

6th Grade Math Unit 5-Geometry

Name: _____

Period: _____

Calendar:

Friday, November 30th <ul style="list-style-type: none"> Focus: Area of a parallelogram IXL Topic: FF.2 	Monday, December 3rd <ul style="list-style-type: none"> Focus: Area of a triangle IXL Topic: FF.3 	Tuesday, December 4th <ul style="list-style-type: none"> Focus: Area of a trapezoid IXL Topic: FF.4
Wednesday, December 5th <ul style="list-style-type: none"> Focus: Area of all shapes- Composite Area IXL Topic: FF.5, FF.6, FF.7, FF.8 	Thursday, December 6th <ul style="list-style-type: none"> Focus: Surface Area IXL Topic: FF.15 	Friday, December 7th <ul style="list-style-type: none"> Focus: Surface Area IXL Topic: FF.15
Monday, December 10th <ul style="list-style-type: none"> Focus: Volume IXL Topics: FF.14 	Tuesday, December 11th <ul style="list-style-type: none"> Focus: Volume/Project Explanation IXL Topics: FF.14 	Wednesday, December 12th <ul style="list-style-type: none"> Focus: Project IXL Topic: FF.2, FF.3, FF.4, F.5, FF.6, FF.7, FF.8, FF.14, FF.15
Thursday, December 13th <ul style="list-style-type: none"> Focus: Project IXL Topic: FF.2, FF.3, FF.4, F.5, FF.6, FF.7, FF.8, FF.14, FF.15 <p>(Ms. Rankin will not be at school today)</p>	Friday, December 14th <ul style="list-style-type: none"> Focus: Project IXL Topic: FF.2, FF.3, FF.4, F.5, FF.6, FF.7, FF.8, FF.14, FF.15 <p>(Ms. Rankin will not be at school today)</p>	<p>Unit 5 Project Due Today!</p> <p>The Unit 5 Project will count as an assessment (test) grade.</p> <p>Unit 5 Check Points Due Today!</p> <p>The unit 5 checkpoints will be averaged and count as a quiz grade.</p>

***If Lost, Please Return to: Ms. Rankin (Room-F106)**

Standards:

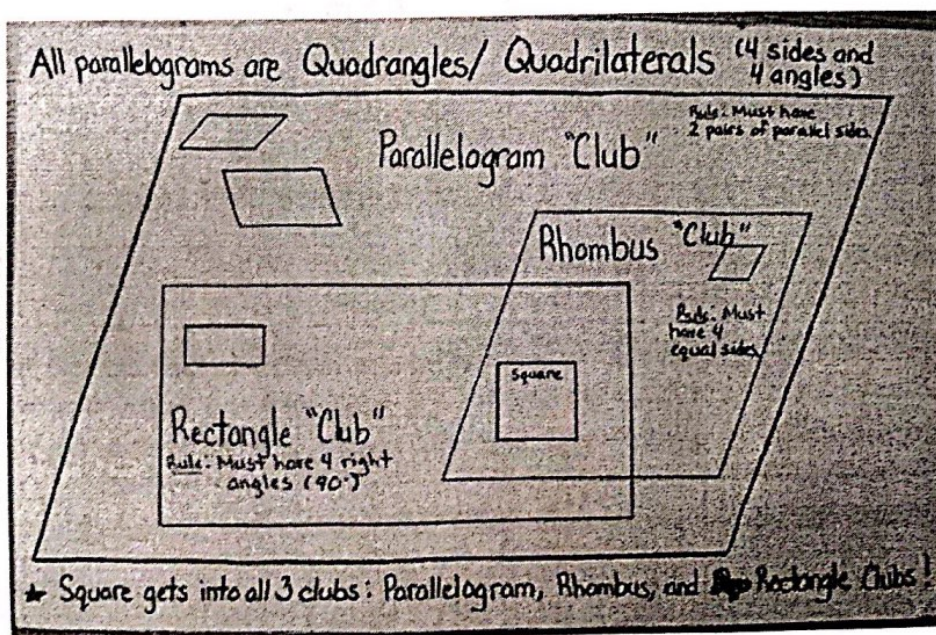
MGSE6.G.1 Find area of right triangles, other triangles, quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

MGSE6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths ($\frac{1}{2}$ u), and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = (\text{length}) \times (\text{width}) \times (\text{height})$ and $V = (\text{area of base}) \times (\text{height})$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

MGSE6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Essential Questions:

- How can we find the area of figures?
- How can we cut and rearrange irregular polygons in order to find their area?
- How can we use one figure to determine the area of another?
- How do we measure the area of a shape without a formula for that shape?
- How are the areas of geometric figures related to each other?
- How can I use manipulatives and nets to help compute the surface areas of rectangular and triangular prisms and pyramids?
- What kinds of problems can be solved using surface areas of rectangular and triangular prisms and pyramids?
 - How can I interpret and sketch views of rectangular and triangular prisms and pyramids?
 - How can I use formulas to determine the volume of right rectangular prisms?
 - How can I determine the appropriate units of measure that should be used when computing the volume and surface area of prisms?
- What kinds of problems can be solved using volumes of fundamental solid figures?
- In what ways can I measure the volume of a rectangular prism with fractional edge lengths?



Vocabulary Words:

- **2-Dimensional:** A shape that only has two dimensions (such as width and height) and no thickness.
- **3-Dimensional:** An object that has height, width and depth (thickness), like any object in the real world.
- **Area:** The number of square units it takes to completely fill a space or surface.
- **Bases of a Prism:** The two faces formed by congruent polygons that lie in parallel planes, all of the other faces being parallelograms.
- **Composing:** Composing is putting two or more geometric figures.
- **Cubic Units:** Volume of the solids is measured in Cubic Units.
- **Dimension:** a measure of spatial length; a linear measurement
- **Decomposing:** subdividing a polygon
- **Edge:** The intersection of a pair of faces in a three-dimensional figure.
- **Equilateral Triangle:** A triangle which has all three of its sides equal in length.
- **Face:** One of the polygons that makes up a polyhedron.
- **Fractional edge length:** The length of each edge of the cube is a fraction.
- **Isosceles Triangle:** A triangle which has two of its sides equal in length.
- **Kite:** A quadrilateral with two distinct pairs of equal adjacent sides. A kite-shaped figure.
- **Lateral Faces:** In a prism, a face that is not a base of the figure.
- **Net:** A two-dimensional figure that, when folded, forms the surfaces of a three dimensional object.
- **Parallelogram:** A quadrilateral with both pairs of opposite sides parallel.
- **Polygon:** A number of coplanar line segments, each connected end to end to form a closed shape. A regular polygon has all sides equal and all interior angles equal. An irregular polygon sides are not all the same length nor does the interior angles have the same measure.
- **Polyhedron:** A 3-dimensional figure that has polygons as faces.
- **Prism:** A polyhedron with two parallel and congruent faces, called bases, and all other faces that are parallelograms.
- **Quadrilaterals:** Four coplanar line segments linked end to end to create a closed figure. A 4-sided polygon.
- **Rectangle:** A 4-sided polygon where all interior angles are 90° .
- **Rectangular prism:** A solid (3-dimensional) object which has six faces that are rectangles.
- **Rhombus:** A quadrilateral with all four sides equal in length.
- **Right Triangle:** A triangle where one of its interior angles is a right angle (90 degrees).
- **Right rectangular prism:** In a right prism, the lateral faces are each perpendicular to the bases.
- **Scalene Triangle:** A triangle where all three sides are different in length.
- **Square:** A quadrilateral that has four right angles and four equal sides.
- **Surface area:** The total area of the 2-dimensional surfaces that make up a 3-dimensional object.
- **Trapezoid:** A quadrilateral which has at least one pair of parallel sides.
- **Triangles:** A closed figure consisting of three line segments linked end-to-end. A 3-sided polygon
- **Triangular prism:** A prism whose bases are triangles. A solid (3-dimensional) object what has five faces: three rectangles and two bases.
- **Vertices:** The common endpoint of two or more rays or line segments
- **Volume:** The amount of space occupied by an object.
- **Volume of a Prism:** The area of a base times the height. The number of cubic units to fill a prism.

Below are the formulas you may find useful as you take the test. However, you may find that you do not need to use all of the formulas. You may refer to this formula sheet as often as needed.

