

Chapter 9

Name	Picture
Angle	
Vertex	
Acute	
Obtuse	
Right	

Two angles are **COMPLEMENTARY ANGLES** if _____

Draw an example:

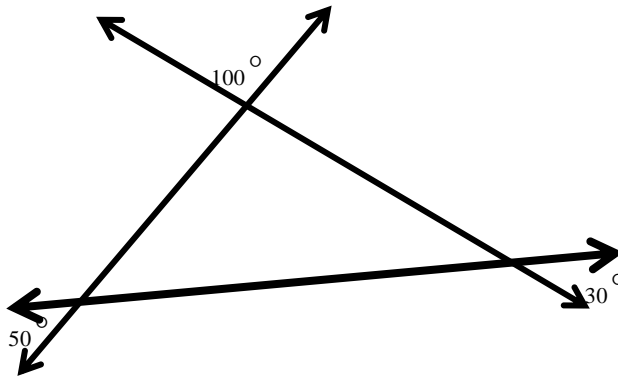
Two angles are **SUPPLEMENTARY ANGLES** if _____

Draw an example:

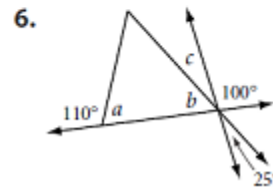
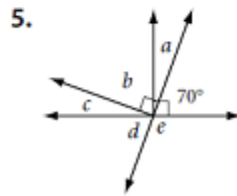
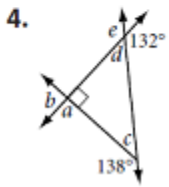
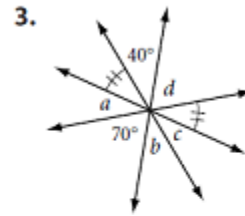
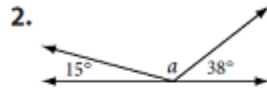
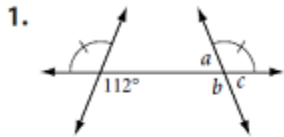
VERTICAL ANGLES

Draw an example:

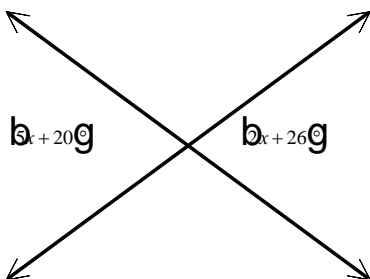
1. Find the missing angles.



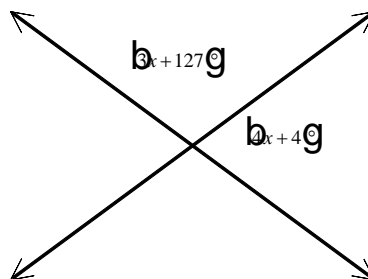
For Exercises 1–6, find each lettered angle measure without using a protractor.



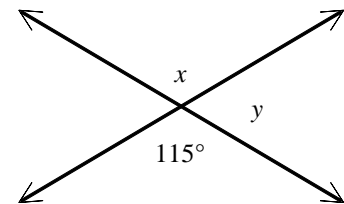
93. Solve for x .



94. Solve for x .



95. Find the values of x and y .



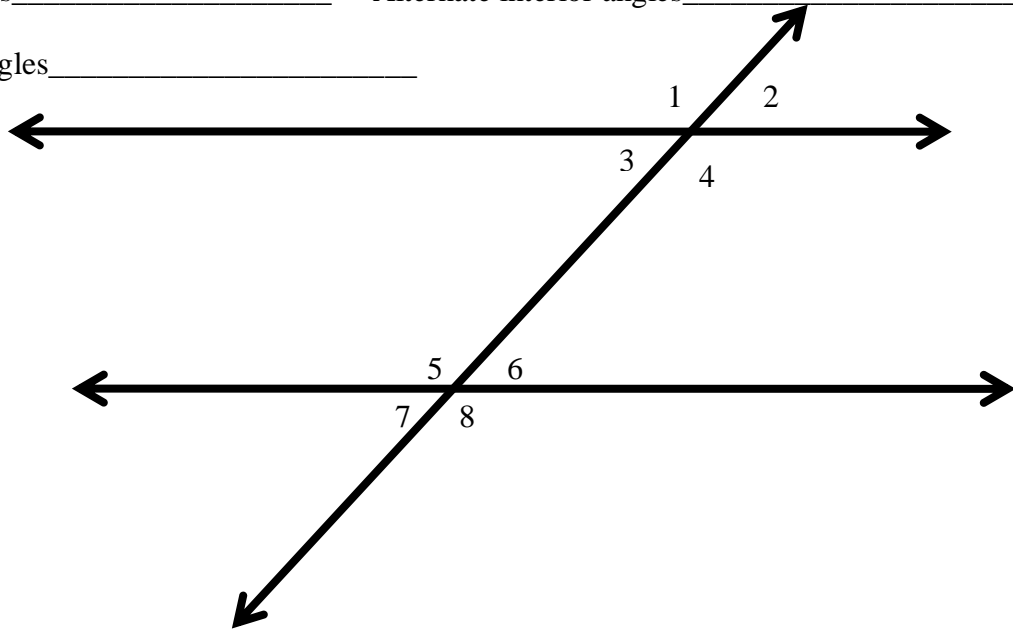
Two or more lines are _____ if and only if they are coplanar and do not intersect

A line intersecting two or more coplanar lines is called a _____

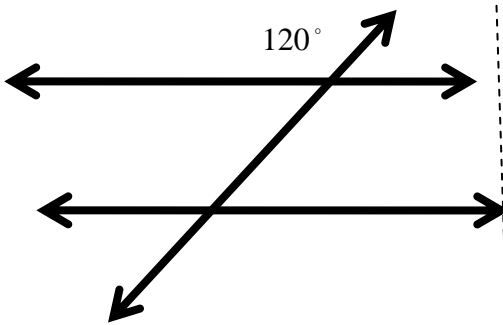
Using the picture below give one pair of:

Corresponding angles _____ Alternate interior angles _____

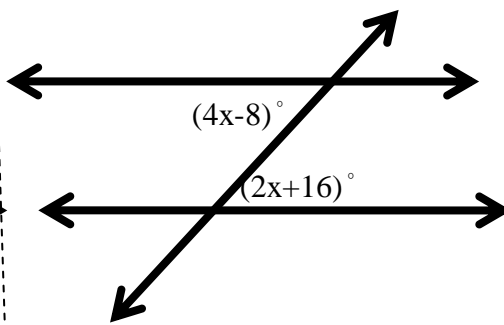
Alternate exterior angles _____



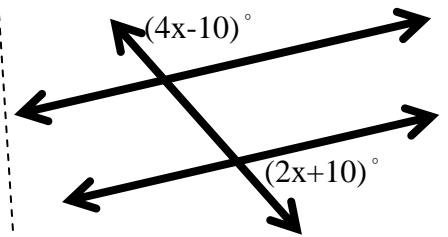
1) Find the missing angles



2) Find the missing angles

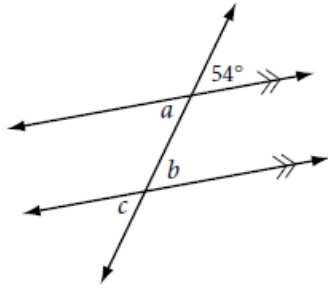


3) Find the missing angles

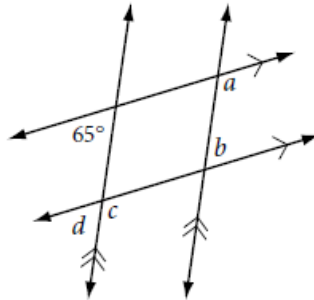


For Exercises 1–3, use your conjectures to find each angle measure.

