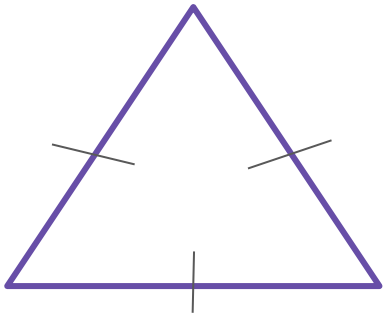
Helping With Math

Finding the Area of Triangle and Quadrilaterals

GRADE 6

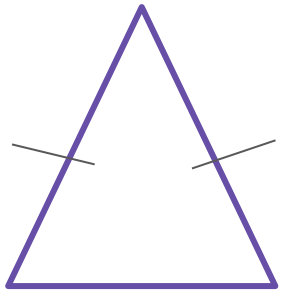
Triangle is a closed plane figure with three sides and three angles while quadrilateral has four sides and four angles.

THREE TYPES OF TRIANGLES DEPENDING ON THE LENGTH OF ITS SIDES



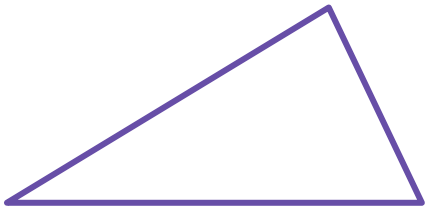
Equilateral Triangle

All sides are equal.



Isosceles Triangle

Two sides are equal.

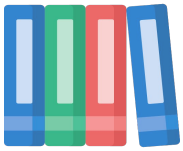


Scalene Triangle

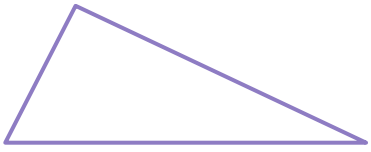
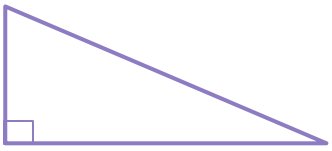
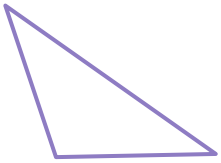
No sides are equal.

PROPERTIES OF TRIANGLES

Types of Triangle	Properties
Equilateral	• Three equal sides • Three equal angles • Each angle measures 60°
Isosceles	• Two equal sides • Two equal angles
Scalene	• No equal sides • No equal angles

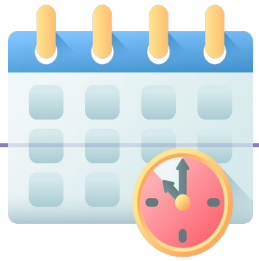


THREE TYPES OF TRIANGLES DEPENDING ON THE ANGLE IT HAS

 **Acute Triangle**	• All angles are less than 90°	The area of a triangle is equal to the half of the product of its base and height. **A = ½ bh** Where b = base of the triangle h = height/altitude of the triangle
 **Right Triangle**	• One of the angles measures 90°	
 **Obtuse Triangle**	• One of the angles measures more than 90°	

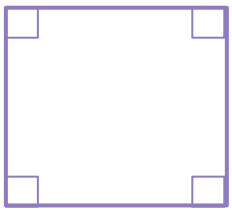
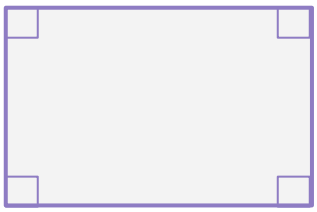
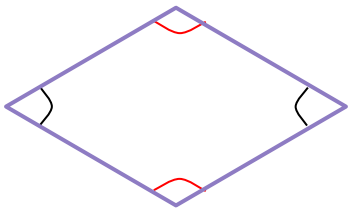
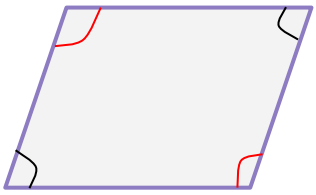
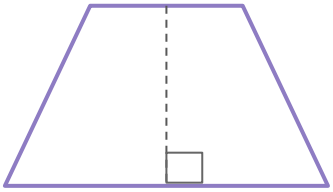
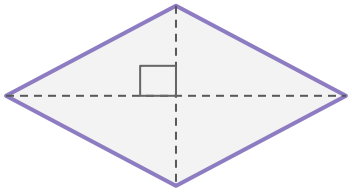
PROPERTIES OF QUADRILATERALS

QUADRILATERALS



- "Quad" means four and "lateral" means side
- It is a 2-dimensional figure
- It is a closed-flat shape
- It has four edges and four straight sides
- The types of quadrilaterals are square, rectangle, rhombus, parallelogram, kite, trapezoid/trapezium.