Perimeter The perimeter of a polygon is equal to the sum of the lengths of its sides.	Mean $\bar{x} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$
Area Triangle $A = \frac{1}{2}bh$ Rectangle $A = bh$ or $A = lw$	Interquartile Range $IQR = Q_3 - Q_1$ The difference between the first quartile and third quartile of a set of data.
Surface Area The total area of the 2-dimensional surfaces that make up a 3-dimensional object.	
Volume of Right Rectangular Prism $V = (\text{length})(\text{width})(\text{height})$ or $V = (\text{area of base})(\text{height})$	

Geometry Check Point Assessment:

Throughout Unit 5, you will be asked to complete various check points on Illuminate to track your mastery progress. At the end of the unit, these scores will be averaged to create an overall grade that will be counted as a quiz grade.

You can access each check point at www.bit.ly/epms1819

Topic:	Illuminate Access Code:	Score:
Area of Parallelogram	6W773K3	/100
Area of Triangle	VWEM6FC	/100
Area of Trapezoid	Z3CK5NW	/100
Composite Area	5CSPYZN	/100
Surface Area	M8B458H	/100
Volume	ES3AA9B	/100
Average Score		% _____

Steps For Finding The Area Of A Shape:

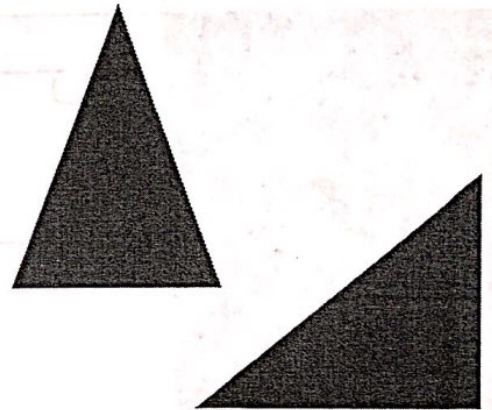
Parallelogram:

1. Identify the base and height
2. Multiply the base and height



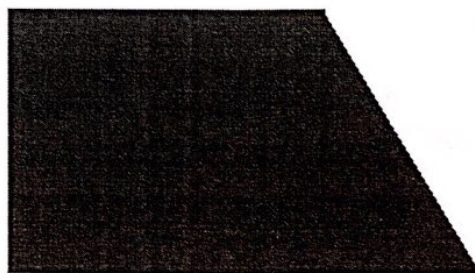
Triangle:

1. Identify the base and height
2. Multiply the base the height
3. Divide by 2



Trapezoid:

1. Identify base 1, base 2, and the height
2. Add both of the bases
3. Multiply the answer by the height
4. Divide your answer by 2

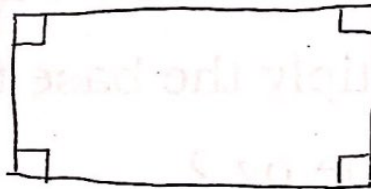
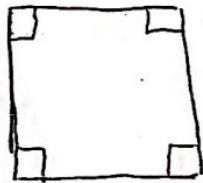


Area of Parallelograms

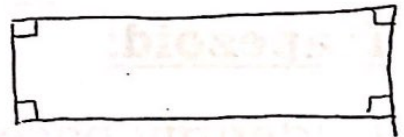
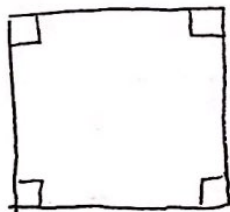
- Parallelograms are polygons with _____ sides and _____ sets of parallel sides
- _____, _____, and _____ are all parallelograms
- _____ is the number of square units it takes to cover a polygon (imagine tiles covering the space)

Box

1

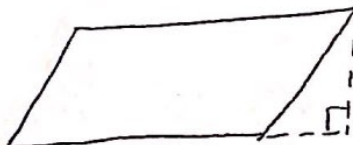
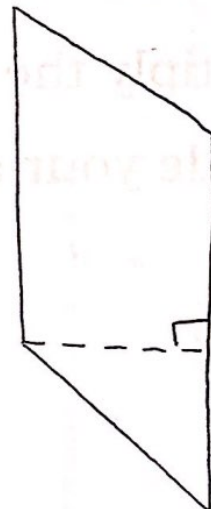
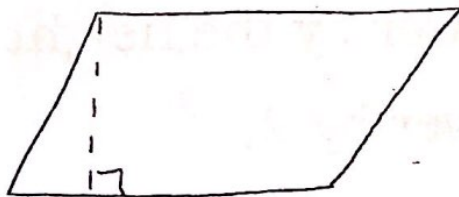


← this means right angle which is 90°



Box

2

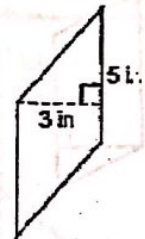
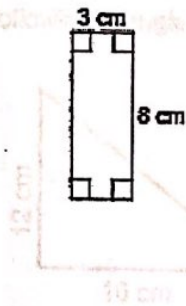
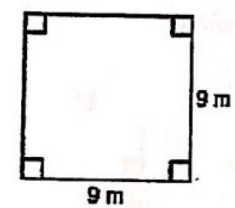


This means that to find the area of the parallelogram (the number of square units needed to cover the figure) we multiply base times height

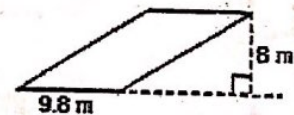
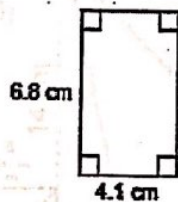
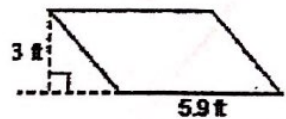
$$\text{Area of a Parallelogram} = \text{Base} \cdot \text{Height}$$

Sample problems: Find the area of each parallelogram

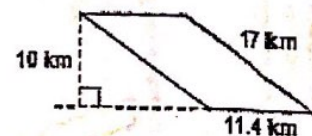
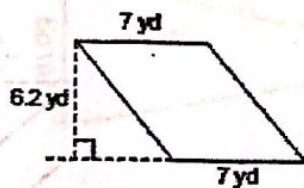
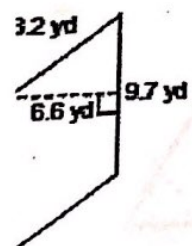
Level 1:



Level 2:



Level 3:



Lesson Summary

The formula to calculate the area of a parallelogram is $A = bh$, where b represents the base and h represents the height of the parallelogram.

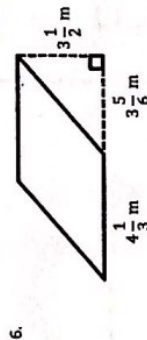
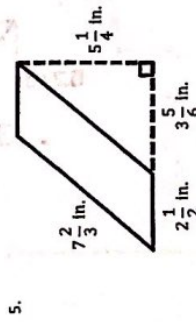
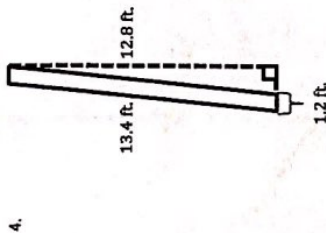
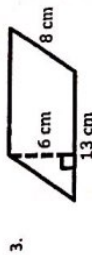
The height of a parallelogram is the line segment perpendicular to the base. The height is usually drawn from a vertex that is opposite the base.

Problem Set

Draw and label the height of each parallelogram.

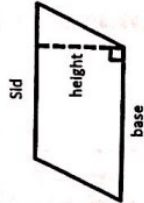


Calculate the area of each parallelogram. The figures are not drawn to scale.



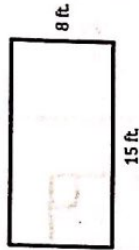
3

7. Brittany and Sid were both asked to draw the height of a parallelogram. Their answers are below.



Are both Brittany and Sid correct? If not, who is correct? Explain your answer.

8. Do the rectangle and parallelogram below have the same area? Explain why or why not.



9. A parallelogram has an area of 20.3 cm^2 and a base of 2.5 cm . Write an equation that relates the area to the base and height, h . Solve the equation to determine the height of the parallelogram.