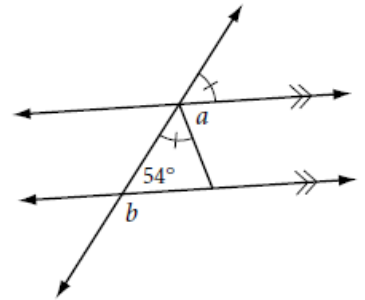
1.



2.

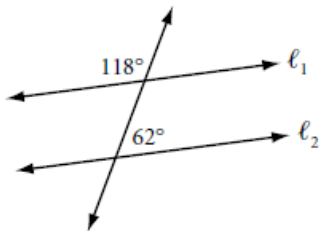


3.

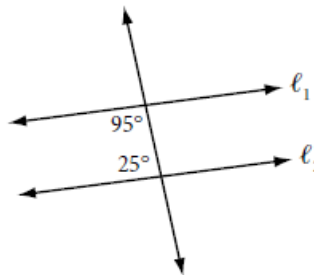


For Exercises 4–6, use your conjectures to determine whether $l_1 \parallel l_2$, and explain why. If not enough information is given, write “cannot be determined.”

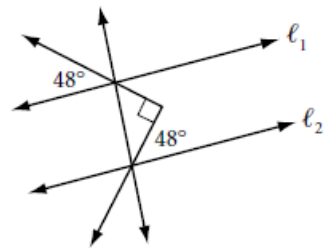
4.



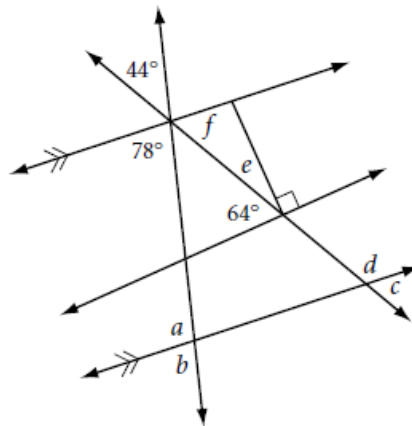
5.



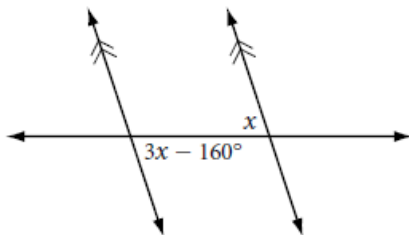
6.



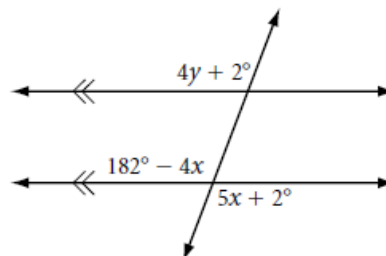
7. Find each angle measure.



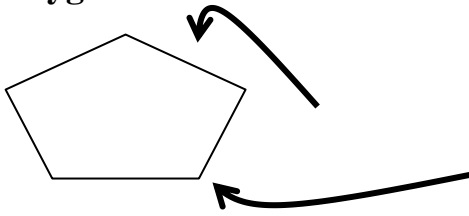
8. Find x .





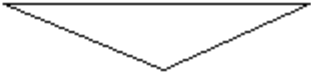
9. Find x and y .



Polygon--



Sides	Name	Sides	Name	Sides	Name
2		6		10	
3		7		11	
4		8		12	
5		9		p	

Name	Definition	Picture
Right triangle	A triangle with one right angle	
Acute triangle	A triangle where all angles are acute.	
Obtuse triangle	A triangle with one obtuse angle	
Scalene triangle	A triangle where no sides are equal	
Isosceles triangle	A triangle with at least two congruent sides	
Equilateral triangle	A triangle where all sides are congruent	

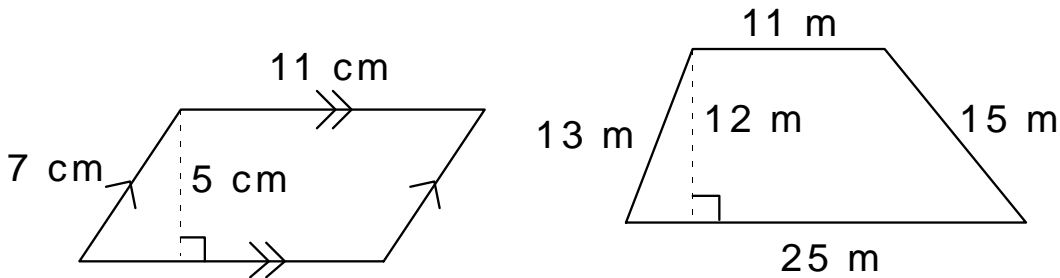
Perimeter-

Find the perimeter of a triangle with sides 3.5cm, 5.5cm, 3cm.

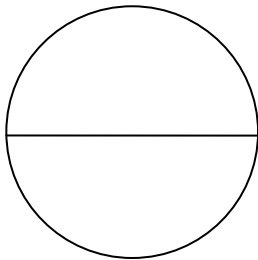
Find the perimeter of a rectangle with side 5.5 cm, by 10 cm.

Find the perimeter of a regular hexagon with side length 10 ft.

Find the perimeters of the following:



Circumference and diameter ratios [[Archimedes of Syracuse](#) (287-212 BC)]



$$\begin{aligned} \text{Circumference} &= 2\pi r \\ &\text{or} \\ C &= \pi d \end{aligned}$$

$$\text{Area} = \pi r^2$$

$\pi = \text{constant value of}$

[Ptolemy](#) (c. 150 AD) 3.1416

[Zu Chongzhi](#) (430-501 AD) $\frac{355}{113}$

[al-Khwarizmi](#) (c. 800) 3.1416

[al-Kashi](#) (c. 1430) 14 places

[Viète](#) (1540-1603) 9 places

[Roomen](#) (1561-1615) 17 places

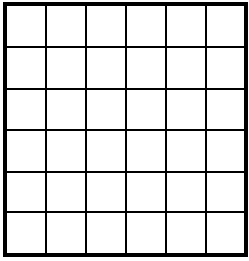
[Van Ceulen](#) (c. 1600) 35 places

$$r =$$

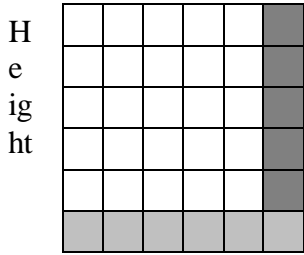
$$d =$$

1. Find the circumference of a circle with radius 5 in.
2. Find the circumference of a circle with a diameter of 14 feet.
3. Find the circumference of a circle with radius 10 cm.

