

360 in³

End of Day 5