Warm Up (Quick Review!)

1) $3^2 =$

2) $10^2 =$

3) $12^3 =$

4) $2^2 \times 2^3 =$

5) $2^2 + 2^3 =$

6) $\sqrt[3]{27}$

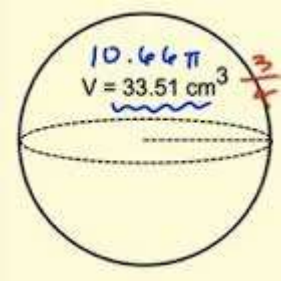
7) $\left(\sqrt{36}\right)^2$

8) $\sqrt{3 \times 75}$

Answers:

1) 9 2) 100 3) 1728 4) 32 5) 12 6) 3 7) 36 8) 15

SAMDEB Mind Tap



Find the missing value in the following:

1. The perimeter of a square is 36cm. What is the length of each side?
2. The area of a triangle is 80cm^2. If the base measures 10cm, what is the height?
3. Find the radius of a circle with area of 40.2mm^2.

#learning

Today we will calculate the missing measure of 3-D objects.

So that we can work backwards from surface area and volume.

Keys to Success:

- Use the correct formula
- Substitute in all values that you know
- Use **opposite** operations to isolate the missing measure, using BEDMAS backwards **(SAMDEB)**

TEAM ACTIVITY

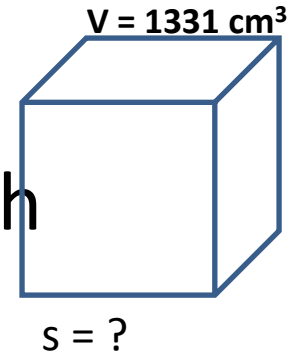
1. Write down the formula
2. Plug in what you know
3. Isolate the missing value by
   - ✓Working backwards using SAMDEB
   - ✓Using opposite operations

4. Try the example! ☺

Steps for Missing Measures

1. Write down the formula
2. Plug in what you know
3. Isolate the missing value by
   - ✓Working backwards using SAMDEB
   - ✓Using opposite operations

Example 1



What is the length of *one side* of a cube with a total volume of 1331 cm^3?

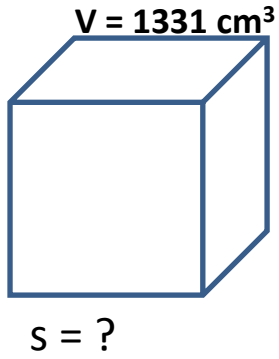
Step 1: *formula!* **$V = s^3$**

Step 2: *plug in what you know!* **$(1331) = s^3$**

Step 3: *do the* ***opposite*** of

cubing a number!

Back to our example



What is the length of *one side* of a cube with a total volume of 1331 cm^3?

Step 1: *formula!* **$V = s^3$**

Step 2: *plug in what you know!* **$(1331) = s^3$**

Step 3: *cube root both sides!*

$$\sqrt[3]{1331} = \sqrt[3]{s^3}$$

s = 11 cm

Example 2:

What is the length of a cube whose volume is 512 cm^3?

$$V = a^3$$

$$(512) = a^3$$

$$\sqrt[3]{512} = \sqrt[3]{a^3}$$

$$a = 8 \text{ cm}$$

Example 3

The volume of a sphere is 179.5 cm^3. What is its radius?

$$V = \frac{4\pi r^3}{3}$$

$$179.5 = \frac{4\pi r^3}{3}$$

$$(3)(179.5) = (3)\frac{4\pi r^3}{3}$$

$537 = 4\pi r^3$

$\div 4\pi \quad \div 4\pi$

$42.8 = r^3$

$$\sqrt[3]{42.8} = \sqrt[3]{r^3}$$

r = 3.5 cm

#learning

Today we will calculate the missing measure of 3-D objects.

So that we can work backwards if given surface area and volume.