Area= the number of unit squares in an object. (laying tile)



What is the area of this square?

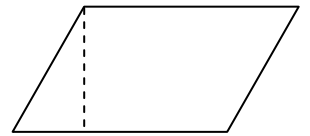


Base

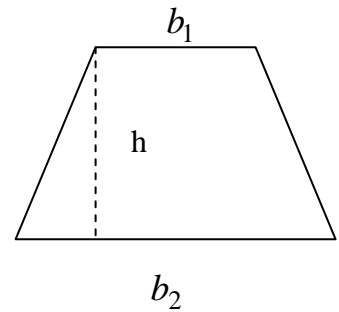
$$\text{Area} = \text{ ______ } \text{ Columns} \bullet \text{ ______ } \text{ Rows} = \text{ ______ }$$

$$\text{Area} = \text{Base} \bullet \text{Height}$$

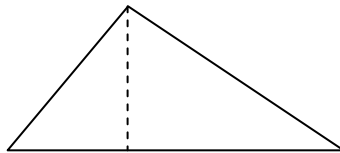
$$A_{\text{parallelogram}} = \textit{base} \cdot \textit{height} = bh$$



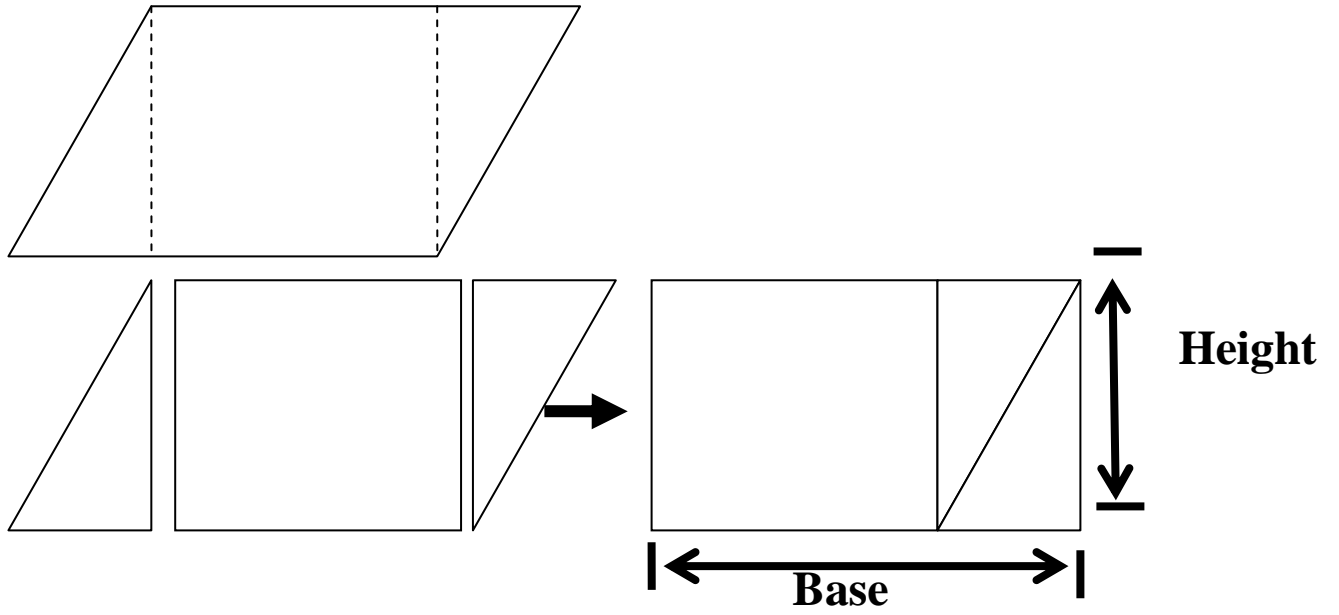
$$A_{\text{trapezoid}} = \frac{1}{2} h(b_1 + b_2)$$



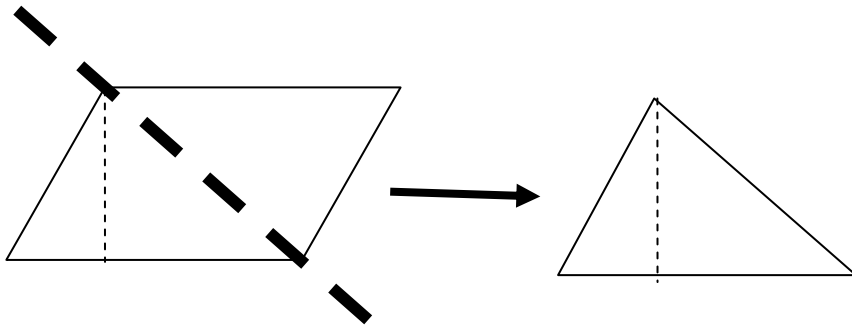
$$A_{\text{triangle}} = \frac{1}{2} \textit{base} \cdot \textit{height} = \frac{1}{2} bh$$



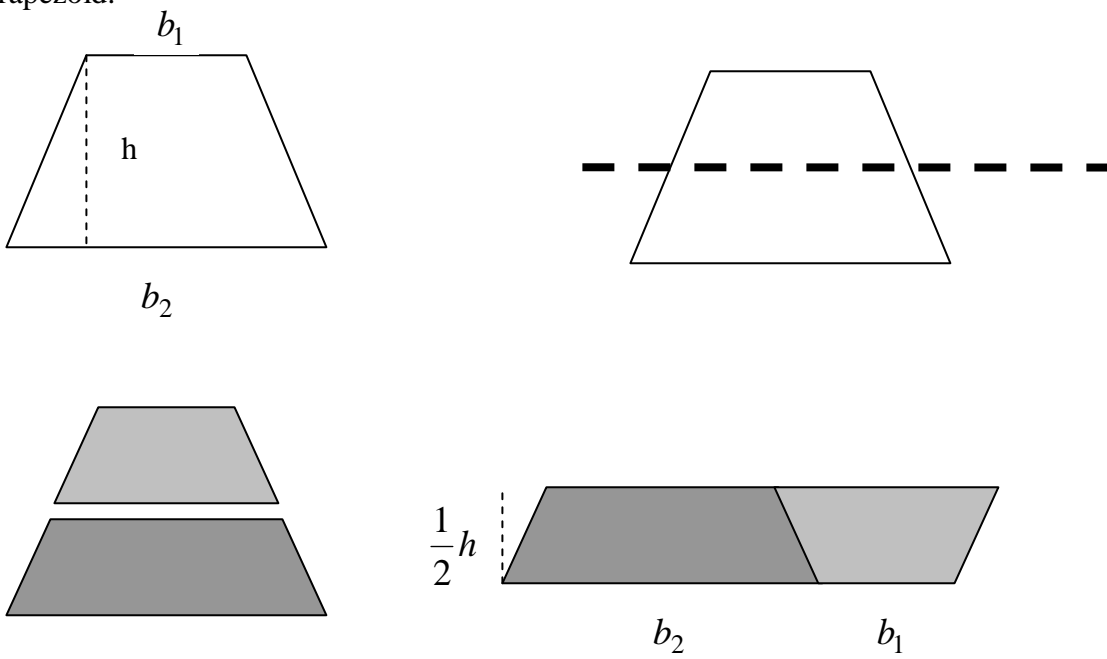
Parallelograms:



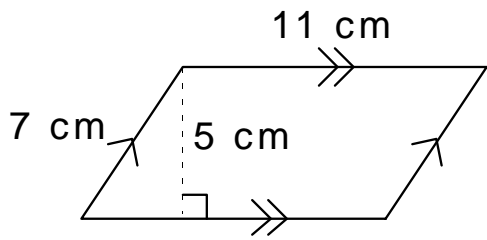
Triangle:



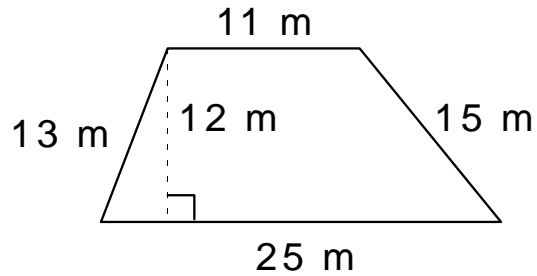
Trapezoid:



1. Area = _____

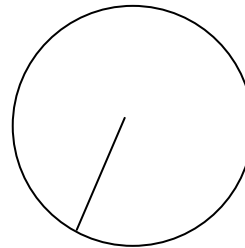


2. Area = _____



Area of a Circle

$$A_{\text{Circle}} = \pi r^2$$



Find the area of the circle with radius:

- a) 4cm b) 3.56 in c) 7 m d) 56 ft e) 5 mm

- How many feet of fencing should be purchased for a rectangular yard that is 18 ft long and 12 ft wide?
- How many square feet of sod should be purchased for the above yard?
- A rectangular room has a perimeter of 440 ft. If the width is 100ft, then what is the length of the room?
- The circumference of a circle is 8 cm. Find the diameter of the circle.
- A tricycle tire has a diameter of 12 inches. How many feet does the tricycle travel when the wheel makes 12 revolutions?
- an irrigation system waters a circular field that has a 50-foot radius. Find the area watered by the irrigation system. Give the exact value.

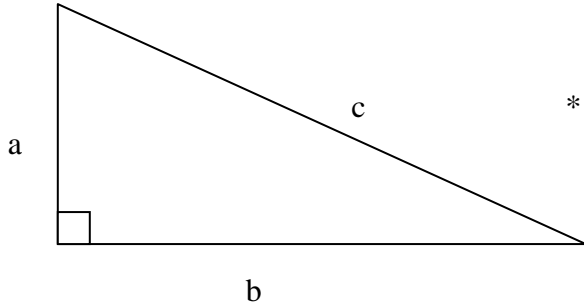
Solve:

a) $x^2 + 4 = 9$

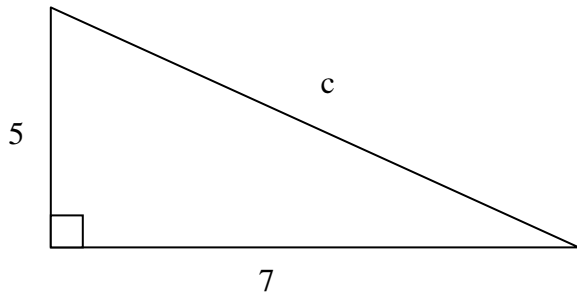
b) $16 + a^2 = 80$

c) $9 + 16 = c^2$

Pythagorean Theorem (right triangles)

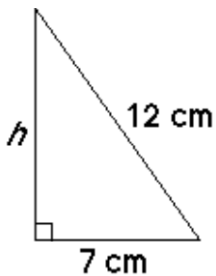


If a triangle is a right triangle then $a^2 + b^2 = c^2$
a, b are the legs
* **c is called the hypotenuse (side opposite the right angle)**
* **c is also the longest side**

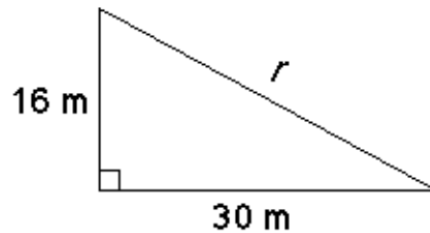


$$\begin{array}{c} a^2 + b^2 = c^2 \\ \downarrow \quad \downarrow \\ 5^2 + 7^2 = c^2 \end{array}$$

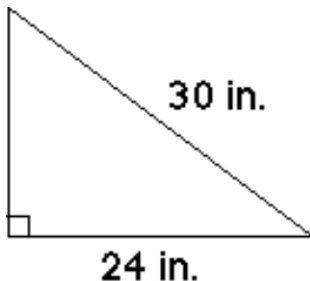
1. $h =$ _____



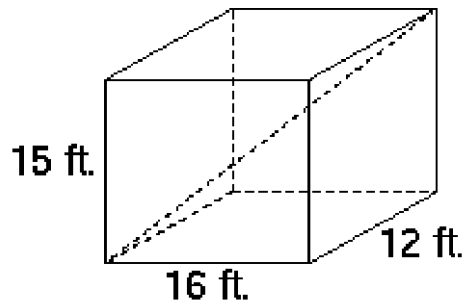
2. $r =$ _____



3. Find the area of the triangle. Area = _____

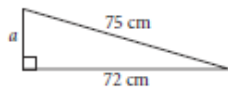


4. What is the length of the diagonal shown in the rectangular box below? Length = _____

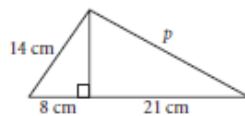


Give all answers rounded to the nearest 0.1 unit.

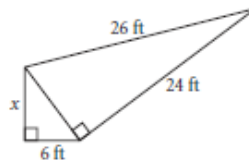
1. $a =$ _____



2. $p \approx$ _____

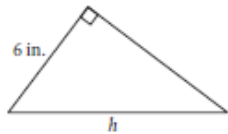


3. $x =$ _____

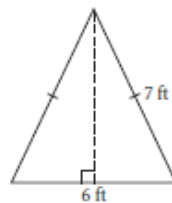


4. Area = 39 in^2

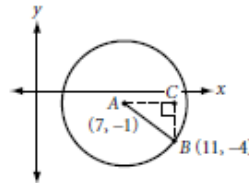
$h \approx$ _____



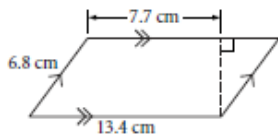
5. Find the area.



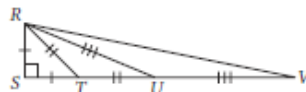
6. Find the coordinates of C and the radius of circle A.



7. Find the area.



8. $RS = 3 \text{ cm}$. Find RV .

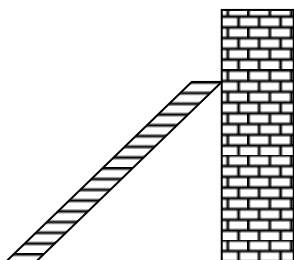


9. Base area = $16\pi \text{ cm}^2$ and slant height = 3 cm. What's wrong with this picture?



10. Given $\triangle PQR$, with $m\angle P = 90^\circ$, $PQ = 20 \text{ in.}$, and $PR = 15 \text{ in.}$, find the area of $\triangle PQR$, the length of the hypotenuse, and the altitude to the hypotenuse.