Types of Quadrilaterals

 **Square**	 **Rectangle**	 **Rhombus**
 **Parallelogram**	 **Trapezoid**	 **Kite**

FORMULA

Area of square $A = s^2$	Area of rectangle $A = lw$	Area of Rhombus $A = bh$ or $\frac{d_1 x\ d_2}{2}$

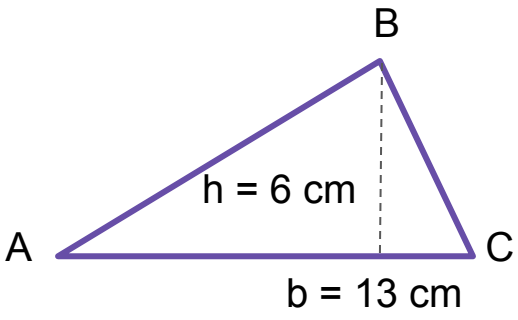
PROPERTIES OF QUADRILATERALS

FORMULA

Area of Parallelogram	Area of Trapezoid	Area of Kite
$A = bh$	$A = bh$ or $\frac{b_1 \times b_2}{2} h$	$A = bh$ or $\frac{d_1 \times d_2}{2}$

ILLUSTRATIVE EXAMPLES

1. Find the area of △ABC



Solution:
Given: base is 13 cm and the height is 6 cm.

$$A = \frac{1}{2} bh$$
$$= \frac{1}{2} (13 \text{ cm})(6 \text{ cm})$$
$$= \frac{1}{2} (78 \text{ sq.cm})$$
$$= 39 \text{ sq. cm}$$

The area of △ABC is 39 square centimeters.

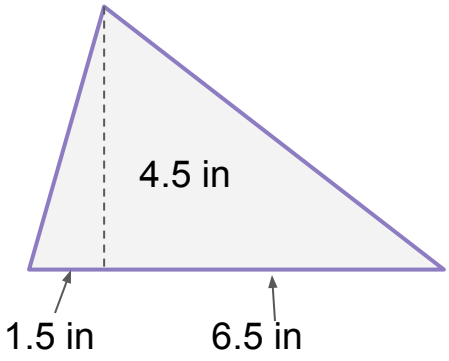
What is an area?

In geometry...

- Area can be defined as the region covered by a flat shape or the surface of an object.
- The area of a figure is the number of unit squares that occupied the surface of a closed figure.
- Area is measured in square units such as square centimeters, square feet, square inches, etc.

ILLUSTRATIVE EXAMPLES

2. How many square inches can fit on this triangle?

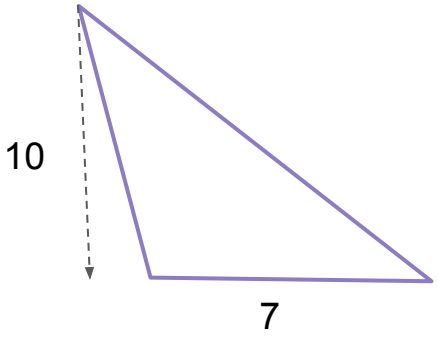


Solution:
Given: base is 8 in (1.5 in + 6.5 in) and the height is 4.5 in.

$$A = \tfrac{1}{2}\, bh$$
$$= \tfrac{1}{2}\,(8 \text{ in})(4.5 \text{ in})$$
$$= \tfrac{1}{2}\,(36 \text{ sq. inches})$$
$$= 18 \text{ sq. inches}$$

The area of the triangle is 18 square inches.

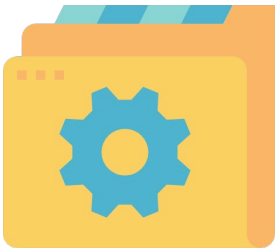
3. Calculate for the area.