AREA OF TRIANGLES

To find the area of any triangle, simply multiply the base and the height of the triangle together. Take the resulting product and divide by two.

We can use the following formula to calculate the area of any triangle.

$$\text{Area} = \frac{b \cdot h}{2}$$

Example: $\text{Area} = \frac{b \cdot h}{2}$

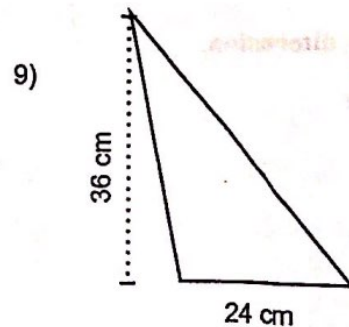
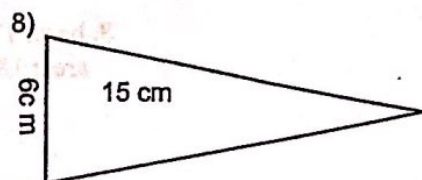
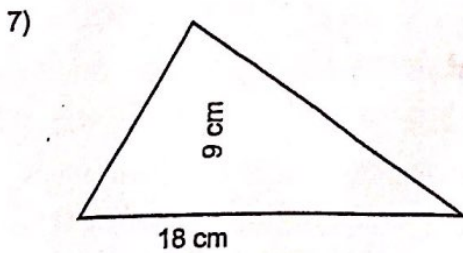
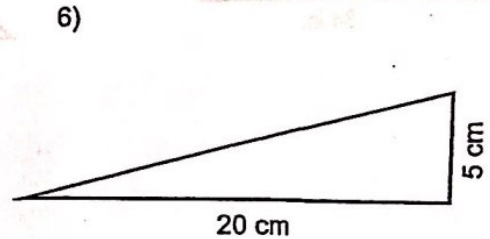
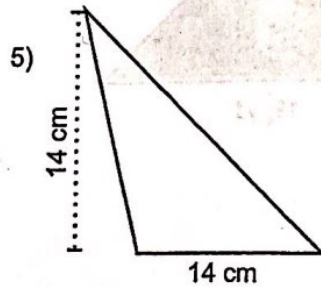
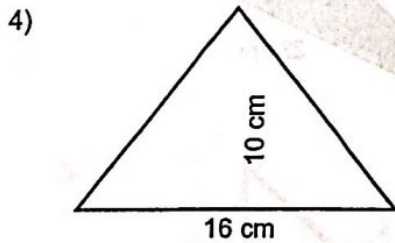
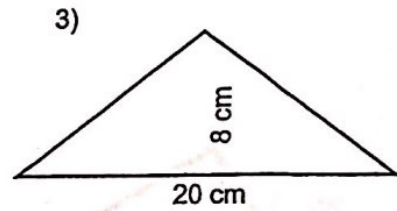
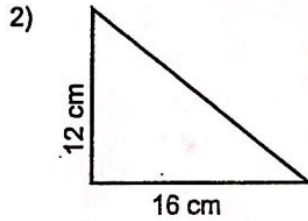
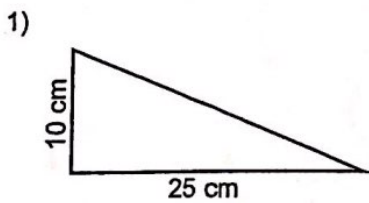
$$\text{Area} = \frac{2 \cdot 5}{2}$$

$$\text{Area} = \frac{10}{2}$$

$$\text{Area} = 5 \text{ cm}^2$$

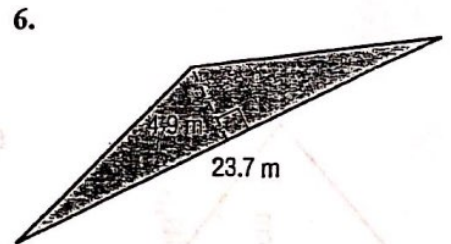
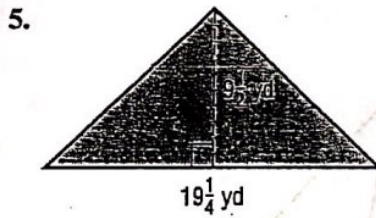
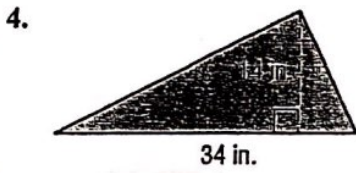
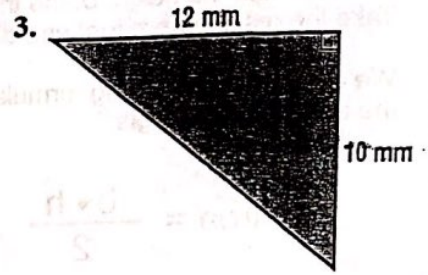
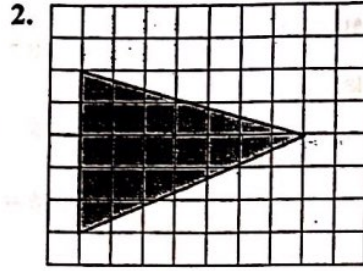
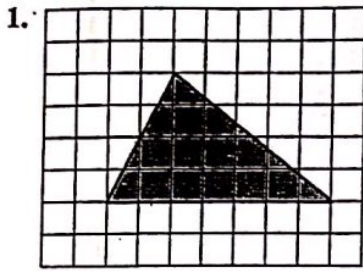


Directions: Find the area of each of the following triangles. Show your work like the example given above.



Homework Practice: Area of Triangles

Find the area of each triangle.



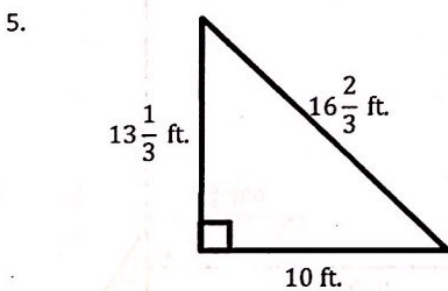
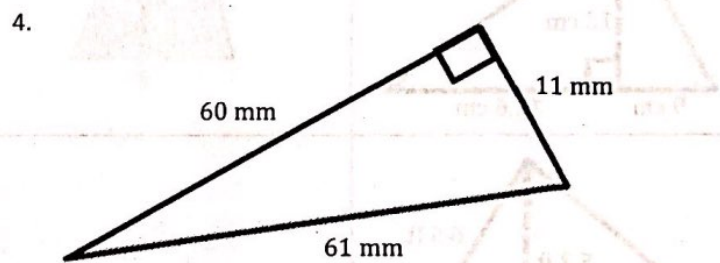
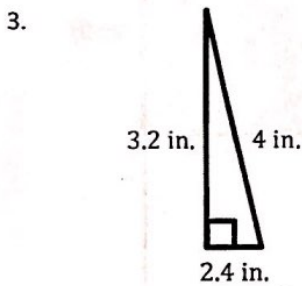
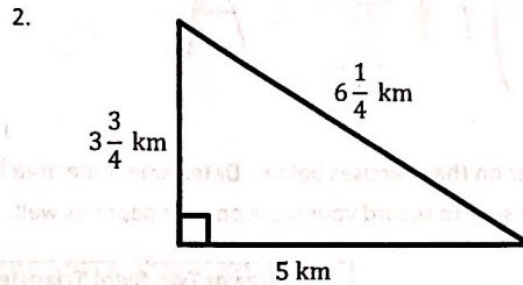
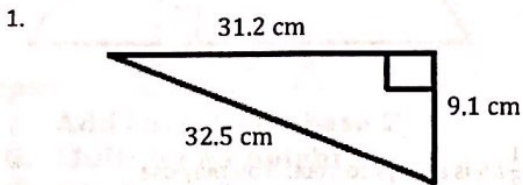
Find the missing dimension.

7. height: 15 ft
area: 285 ft²

8. base: 17 cm
area: 18.7 cm²

Problem Set

Calculate the area of each right triangle below. Note that the figures are not drawn to scale.