11) The foot of an extension ladder is 10 ft from a wall. The ladder is 2 ft longer than the height that it reaches on the wall. How far up the wall does the ladder reach? $h =$ _____



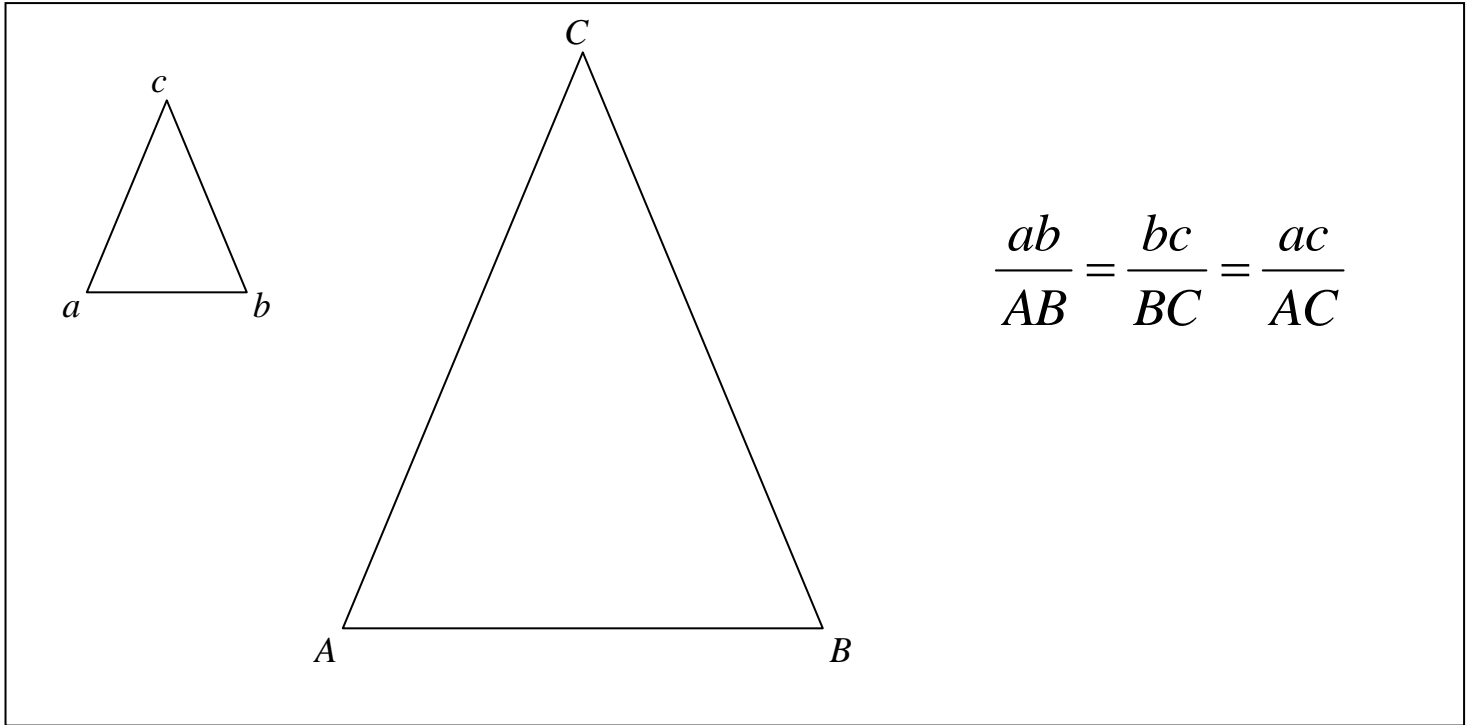
$$a^2 + b^2 = c^2$$

12) If you travel 18 miles east and then 12 mi north, how far are you from your starting point?

Two polygons are **similar polygons** if and only if

1) corresponding angles are congruent and 2) Corresponding sides are proportional

Must be both for two shapes to be similar.

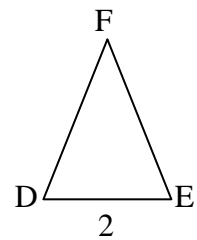
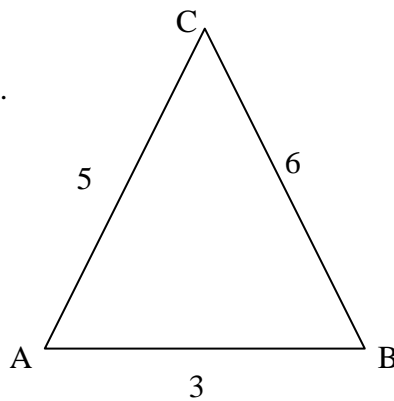


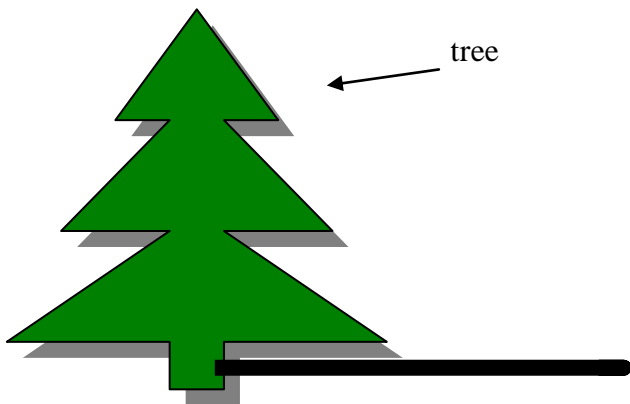
The symbol for **similar to** is \sim

1. $\triangle ABC \sim \triangle DEF$

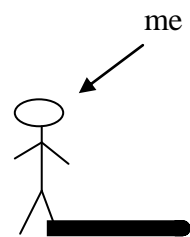
Find the dimensions of the remaining sides.

hint: since they are similar, they are proportional





$$\frac{\text{height of tree}}{\text{shadow of tree}} = \frac{\text{height of me}}{\text{shadow of me}}$$



$$\frac{h}{11'} = \frac{6'}{2.5'}$$

What is the height of the tree?

1. A massive dog casts a shadow of 10 ft. A nearby 40 ft building casts a 65 foot shadow. Approximately how tall is the dog?