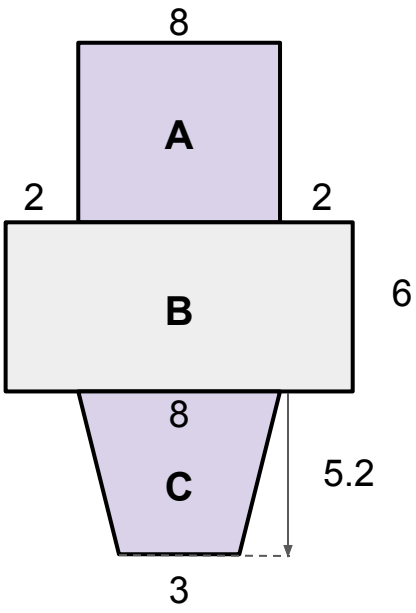
Solution:
Given: base is 7 and the height is 10.

$$A = \tfrac{1}{2}\, bh$$
$$= \tfrac{1}{2}\,(7)(10)$$
$$= \tfrac{1}{2}\,(70)$$
$$= 35 \text{ sq. units}$$

The area of the triangle is 35 square units.



ILLUSTRATIVE EXAMPLES



4. Examine the figure at the left and solve for its total area. *Note: Figure A is a square, figure B is a rectangle, and figure C is a trapezoid.*

Solution:
Since figure A is a square, the area is equal to the square of its side. Thus,

$$A = s^2$$

$$A = (8)^2$$

$$A = 64 \text{ sq. units}$$

Since figure B is a rectangle, the area is equal to the product of its length and width. Thus,

$$A = lw$$

$$A = (2+ 8 + 2)(6)$$

$$A = (12)(6)$$

$$A = 72 \text{ sq. units}$$

Figure C is a trapezoid. The area of the trapezoid is equal to the half of the product of the bases and its height. Thus,

$$A = \tfrac{1}{2} (\text{bases})(\text{height})$$

$$A = \tfrac{1}{2} (8+3)(5.2)$$

$$A = \tfrac{1}{2} (11)(5.2)$$

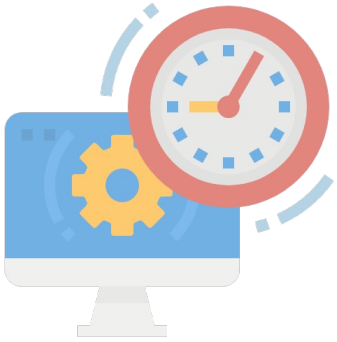
$$A = 28.6 \text{ sq. units}$$

To get the total area,

Total area = areas of figure A, B, and C

= 64 + 72 + 28.6

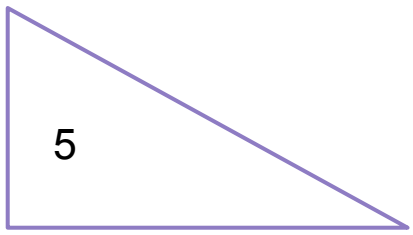
= 164. 6 sq. units



PRACTICE EXERCISES

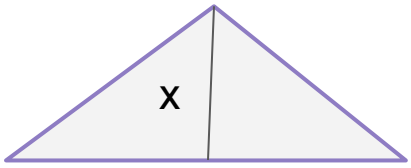
Solve for the area of the following plane figures.

1.



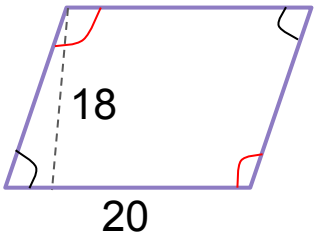
Solution:

2.



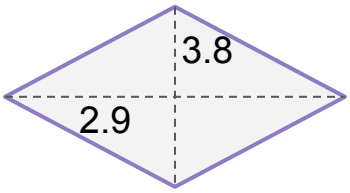
Solution:

3.



Solution:

4.



Solution:

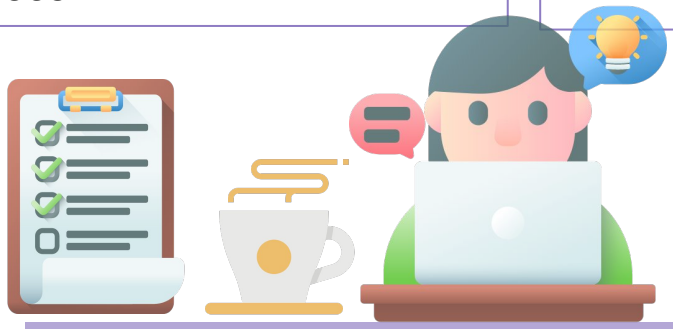
TABLE OF ACTIVITIES

1. Working Thoughts
2. Home or Office?
3. Sorting Files
4. My Working Team
5. The Office Building
6. Room Passcode
7. Office Hours
8. Workshop Session
9. Office Supplies
10. Sending Emails

WORKING THOUGHTS

Looks like Mrs. Alison has some working thoughts. She's somehow challenged by the following questions. Can you help her identify which term/concept is being described?