Lesson 3: The Area of Acute Triangles Using Height and Base

Classwork

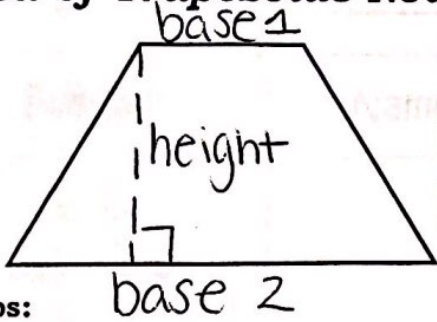
Exercises

- Work with a partner on the exercises below. Determine if the area formula $A = \frac{1}{2}bh$ is always correct. You may use a calculator, but be sure to record your work on your paper as well. Figures are not drawn to scale.

	Area of Two Right Triangles	Area of Entire Triangle

7

Area of Trapezoids Notes



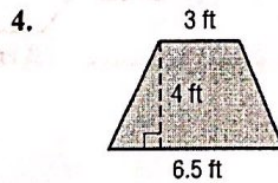
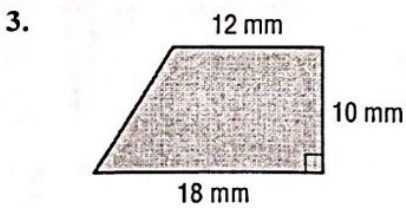
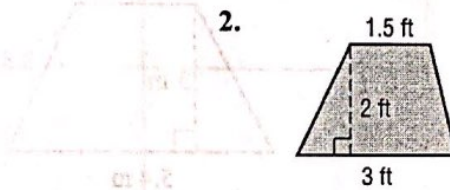
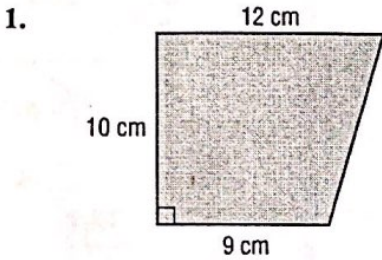
How To Write The Area Formula:

$$A = \frac{1}{2} h (b_1 + b_2)$$

Steps:

1. Add base 1 and base 2
2. Multiply by height
3. Divide by 2

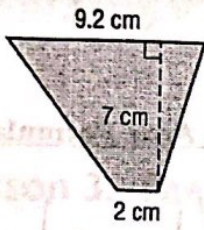
Find the area of each figure. Round to the nearest tenth if necessary.



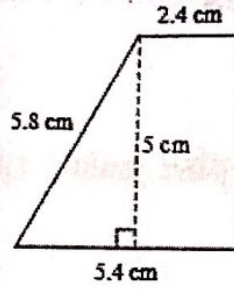
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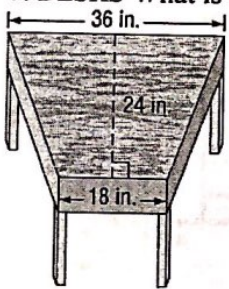
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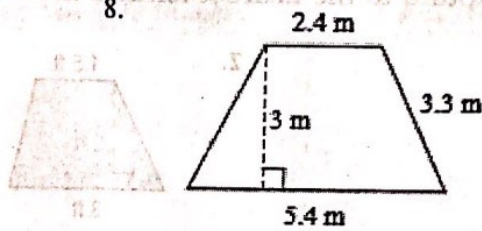
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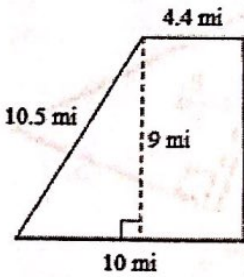
7. DESKS What is the area of the top of the desk shown?



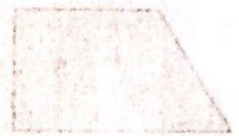
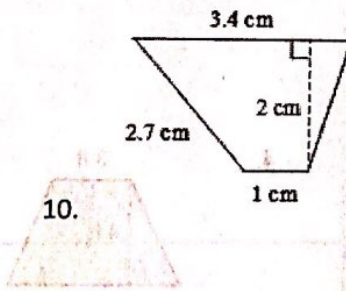
8.



9.



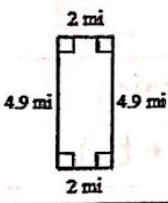
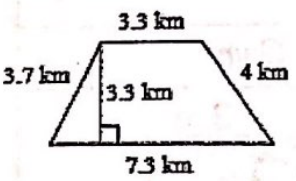
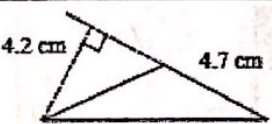
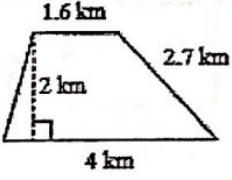
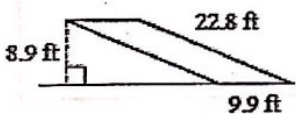
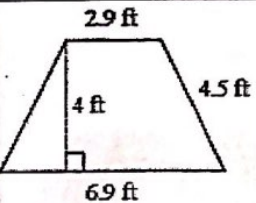
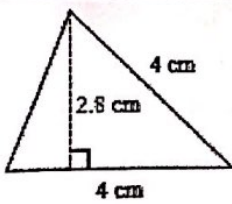
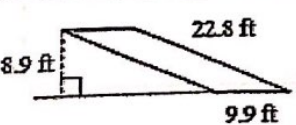
10.



Practicing Area B

Name: _____

Date: _____

Polygon	Name	Area Formula	Substitution	Area with Units
				
				
				
				
				
				
				
				

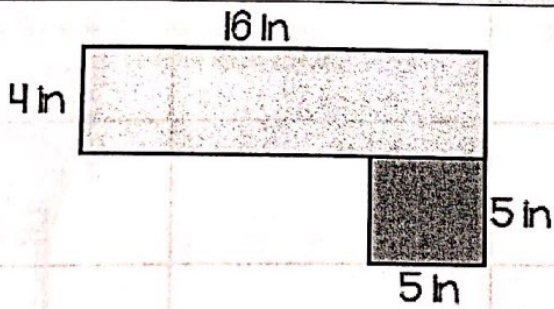
A **composite figure** is a figure made up of two or more two-dimensional shapes. To find the composite area, break down the shape into smaller pieces. Then add the area of each shape together to find the total.

Parallelogram:
 $A = bh$

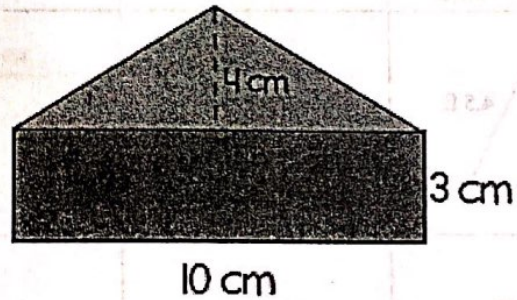
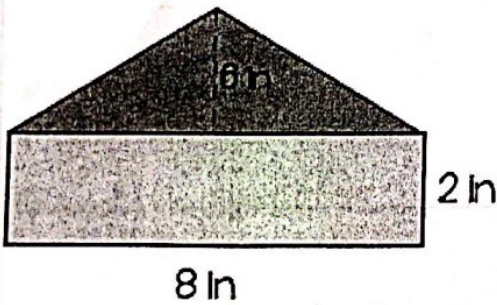
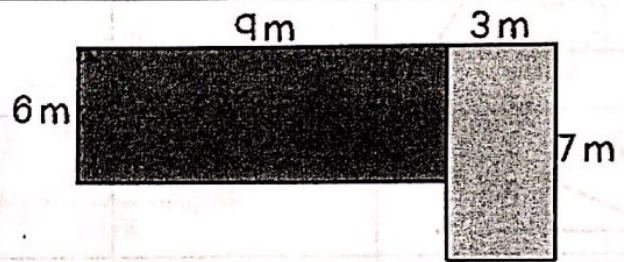
Triangle:
 $A = \frac{1}{2}bh$