2. A 1 inch tall roach casts a 2 inch shadow. At the same time a cat's shadow is 13 inches longer. How tall is the cat?

Area of a Parallelogram:

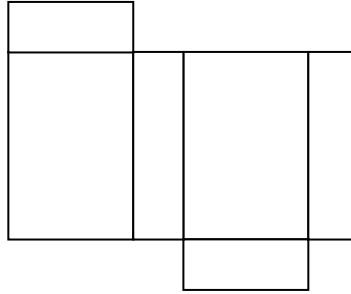
Area of a Triangle:

Area of a Trapezoid:

Area of a Circle:

Surface Area

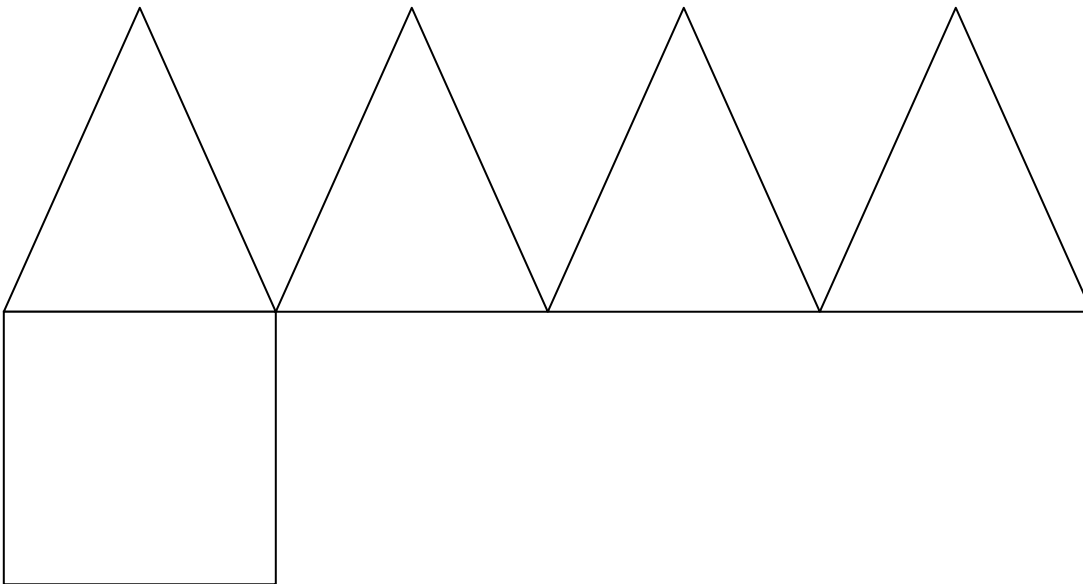
Draw the different rectangles separately.



How many of each type of rectangle do you see?

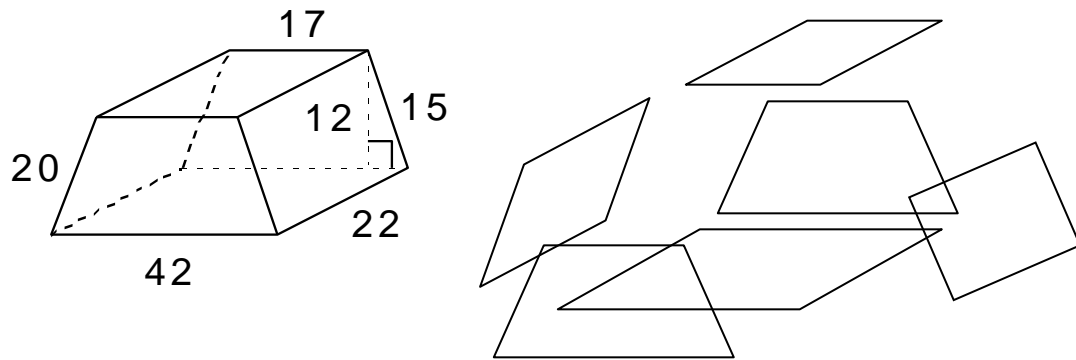
l = Slant height = _____

Cut out the following to make a square based pyramid:



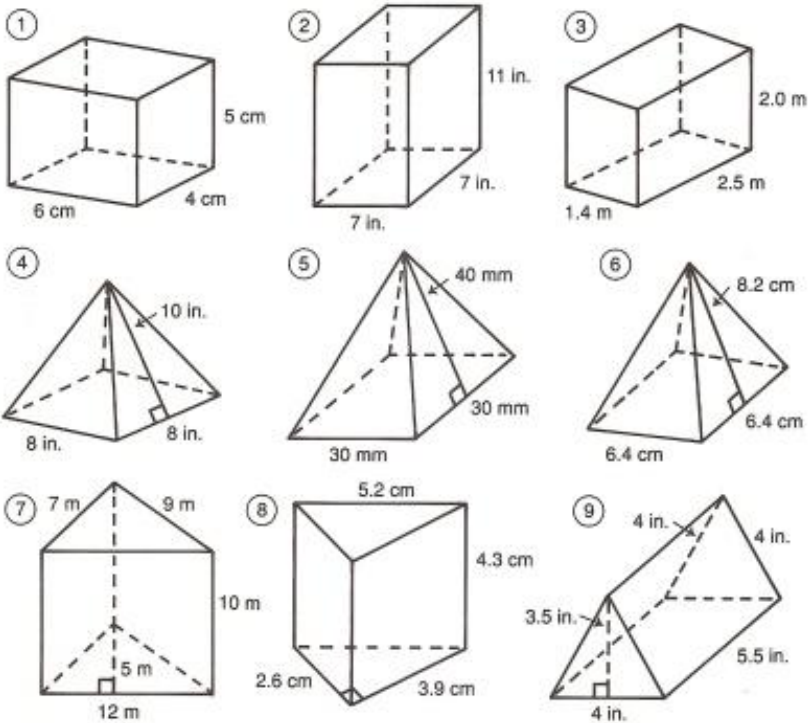
Total Surface Area of the square-based pyramid in mm=

1. Find the total surface area of the trapezoidal prism. Measurements are in meters. Surface area \approx _____




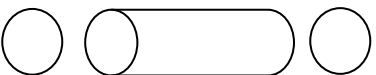
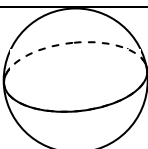
What Is Cold And Comes In Cans?

Find the surface area of each figure. Cross out the box containing each correct answer. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.



MU	RI	CH	OW	OP	FO	IL
340 m ²	224 in. ²	3,120 mm ²	148 cm ²	80 in. ²	3,300 mm ²	118 in. ²
IB	AR	CL	EA	CA	NS	KE
81.5 cm ²	22.6 m ²	60.45 cm ²	312 m ²	145.92 cm ²	25.8 m ²	406 in. ²

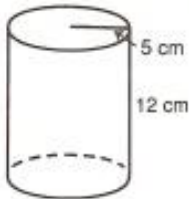
Special ones

	Picture of lateral surface and base / bases	Lateral Surface Area
Cylinder		$Surface\ area = 2\pi rh + 2\pi r^2$ 
Cone		
Sphere		$Surface\ area = 4\pi r^2$ $Surface\ area\ hemisphere = \underline{\hspace{2cm}}$

Why Did Humpty Dumpty Have a Great Fall?

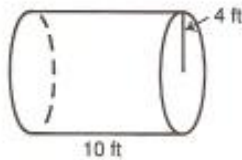
Do each exercise and find your answer in the answer column. Write the letter of the answer in each box containing the number of the exercise. Use 3.14 for π .

