A manufacturer produces preserving jars with a radius of 2 cm and a volume of 64 cm$^3$. He is asked to produce a new preserving jar similar to the first but capable of holding 125 cm$^3$.

What is the area of the base of the larger bottle?

A) $2.56\pi$ cm$^2$  
B) $5\pi$ cm$^2$  
C) $5.59\pi$ cm$^2$  
D) $6.25\pi$ cm$^2$

If rectangles A and B are similar, what is the area of rectangle B?

A) 7 cm$^2$  
B) 10 cm$^2$  
C) 28 cm$^2$  
D) 40 cm$^2$
3 A model 1.6 metres wide by 2.4 metres long is exactly similar to the future site of a planned real estate development.

If the site is 72 m wide, what is its area?

A) 108 m²  
B) 360 m²  
C) 5184 m²  
D) 7776 m²

4 A slide measuring 20 mm by 35 mm is projected onto a screen. The image thus projected measures 4 m by 7 m. There is a flag on the slide whose area is 1 cm².

What is the area of the image of the flag on the screen?

A) 2000 cm²  
B) 4000 cm²  
C) 20000 cm²  
D) 40000 cm²

5 The ratio of the perimeters of two similar rectangles is \( \frac{1}{4} \).

What is the ratio of the areas of these rectangles?

A) \( \frac{1}{16} \)  
B) \( \frac{1}{8} \)  
C) \( \frac{1}{4} \)  
D) \( \frac{1}{2} \)

6 The ratio of the areas of two regular hexagons (6 sides) is \( \frac{9}{16} \).

One side of the small hexagon measures 6 m.

What is the perimeter of the large hexagon?
The containers shown below are similar cylinders used in the kitchen.

The ratio of their volumes is \( \frac{1}{8} \).

The heights of the cylinders are 20 cm and 40 cm respectively.

What is the ratio \( \frac{r}{R} \) of their radii?

A child has two beach balls. The volume of ball B is 27 times greater than that of ball A.

What is the ratio of the radius of ball A to that of ball B?

A) \( \frac{1}{27} \)  
B) \( \frac{1}{8} \)  
C) \( \frac{1}{3} \)  
D) \( \frac{1}{2} \)
9. If the ratio of the volumes of two cubes is $\frac{8}{27}$, what is the ratio of the lengths of their sides?

10. The ratio of the areas of two similar prisms is $\frac{1}{64}$. What is the ratio of their volumes?

A) $\left(\frac{1}{64}\right)^3$  
B) $\left(\frac{1}{8}\right)^3$  
C) $\frac{1}{8}$  
D) $\frac{1}{4}$

11. Two cylindrical glasses are similar. The first has a height of 18 cm and can hold 1800 cm$^3$ of liquid. The second can hold 225 cm$^3$ of liquid.

What is the height of the second glass?

A) 2.25 cm  
B) 4.50 cm  
C) 5 cm  
D) 9 cm
An Olympic athlete warms up for the javelin throw by throwing 2 balls full of sand. The large ball contains 8 times as much sand as the small one.

What is the ratio of the radius of the small ball to that of the large ball?

A) \( \frac{1}{2} \)  
B) \( \frac{1}{4} \)  
C) \( \frac{1}{8} \)  
D) \( \frac{1}{16} \)

To connect electric wire to Hydro poles, conic insulators of different sizes are used.

If the volume of insulator A is 8 times smaller than that of insulator B, what is the ratio of the height of insulator A to that of insulator B?

A) \( \frac{1}{4} \)  
B) \( \frac{1}{16} \)  
C) \( \frac{1}{8} \)  
D) \( \frac{1}{2} \)
The two columns supporting an observation platform are similar right prisms with square bases. The height of the smaller column is 4 m and the measure of one side of its base is 0.2 m. The height of the larger column is 6 m.

The ratio of the measures of their heights is \( \frac{2}{3} \).

What is the volume of the large column?

A) 0.047 m\(^3\)  
B) 0.106 m\(^3\)  
C) 0.24 m\(^3\)  
D) 0.54 m\(^3\)

A company manufactures two cylindrical containers that are similar. The volume of one is 27 times greater than that of the other. The radius of the base of the small container is 6 cm.

What is the measure of the radius of the base of the large container?

A) 162 cm  
B) 54 cm  
C) 36 cm  
D) 18 cm
A large piece of metal with a volume of $3768 \text{ cm}^3$ is completely melted to produce small pieces. The large piece is in the shape of a cylinder and all the small pieces being produced are similar to it. The area of the base of the large piece is $314 \text{ cm}^2$ and that of each small piece is $78.5 \text{ cm}^2$.

How many small pieces can be produced from the large one?

A) 2  
B) 4  
C) 8  
D) 64

The ratio of the total areas of two similar cones is equal to $\frac{25}{64}$.

The radius of the smaller cone is 30 cm.