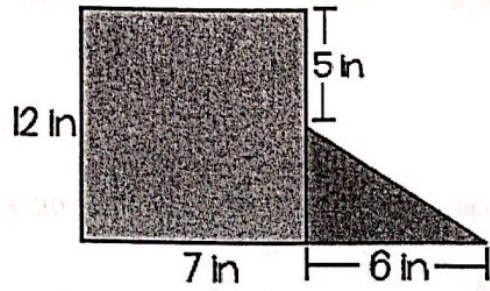
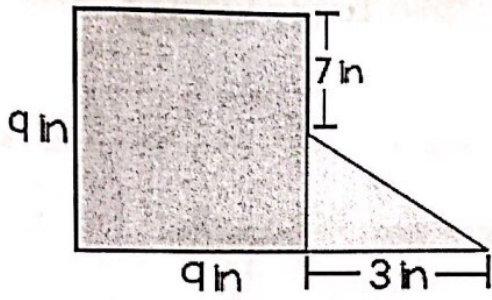
Trapezoid:
 $A = \frac{1}{2}h(b_1 + b_2)$

Let's Do as a Class:

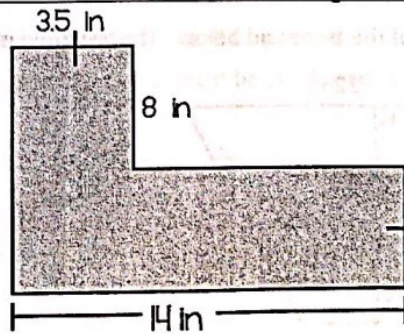
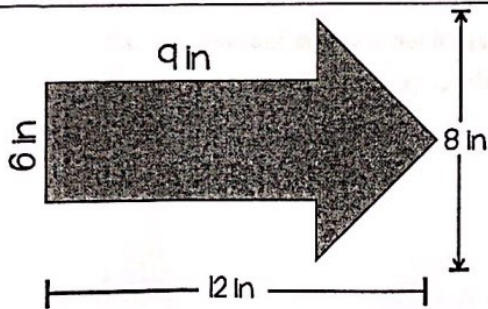
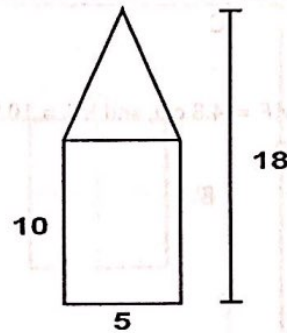
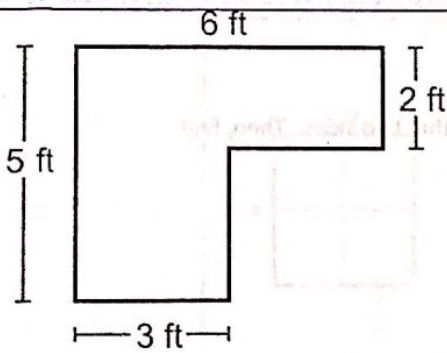


I'll Try On My Own:





Challenge Problems:

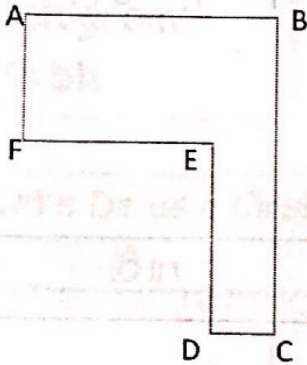


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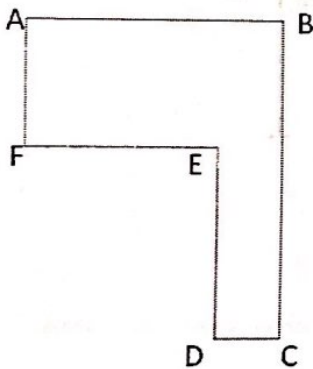
12

Problem Set

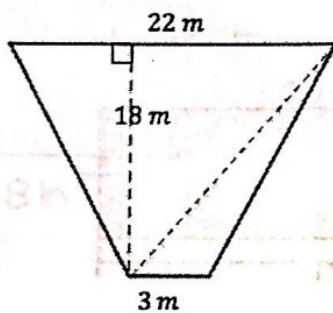
1. If $AB = 20$ units, $FE = 12$ units, $AF = 9$ units, and $DE = 12$ units, find the length of the other two sides. Then, find the area of the irregular polygon.



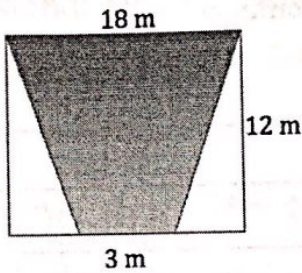
2. If $DC = 1.9$ cm, $FE = 5.6$ cm, $AF = 4.8$ cm, and $BC = 10.9$ cm, find the length of the other two sides. Then, find the area of the irregular polygon.



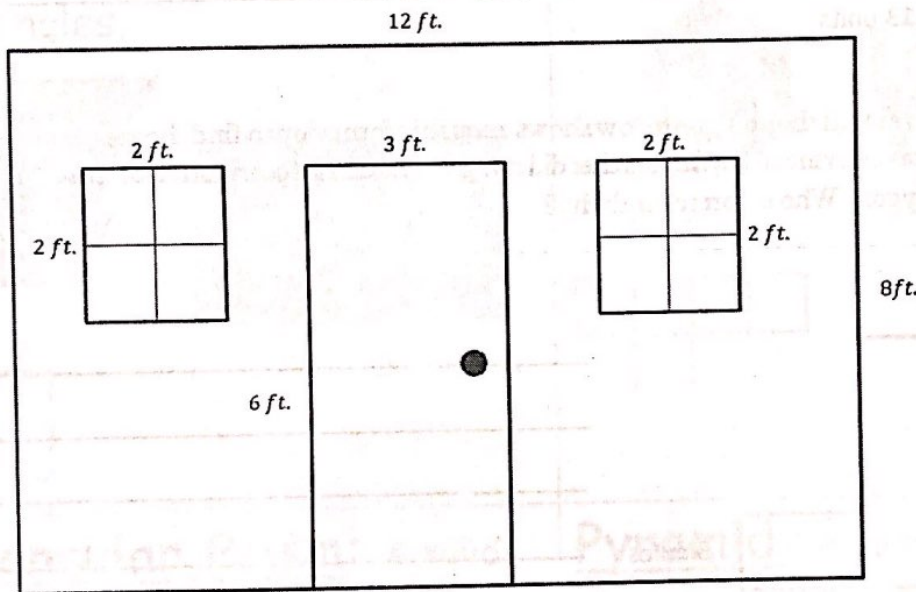
3. Determine the area of the trapezoid below. The trapezoid is not drawn to scale.



4. Determine the area of the shaded isosceles trapezoid below. The image is not drawn to scale.

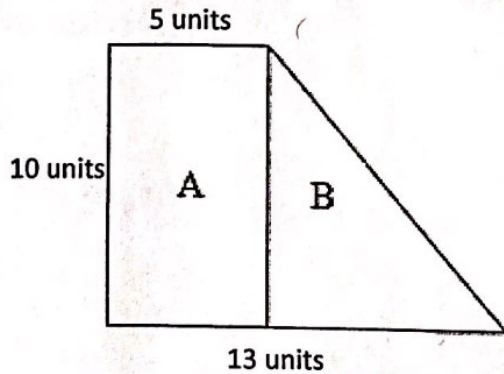


5. Here is a sketch of a wall that needs to be painted:

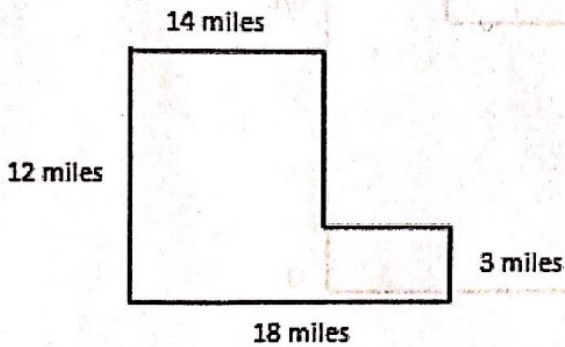


- The windows and door will not be painted. Calculate the area of the wall that will be painted.
- If a quart of Extra-Thick Goopy Sparkle paint covers 30 ft^2 , how many quarts must be purchased for the painting job?