I. Find the lateral area and the total surface area of each cylinder.



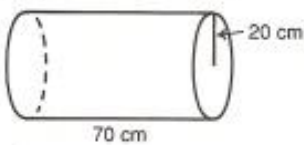
① lateral area: _____

② total area: _____



③ lateral area: _____

④ total area: _____



⑤ lateral area: _____

⑥ total area: _____



⑦ lateral area: _____

⑧ total area: _____

II. Find the total surface area of each cylinder.

⑨ $r = 3\text{ cm}$
 $h = 10\text{ cm}$

⑩ $r = 8\text{ in.}$
 $h = 8\text{ in.}$

⑪ $d = 10.8\text{ m}$
 $h = 2.6\text{ m}$

III. Solve.

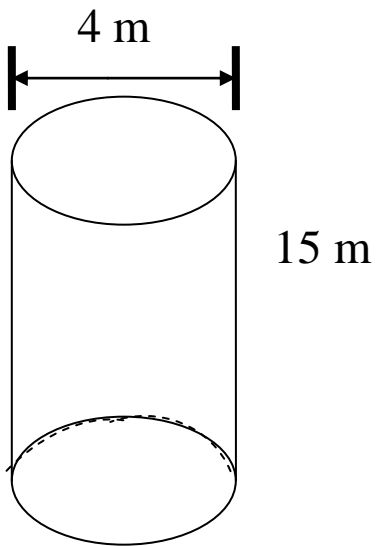
⑫ A can of tomato juice is a cylinder with a radius of 7.5 cm and a height of 20 cm. What is the area of the label around the can?

⑬ A steel oil tank is a cylinder with a diameter of 12 ft and a height of 18 ft. How many square feet of steel were needed to make the tank?

- Ⓐ 412.18 ft²
- Ⓑ 803.84 in.²
- Ⓒ 792.16 m²
- Ⓓ 251.2 ft²
- Ⓔ 904.32 ft²
- Ⓕ 861.6 cm²
- Ⓖ 367.38 m²
- Ⓗ 376.8 cm²
- Ⓙ 244.92 cm²
- Ⓚ 815.18 ft²
- Ⓛ 11,304 cm²
- Ⓜ 942 cm²
- Ⓝ 351.68 ft²
- Ⓟ 775.14 in.²
- Ⓡ 533.8 cm²
- Ⓛ 271.296 m²
- Ⓞ 876.06 m²
- Ⓡ 12,412 cm²
- Ⓢ 8,792 cm²
- Ⓜ 311.046 m²

3	8	13	11	6	4	2	9	5	8	10	11	12	11	1	7	2	13	13	4	10
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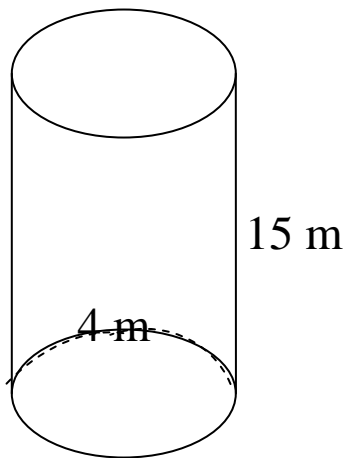
2. Surface Area=



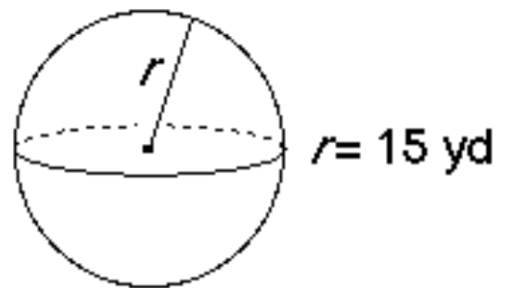
3. Find the surface area of a cone with slant height 8 and radius 3

4. Find the surface area of a square based pyramid with $l = 10$ m and a side of length 5 m

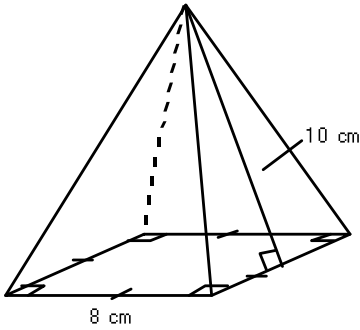
1. Surface Area=



2. Surface area = _____



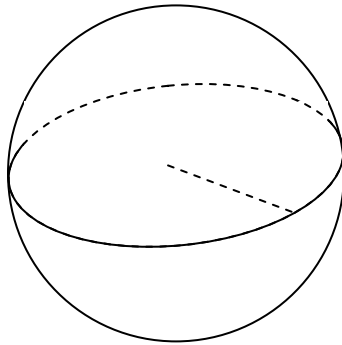
3. If it costs the \$25 for a gallon of paint and a gallon of paint covers 35 square feet. How much would it cost to paint the pyramid?



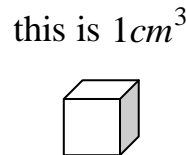
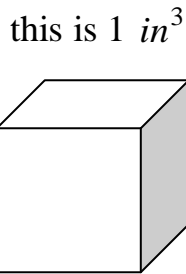
4. Find the surface area of the large pencil.



5. Surface area = ? radius = 5 inches.

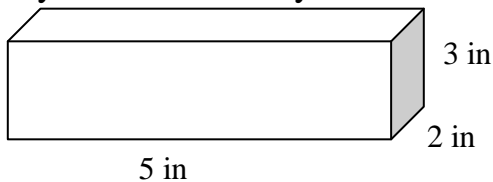


Volume is measure of the amount of space contained in a solid. (3 dimensional measure)
 Basically the number of unit cubes you can fit in a solid.

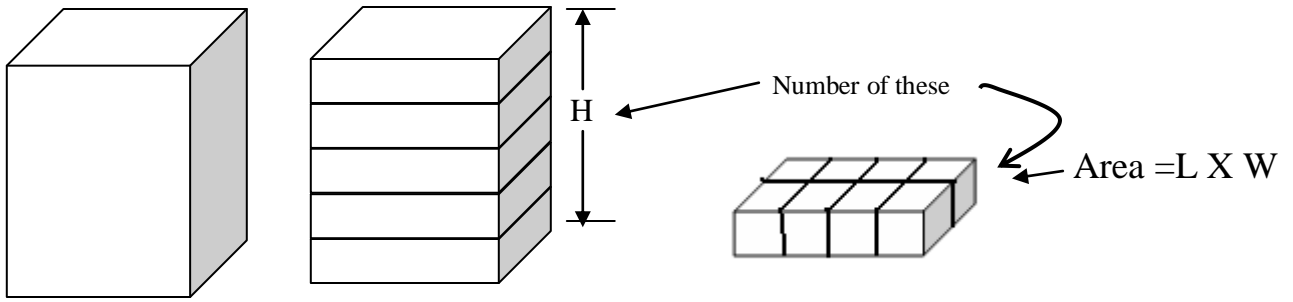


Why do we call the above a cubic inch and a cubic centimeter?