1. It is synonymous to region being covered by a plane figure or polygon.	
2. This type of triangle has equal measurement on each side.	
3. A type of quadrilateral whose four sides are equal.	
4. A triangle that has no equal sides.	
5. It is a closed shape with four sides and four angles.	
6. A triangle whose two angles are equal.	
7. This triangle has angles that are less than 90 degrees.	



HOME OR OFFICE?

Due to pandemic, into which place is better for work? At home or in the office? Match the content of Home Box to Office Box. Write your answer on the space provided.

HOME BOX

A. Triangle	B. Quadrilateral	C. Square
D. Rhombus	E. Kite	F. Parallelogram
G. Scalene	H. Trapezoid	I. Rectangle

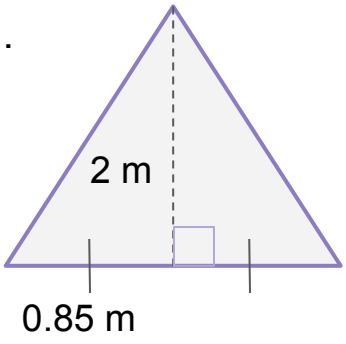
OFFICE BOX

1. The product of its length and width. ____
2. The half of the sum of its diagonals. ____
3. The square of its side. ____
4. The ratio of the product of the bases and height divided by two. ____
5. It is equal to half of its base times height. ____

SORTING FILES

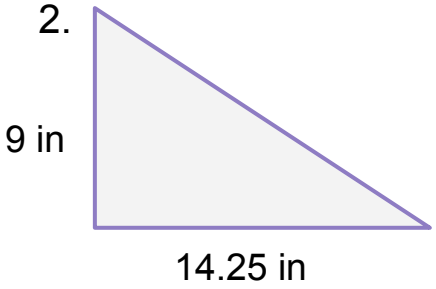
Find a way to sort these files as you solve for the area of the following triangles.

1.



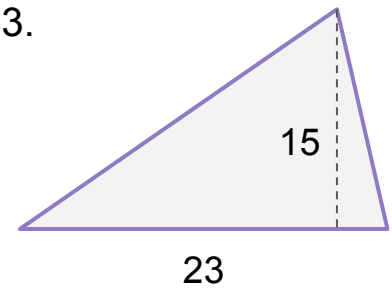
Solution:

2.



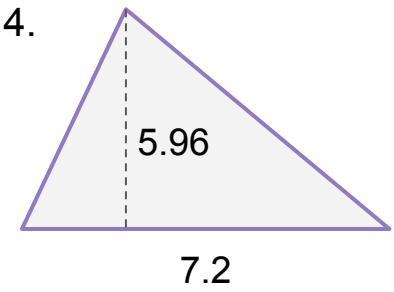
Solution:

3.



Solution:

4.

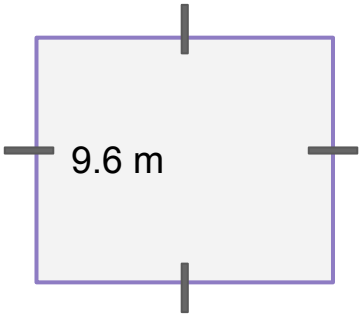


Solution:

MY WORKING TEAM

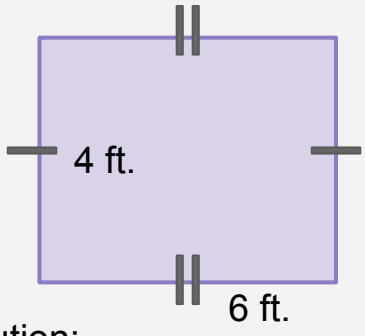
Work gets easier when we are working as a team! Let's solve the area of the following.

1.



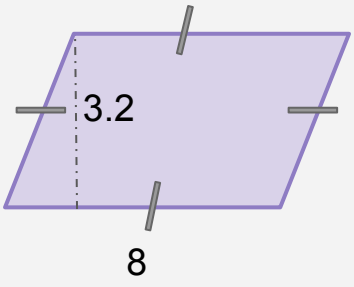
Solution:

2.



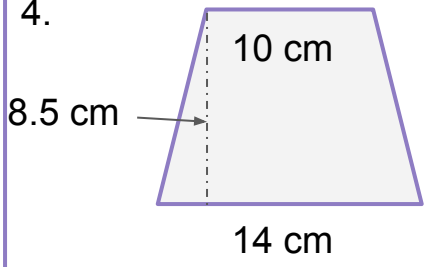
Solution:

3.