1. Which has the greater area, Figure A or Figure B? How do you know?



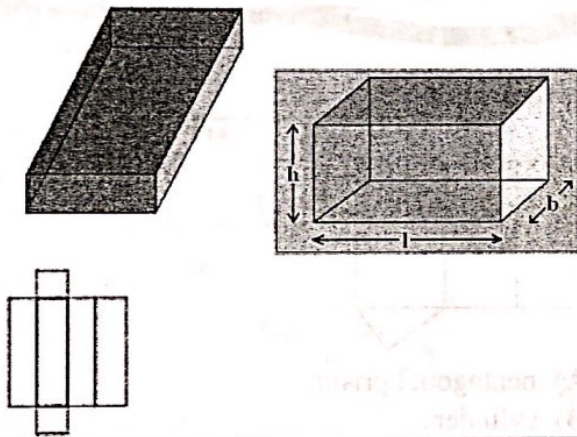
2. Malik believes that the polygon below shows enough information to find the area; whereas, Chris is convinced that his teacher did not give enough information to find the area of the polygon. Who is correct and why?



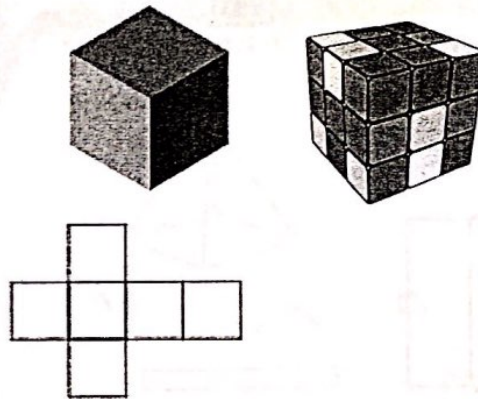
Identifying Three Dimensional Figures:

A three-dimensional figure has length, width, and height. Examples include anything you can hold- a box, a book, a cup, etc. Three-dimensional figures have faces which are the sides that make up the surface of the figure. In 6th grade math, we study the following three-dimensional figures:

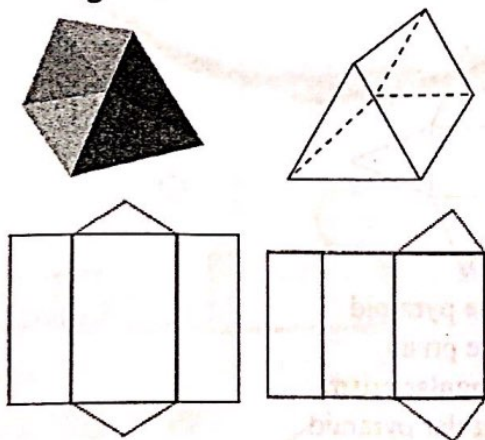
Rectangular Prism: A solid (3-dimensional) object which has six faces that are rectangles.



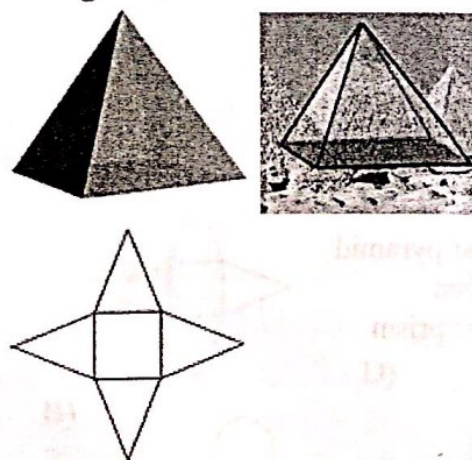
Cube: A solid (3-dimensional) object which has six faces that are squares.



Triangular Prism: A solid (3-dimensional) object which has five faces that are rectangles and triangles.

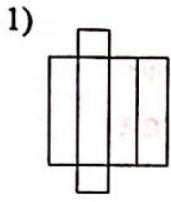


Pyramid: A solid (3-dimensional) object which has five faces that are rectangles and triangles.

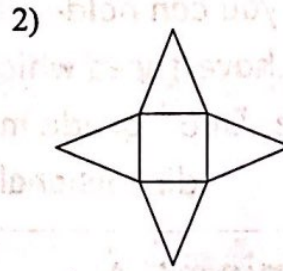


Labeling Nets

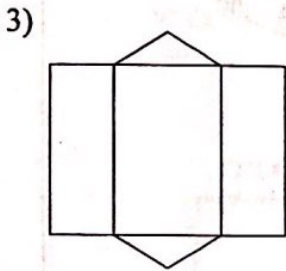
Identify each solid given its net.



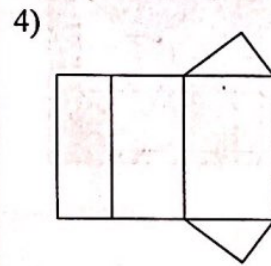
- A) pentagonal pyramid
- B) pentagonal prism
- C) rectangular prism
- D) square pyramid



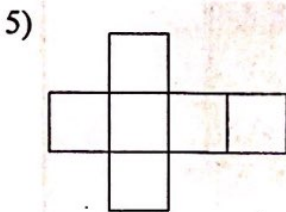
- A) square prism
- B) square pyramid
- C) triangular prism
- D) pentagonal prism



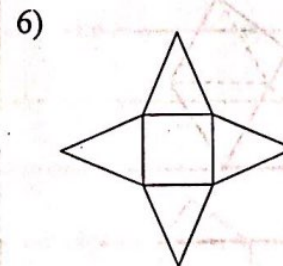
- A) triangular prism
- B) cylinder
- C) cone
- D) hexagonal pyramid



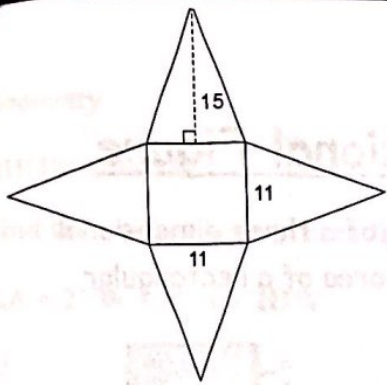
- A) pentagonal prism
- B) cylinder
- C) triangular prism
- D) rectangular pyramid



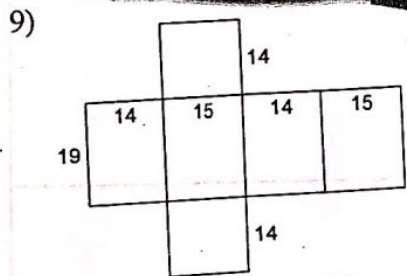
- A) rectangular pyramid
- B) square prism
- C) rectangular prism
- D) cone



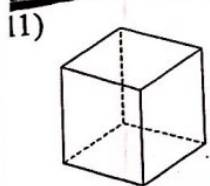
- A) square pyramid
- B) square prism
- C) rectangular prism
- D) triangular pyramid



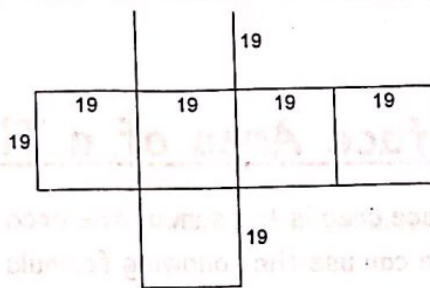
- A) B) C) D)



- A) B) C) D)

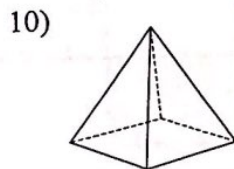


- A) B) C) D)

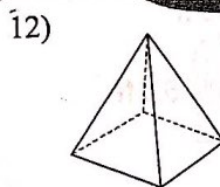


- A) B) C) D)

Sketch the net of each solid.