What is the radius of the larger cone, rounded to the nearest centimetre?

A) 19 cm  
B) 24 cm  
C) 48 cm  
D) 77 cm

Two rectangles are similar. The ratio of their areas is $\frac{1}{16}$.

What is the ratio of the corresponding sides?

A) $\frac{1}{256}$  
B) $\frac{1}{16}$  
C) $\frac{1}{8}$  
D) $\frac{1}{4}$
The ratio of the volumes of two similar cylinders is $\frac{125}{216}$. The radius of the smaller cylinder is 4 cm, and its height is 10 cm.

To the nearest cm², what is the lateral surface area of the larger cylinder?

Two cylindrical rods are similar. One of these rods is 1 m long and the diameter of its base is 4 cm. The volume of the other rod is $50\pi$ cm³.

Rounded to the nearest tenth of a centimetre, what is the length of the second rod?

A) 12.5 cm  
B) 31.5 cm  
C) 35.4 cm  
D) 50.0 cm

A cylinder and a right prism with a rectangular base are equivalent. The diameter of the base of the cylinder is 20 cm. The dimensions of the prism are 18 cm by 25 cm by 30 cm.

What is the height of the cylinder?

A company makes two similar cylindrical vases. The height of the smaller vase is 20 cm and its diameter is 10 cm. The total area of the larger vase is 4 times that of the smaller vase.

What is the volume of the larger vase to the nearest cubic centimetre?

A) 6283 cm³  
B) 12 566 cm³  
C) 25 133 cm³  
D) 50 265 cm³
The ratio of the areas of the bases of two similar cones is $\frac{1}{36}$.

Which of the following statements is true?

A) The ratio of the volumes is $\frac{1}{46656}$.

B) The ratio of the circumferences of the bases is $\frac{1}{36}$.

C) The ratio of the diameters of the bases is $\frac{1}{18}$.

D) The ratio of the slant heights is $\frac{1}{6}$.

A company manufactures loudspeakers in two sizes. Both models are similar prisms. The small speaker is 40 cm high and the area of its base is 250 cm$^2$. The area of the base of the large speaker is 490 cm$^2$.

What is the volume of the large speaker?

A) 14000 cm$^3$  
B) 19600 cm$^3$  
C) 27440 cm$^3$  
D) 38416 cm$^3$
A piece of metal 4800 cm\(^3\) in volume is melted down in order to make small pieces of metal similar to this large piece. The piece to be melted down is in the shape of a right circular cylinder 20 cm high. The height of each small piece is 5 cm.

What is the volume of each small piece?

A) 75 cm\(^3\)

B) 150 cm\(^3\)

C) 300 cm\(^3\)

D) 1200 cm\(^3\)

A sculpture is composed of two similar right circular cones.

The slant height of the larger cone is 36 cm.

The radius of the base of the smaller cone is 12 cm.

What is the total height of the sculpture to the nearest centimetre?
The two cylindrical food cans in the diagram below are similar. The diameter of the smaller can is equal to the radius of the larger can.

How many of these smaller cans could you fill with the contents of the larger can?

A) 2  C) 6
B) 4  D) 8

A sugar shack sells maple sugar cones. Each cone is in the shape of a right circular cone. The radius of the base of the cone is 2 cm.

Last year, 40 mL of maple sugar was required to fill a cone to the top.

This year, management decided not to fill the cones to the same level in order to save money. The maple sugar in the cones reaches a height that is 1 cm less than it was last year.

Note: 1 mL = 1 cm³

To the nearest tenth of a millilitre, how much maple sugar does each cone contain this year?
A block of modelling clay in the shape of a right prism measures 40 cm by 15 cm by 15 cm.

An artisan uses all this modelling clay to make two similar right pyramids. They each have a square base. Each edge of the base of the smaller pyramid measures 10 cm. The height of the smaller pyramid is 30 cm.

What is the height of the bigger pyramid?
Using the sand at the beach, David made two right pyramids with square bases. To do this, he filled a bucket with sand several times.

To build the smaller pyramid, David filled his bucket 8 times.
To build the larger pyramid, David filled his bucket 27 times.
The resulting pyramids are similar.
The height of the smaller pyramid is 30 cm.
The area of the base of the larger pyramid is 3969 cm$^2$.

How many cm$^3$ of sand does David's bucket hold?

The two pyramids illustrated below are similar. The area of the base of the larger pyramid is 882 cm$^2$ and its volume is 13 230 cm$^3$. The area of the base of the smaller pyramid is 98 cm$^2$.

What is the volume of the smaller pyramid?

A) 490 cm$^3$  
B) 980 cm$^3$  
C) 1470 cm$^3$  
D) 4410 cm$^3$
Answers:

26. 52 cm  27. D  28. 28.7 mL  29. 60 cm  30. 2205 cm³
31. A