Solution:

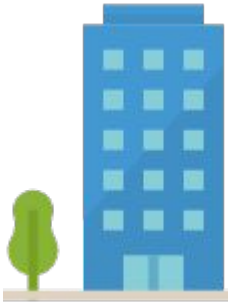
4.



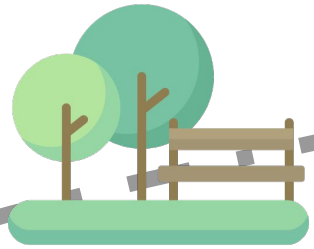
Solution:

THE OFFICE BUILDING

Mr. Johnson is excited on his first day of work. Can you lead his way towards the workplace? Solve the following areas.



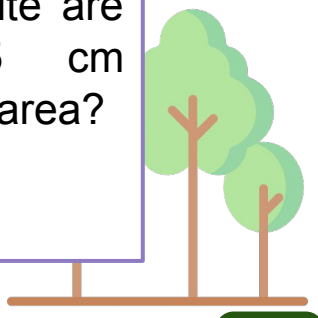
4. A square tile has an area of 49 sq. cm. What is the measure of its side?



3. A rectangular table has dimensions of 14 ft and 125 inches. How many sq. inches will fit on it?

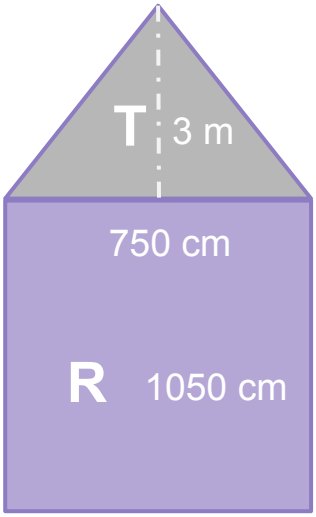
2. A parallelogram board measures 57 inches on its base and has an altitude of 65 inches. Compute for the area.

1. The diagonals of a kite are 12.89 m and 135 cm respectively. What is the area?



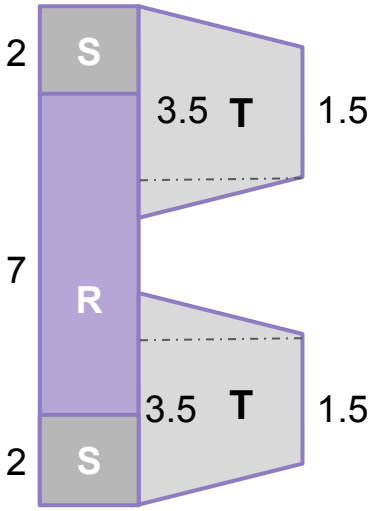
ROOM PASSCODE

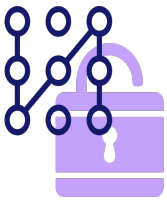
Solve for the password of the office room. Get a hint from each question to find it out!



1. Figure T and R are triangle and rectangle respectively. Given the dimensions indicated at the left. Solve for the total area in terms of sq. cm.

2. Figure S, R, and T are square, rectangle and trapezoid. The height of the figure T is 1.75. Compute for the total area.





The sum of the two items is the room pass code.

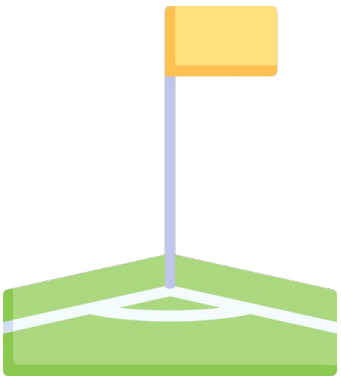
OFFICE HOURS

Few minutes from now, office hours will be over. Looks like the workers are challenging each other in answering math questions. Help them out!

1. The perimeter of a square is 16 cm. What is its area?

2. Plane figure HWM is an equilateral triangle with a perimeter equal to 30 in. Its height is 17.32 in. Calculate the area of the plane figure HWM.

3. The length of a rectangular field is 100 yards. Its perimeter is 350 yards. What is the region being covered by the field?



WORKSHOP SESSION

The facilitator wants you to do the following tasks. You need any colored paper, scissors, ruler, pen, and glue.