- A) B) C) D)



- A) B) C) D)

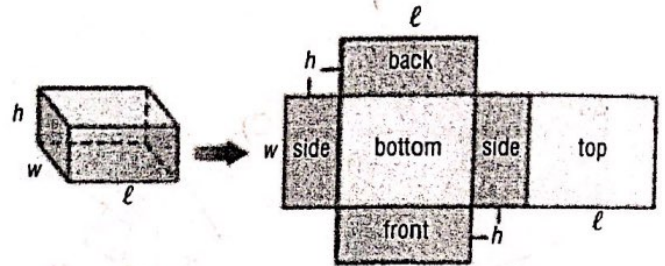
18

Surface Area of a Three Dimensional Figure

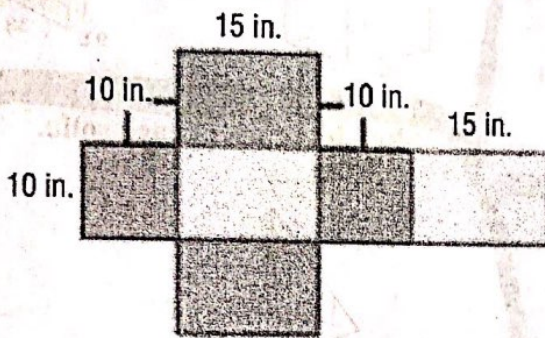
The surface area is the sum of the area all the faces (sides) of a three dimensional shape. We can use the following formula to find the surface area of a rectangular prism or cube.

$$S.A. = 2LW + 2LH + 2HW$$

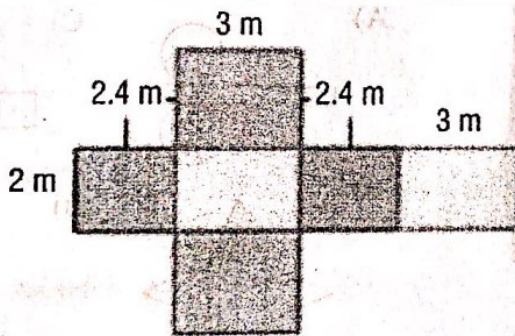
L= Length W= Width H= Height



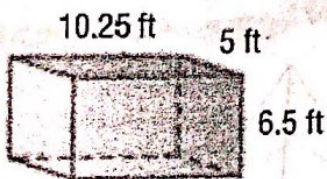
1.



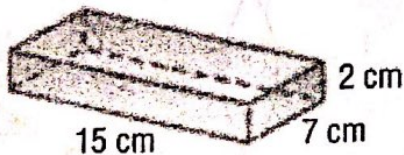
2.



3.



4.

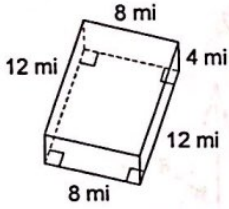


Surface Area

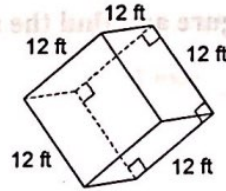
Find the surface area of each figure. Round your answers to the nearest whole, if necessary.

$$S.A. = 2LW + 2LH + 2HW$$

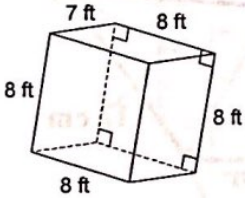
1)



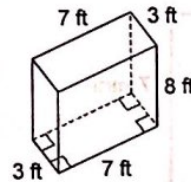
2)



3)



4)



15

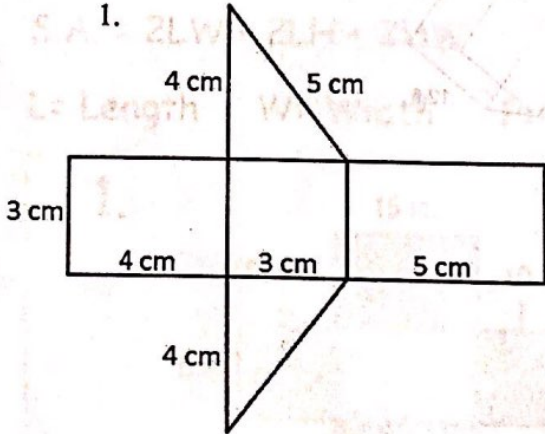
20

Name _____

Finding Surface Area

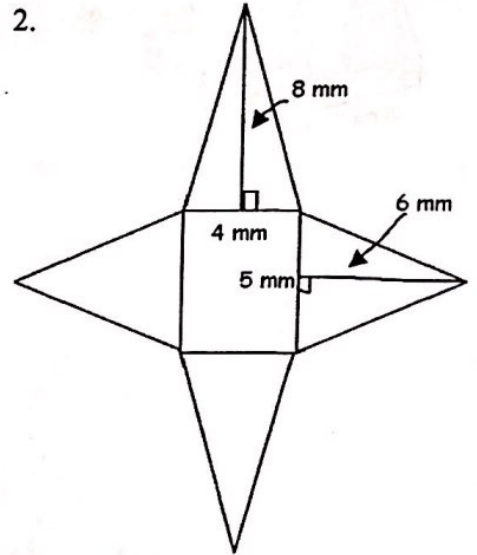
Write the name of each figure and find the surface area of the nets drawn below.

1.



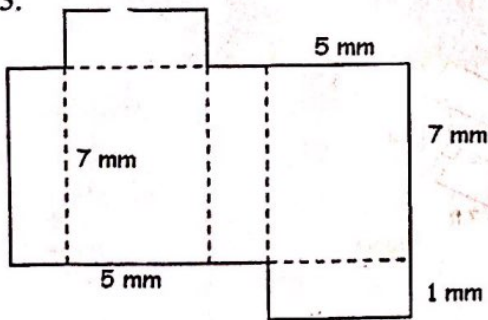
Name _____ Surface Area _____

2.



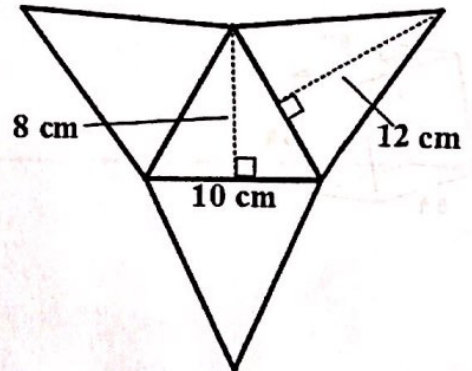
Name _____ Surface Area _____

3.



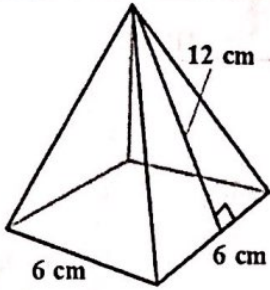
Name _____ Surface Area _____

4.



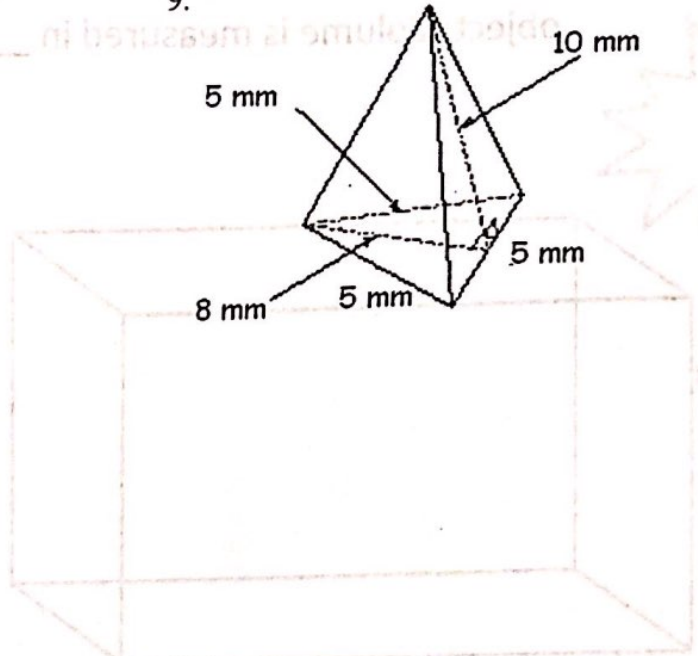
Name _____ Surface Area _____

8.



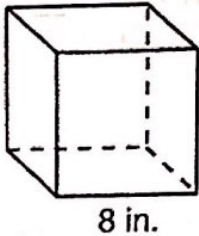
Name _____ Surface Area _____

9.

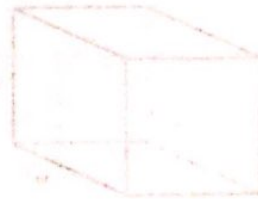


Name _____ Surface Area _____

10.