Keys to Success:

- Use the correct formula
- Substitute numbers that you know
- Use BEDMAS backwards (**SAMDEB**)
- Use **opposite** operations to cancel
- Isolate the missing measure

Warm Up

1. If the total volume of a sphere is 120 cm^3, what is its radius?

2. If we know that the **lateral area** of a cylinder is 483 cm^2, and its radius measures 4cm, what is it's height?

Warm-Up Solutions

1. If the total volume of a sphere is 120 cm^3, what is its radius?

$$V = \frac{4\pi r^3}{3}$$

$$r = \sqrt[3]{\frac{3V}{4\pi}}$$

$$r = \sqrt[3]{\frac{3\ x\ 120}{4\ x\ 3.14}}$$

$$r = \sqrt[3]{\frac{360}{12.56}}$$

r = 3cm

Warm Up Solutions

2. If we know that the **lateral area** of a cylinder is 483 cm^2, and its radius measures 4cm, what is it's height?

$A_L = \pi rh$

$h = A_L \div \pi \div r$

$h = 483 \div 3.14 \div 4$

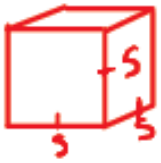
h = 38.5cm

WORK PERIOD

- ✓PAGE 115
- ✓116
- ✓Page 117 #5

REMINDER:

TAKE-HOME SITUATIONAL PROBLEM DUE MARCH 11TH – WORKBOOK, PAGE 102

Solid	Volume Formula	Missing Measure	Missing Measure
Cube 	$V = s^3$		Side length $s = \sqrt[3]{V}$
Cylinder 	$V = \pi r^2 h$	Radius $r = \sqrt{\frac{V}{\pi h}}$	Height $h = \frac{V}{\pi r^2}$
Cone 	$V = \frac{\pi r^2 h}{3}$	Radius $r = \sqrt{\frac{3V}{\pi h}}$	Height $h = \frac{3V}{\pi r^2}$
Regular Polygon Prism n = # of sides 	$V = \frac{nsah}{2}$	Side length $s = \frac{2V}{nsah}$	Height $h = \frac{2V}{nsa}$
Regular Polygon Pyramid 	$V = \frac{nsah}{6}$	Side length $s = \frac{6V}{nah}$	Height $h = \frac{6V}{nsa}$
Sphere 	$V = \frac{4}{3}\pi r^3$		Radius $r = \sqrt[3]{\frac{3V}{4\pi}}$

Two Options for Showing Work

Ex: Find the side length of a cube with a volume of $729mm^3$.

1. Rearrange formula 2. Substitute 3. Solve	1. Substitute 2. Rearrange 3. Solve
$V = s^3$	$V = s^3$
$s = \sqrt[3]{V}$	$729 = s^3$
$s = \sqrt[3]{729}$	$\sqrt[3]{729} = \sqrt[3]{s^3}$
$s = 9mm$	$s = 9mm$

Warm UP

The surface area of a cone is 219.8cm^2.

What is the slant height of the cone?

$SA = \pi r^2 + \pi rs$

219.8 = (3.14x 5 x 5) + (3.14 x 5 x s)

219.8 = 78.5 + 15.75s

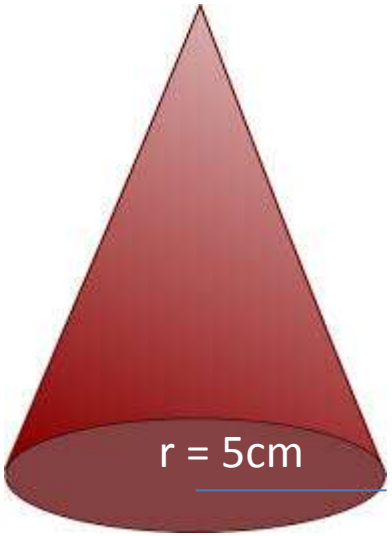
-78.5 -78.5

219.8 = 78.5 + 15.75s

141.3 = 15.75s

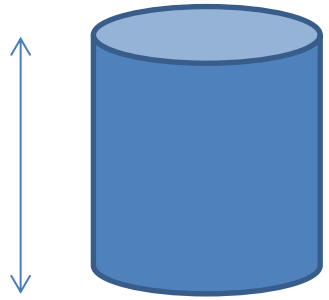
15.75 15.75

s = 8.97cm



Warm Up

The lateral area of a cylinder is 640.56mm^2.
What is the diameter?