Activity 1

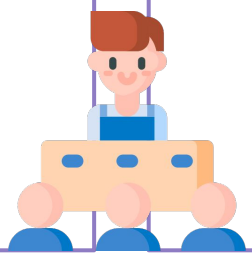
1. Draw a square on the colored paper. Each side must be 2 inches.
2. Cut-out the figure. Fold it diagonally and cut it again. Paste your work.
3. Compute for the area of each figure that you have made from the square.

Activity 2

1. Draw a trapezoid on the colored paper. The upper base should measure 5 cm while the lower base should be 7 cm. Make the height equal to 2 cm.
2. Cut- out the figure, paste it below and calculate the area.

Activity 1

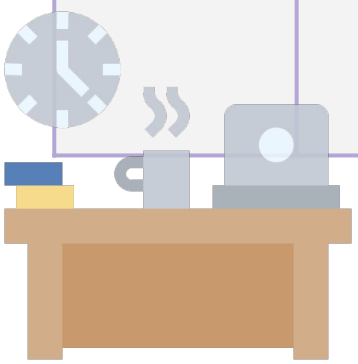
Activity 2

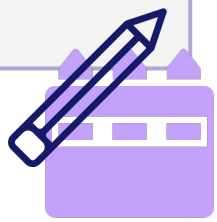


OFFICE SUPPLIES

Look around your house. Find four supplies/tool/equipment that are usually used in the office. Fill-in the details of the table below.

Object	Illustration	Dimensions	Area
1.			
2.			
3.			
4.			





SENDING EMAILS

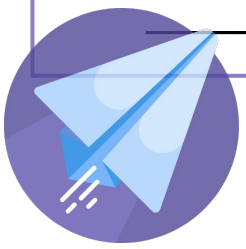
Assume that you are an office worker and needs to send important emails today. What will be the content of it based on the questions below?

1. Base on your work from the previous activity, arrange the objects in descending orders in terms of their area.

    1. _____
    2. _____
    3. _____
    4. _____

2. What are the things that you have learned from this topic? How will you apply this in dealing with life problems? Cite at least 3 and explain each briefly.

    1. _____
    _____
    2. _____
    _____
    3. _____
    _____



ANSWER GUIDE

Activity 1

1. Area 2. Equilateral 3. Square 4. Scalene
5. Quadrilaterals 6. Isosceles 7. Scalene

Activity 2

1. I 2. E 3. C 4. H 5. A

Activity 3

1. A = ½ (2) (0.85) = 0. 85 sq. cm
2. A = ½ (9) (14.25) = 64. 125 sq. in
3. A = ½ (15) (23) = 172.5 sq. units
4. A = ½ (5.96) (7.2) = 21. 456 sq. units

Activity 4

1. A = s x s = 9.6 x 9.6 = 92. 16 sq. m
2. A = lw = (4 ft)(6 ft) = 24 sq. ft.
3. A = bh = (3.2)(8) = 25. 6 sq. units
4. A = (b1 + b2)/2 * h = 12(8.5) = 102 sq. cm

ANSWER GUIDE

Activity 5

1. A = (d1*d2)/2 = (12.89)(0.135) = 1. 74 sq. m or 174 sq. cm
2. A = bh = (57)(65) = 3, 705 sq. in
3. A = lw = (168)(125) = 21, 000 sq. m
4. A = s x s = 49 = 7 x 7 , thus, 7 cm

Activity 6

1. Area of triangle is ½ (750)(300) = 112, 500 sq. cm

   Area of rectangle is (750)(1050) = 787, 500 sq. cm

   Total area = 112, 500 + 787, 500 = 900, 000 sq. cm
2. Area of square is 4 sq cm x 2 = 8 sq. units

   Area of rectangle is 7 x 2 = 14 sq. sq. units

   Area of trapezoid is (1.5 + 3.5)/2 (1.75) = 8. 75

   Total area : 8 + 14 + 8. 75 = 30. 75 sq. units Passcode is 3075

Activity 7

1. P = 4s = 16 = 4s, thus s = 4. To get the area, 4 x 4 = 16 sq. cm
2. P = 3s = 30 = 3s, thus s = 10. To get the area is (½)(10)(17.32) = 86. 6 sq. in
3. L = 100, w = 75, the area is 7500 sq. yards

ANSWER GUIDE

Activity 8

1. The figure that will produce from the square is a triangle. The area is (½)(2)(1.414). Thus, A = 1.414 sq. in
2. The area is (b1 + b2)/2 * h. (5+7)/2 *2 . Thus,The area is 12 sq. cm

Activities 9 and 10

1. Answers may vary.

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