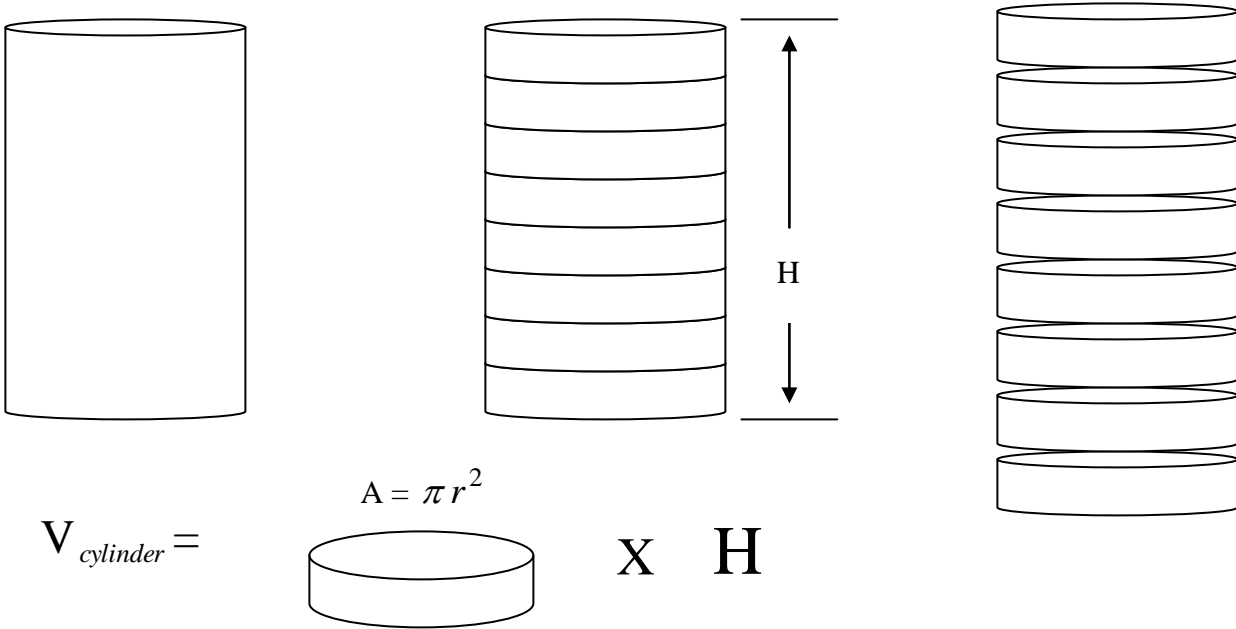
1. How many inch cubes can you fit in the shape below? I need you to draw it and use the inch cubes.



The volume of a Prism is $V_{Prism} = (\text{area of the base})(\text{height}) = BH$

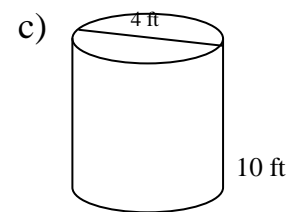
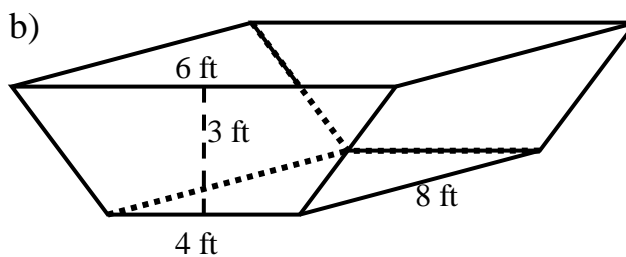
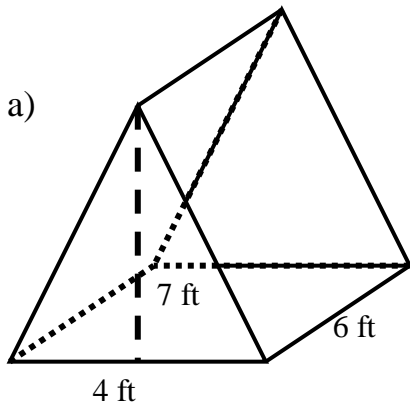


This works for cylinders as well.



$V_{cylinder} = (\text{area of the base})(\text{height}) = BH$

2. Find the volume of the prisms and cylinders.

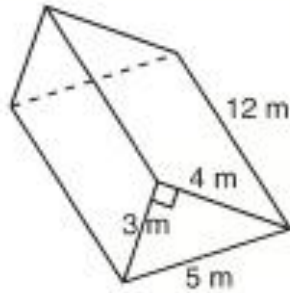


Volume of Right Prisms

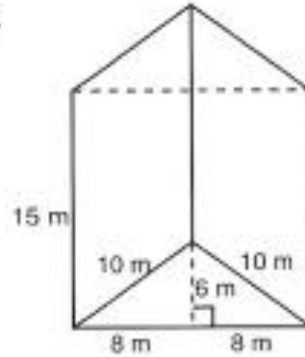
The volume of right prisms is found by multiplying the area of the base by the height of the prism.
Remember: The bases are the parallel faces of the prism.

Find the volume of the prisms described. Use your answers to reveal what Archimedes said upon discovering the principle of buoyancy in his bath.

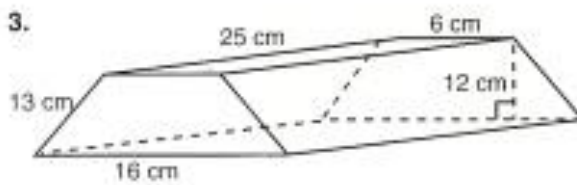
1.



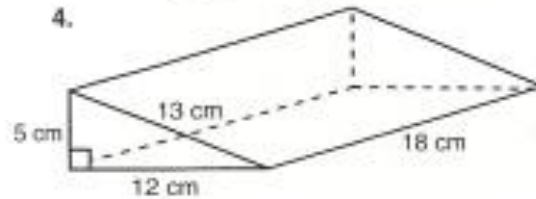
2.



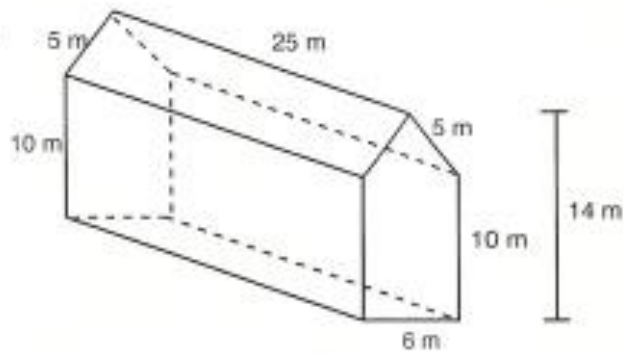
3.



4.



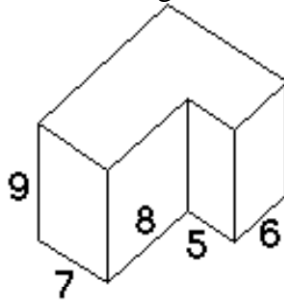
5.



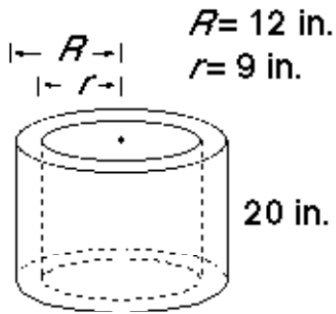
720 m ³	3300 cm ³	72 m ³	1800 m ³	540 cm ³
A	E	K	R	U

3 4 5 3 1 2

3. Find the volume. All angles are right angles. Measurements are in meters. Volume =



4. Find the volume between the cylinders. Volume = _____



5. If you cut a 2 inch square out of each corner of an $8\frac{1}{2} \times 11$ piece of paper (the lined paper in your folder) and fold it into a box leaving the top of the box open, then what is the volume of the box?

Volume of Pyramids and Cones

$$V_{\text{pyramid or cone}} = \frac{1}{3}(\text{area of the base})(\text{height}) = \frac{1}{3}BH$$