Name _____ Surface Area _____



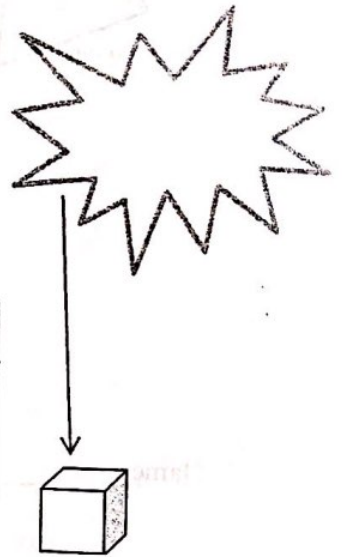
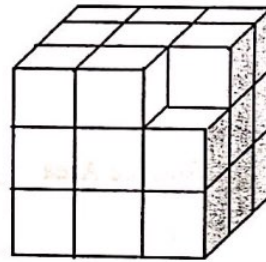
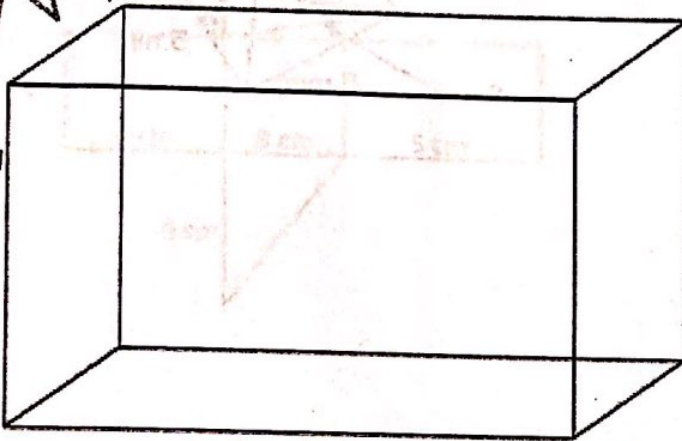
42

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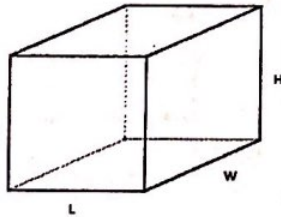
Name: _____ Date: _____

VOLUME OF PRISMS

The total space inside of a 3D figure is the _____ of an object. Volume is measured in _____ units.



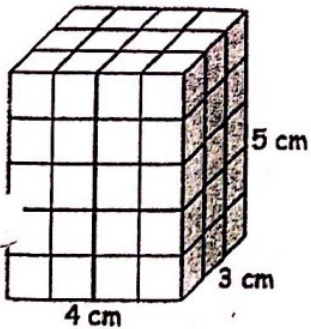
To find the volume of a rectangular prism, we have to see how many _____ units fit inside the shape.



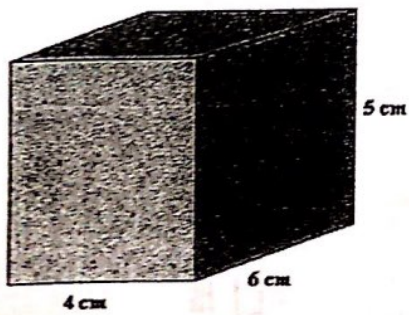
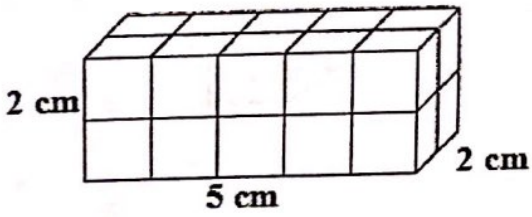
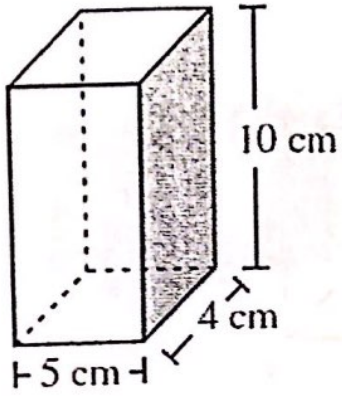
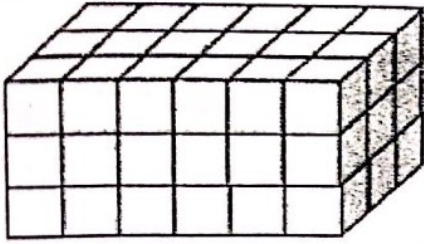
Volume formula

$$V = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} \times \underline{\hspace{2cm}}$$

Example: Find the volume.



Let's Practice



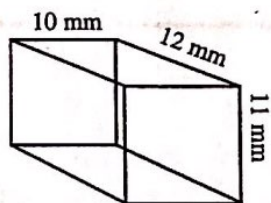
Volume of a Rectangular Prism

Reminder

The volume of a rectangular prism is computed by multiplying the length times the width times the height of the prism or $V = l \times w \times h$ or $V = lwh$

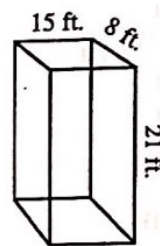
Directions: Compute the volume of each rectangular prism

1.



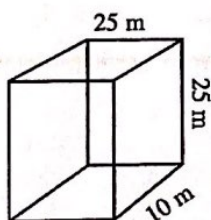
$$V = \underline{\hspace{2cm}} \text{ mm}^3$$

2.



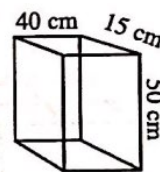
$$V = \underline{\hspace{2cm}} \text{ ft.}^3$$

3.



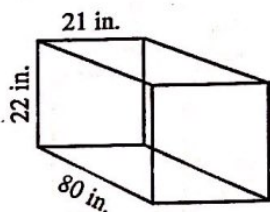
$$V = \underline{\hspace{2cm}} \text{ m}^3$$

4.



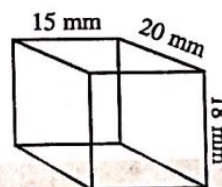
$$V = \underline{\hspace{2cm}} \text{ cm}^3$$

5.



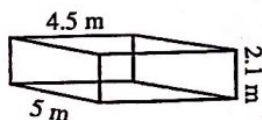
$$V = \underline{\hspace{2cm}} \text{ in.}^3$$

6.



$$V = \underline{\hspace{2cm}} \text{ mm}^3$$

7.



$$V = \underline{\hspace{2cm}} \text{ m}^3$$

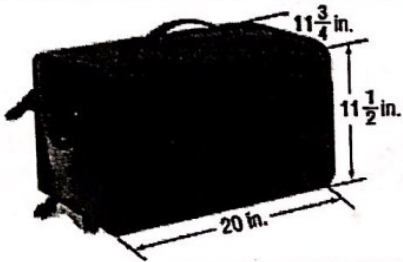
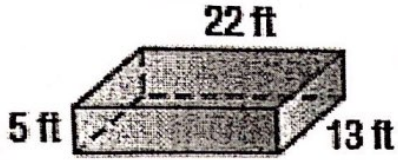
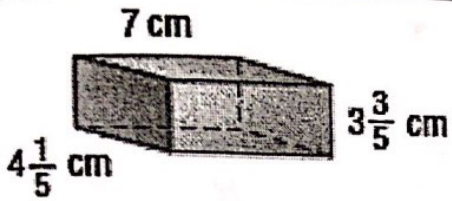
8.



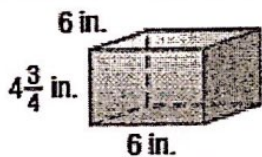
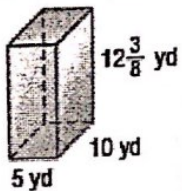
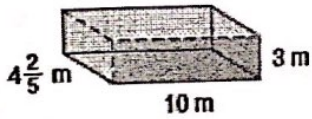
$$V = \underline{\hspace{2cm}} \text{ cm}^3$$

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Volume Practice: Find the volume of each. Be sure to include units, simplify your answer, and circle it.



The Palo Duro Canyon is 120 miles long, as much as 20 miles wide, and has a maximum depth of 0.15 mile. What is the approximate volume?



Challenge: Find the missing dimension using inverse operations.