$A_L = 2\pi rh$

640.56 = 2 x 3.14 x r x 17

r = 640.56 ÷ 2÷ 3.14 ÷ 17

r = 6mm

d = r x 2

d = 6 x 2

d = 12mm

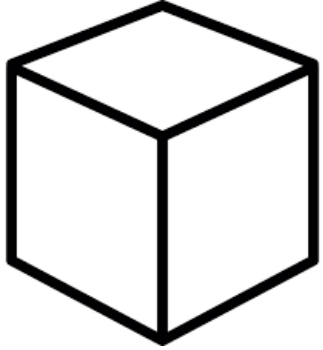
Quiz: Wednesday – Missing Measures

#learning

Today we will determine a missing measure using equivalent solids.

Keys to Success

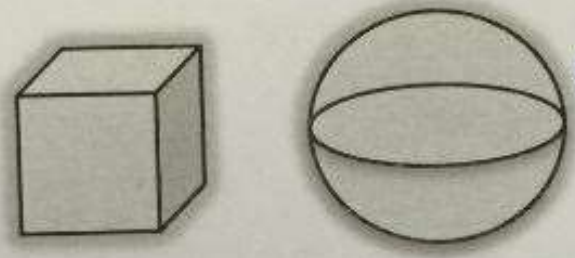
- Find the surface area or volume of one solid
- Use this to find a missing measure in an equivalent solid



Example 1

A cube and a sphere have the same volume. If the sphere's radius is 3cm, what is the cube's total area?

total area?



$r = 3\text{cm}$

12 d

$V_{sphere} = 4/3\,\pi r^3$

$= 4/3\,\pi(3)^3$

$V = 113.04\text{cm}^3$

Cube

$SA = 6s^2$

$= 6(4.84)^2$

$SA = 140.6\text{cm}^2$

Cube

$s = \sqrt[3]{V}$

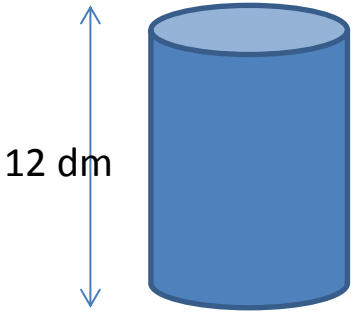
$= \sqrt[3]{113}$

$s = 4.84\text{cm}$

4)

Example 2

A cylinder and a cone have the same volume. What is the total area of the cylinder? The cone has a radius of 4dm and a height of 9dm.



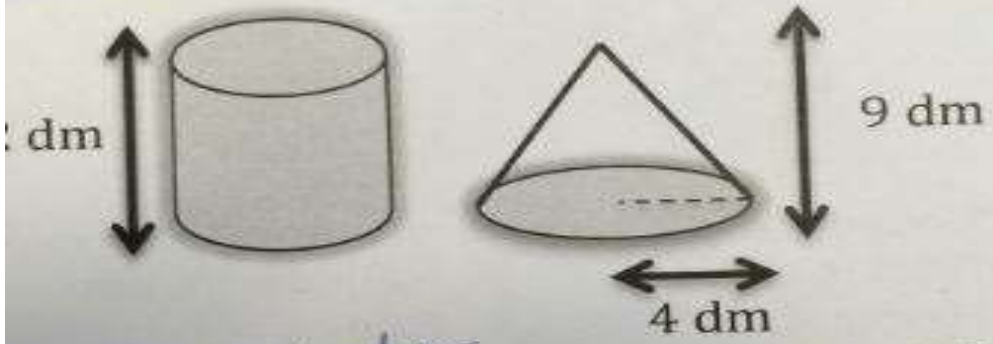
Cone $V = \pi r^2 h / 3$

$= 3.14 \times 4^2 \times 9 \div 3$

$V = 150.72\ dm^3$

Solids

A cylinder and a cone have the same
lume. What is the total area of the cylinder?



Cylinder

$r = \sqrt{\frac{V}{\pi h}}$

$= \sqrt{\frac{150.72}{12(3.14)}}$

$r = 2\ dm$

$A_T = 2\pi r^2 + 2\pi rh$

$= 2\pi(2)^2 + 2\pi(2)(9)$

$= 25.12 + 150.7$

$SA = 175.8\ dm^2$

) In LEVEL RED, Cube encounters the

Equivalent Solids Workout

1. Team Questions page 118 –#3 and 4
2. Destination Check
3. Page 119