Helping With Math

Understanding Properties and Hierarchy of Shapes

GRADE 5

Some quadrilaterals also possess the definitions of other quadrilaterals. It is just that these quadrilaterals have even more limitations. For instance, a rectangle is a type of parallelogram with congruent angles.

PROPERTIES OF SHAPES

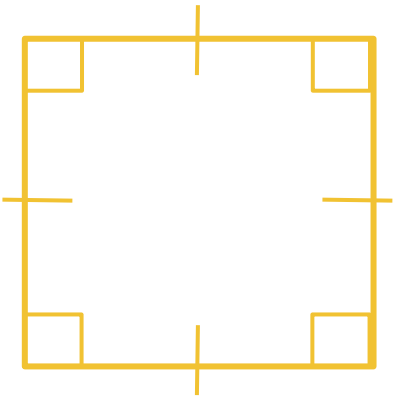
QUADRILATERAL is a closed figure with four sides.

RECTANGLE

Rectangle is a quadrilateral with:

- four right angles, meaning four 90-degree angles
- equal opposite sides

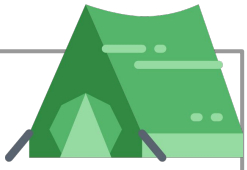
SQUARE



Square is a quadrilateral with:

- four right angles, meaning four 90-degree angles
- four equal sides

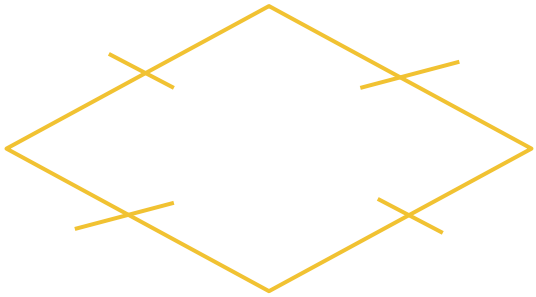
PARALLELOGRAM



Parallelogram is a quadrilateral with:

- two pairs of parallel sides
- equal opposite sides
- opposite angles are equal

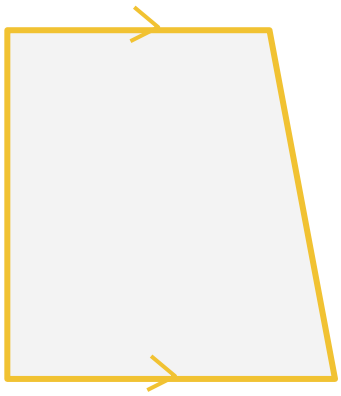
RHOMBUS



Rhombus is a parallelogram with:

- four equal sides
- Opposite sides are parallel
- Opposite angles are equal
- Diagonals bisect each other at right angle

TRAPEZOID

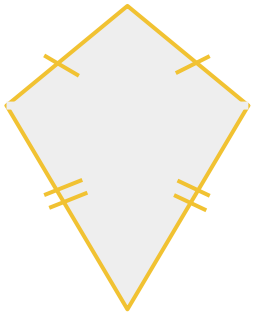


Trapezoid is a quadrilateral with:

- one pair of opposite parallel sides

PROPERTIES OF SHAPES

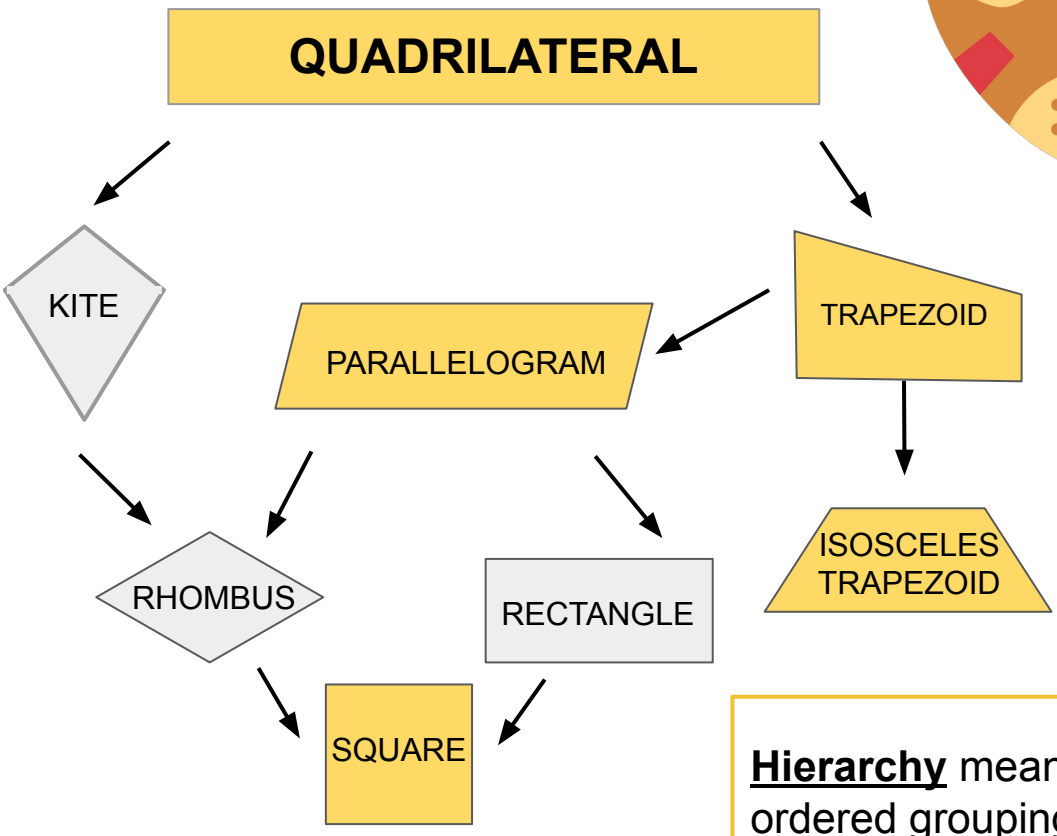
KITE



Kite is a quadrilateral with:

- two pairs of adjacent sides of the same length
- One pair of opposite sides are equal
- One diagonal bisects the other
- Diagonals intersect at right angle

HIERARCHY OF SHAPES

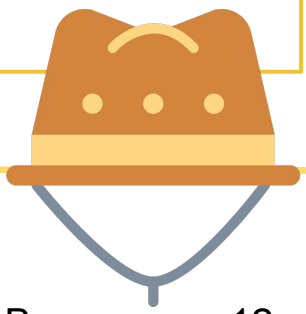


<u>Hierarchy</u> means series of ordered grouping of shapes

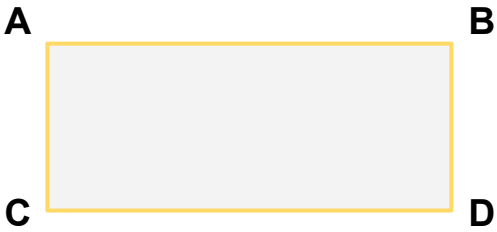
HIERARCHY OF SHAPES

So what does hierarchy of quadrilaterals say?

- ❏ Kite is a quadrilateral.
- ❏ Trapezoid is a quadrilateral.
- ❏ A rhombus is a type of kite. It is also a kind of parallelogram.
- ❏ Parallelogram is a type of trapezoid.
- ❏ Rectangle is a parallelogram and at the same time, an isosceles trapezoid. It possesses the properties of both parallelogram and isosceles trapezoid.
- ❏ Square has the properties of parallelogram, rhombus, and rectangle.



ILLUSTRATIVE EXAMPLES



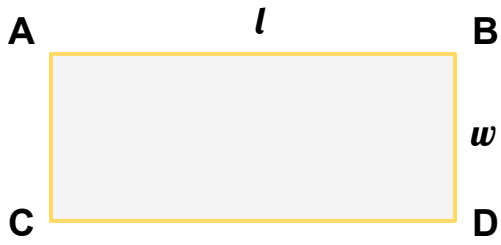
ABCD is a rectangle. AB measures 12 in. If AC = ½ of AB, compute for the area and perimeter of ABCD.

Let first solve the measurement of AC. Since AC is just a half of AB, then ½ of 12 is 6.Thus, AC = 6.

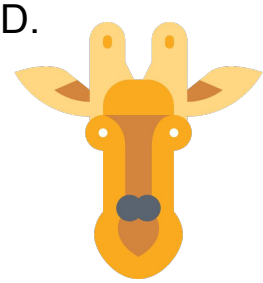
REMEMBER:

One of the properties of rectangle is that its opposite sides are equal. AB and CD are opposite sides. Thus, their length is equal. Likewise, AC and BD are opposite sides so their lengths are equal as well.

ILLUSTRATIVE EXAMPLES



ABCD is a rectangle. AB measures 12 in. If AC = ½ of AB, compute for the area and perimeter of ABCD.



AB = 12 in CD = 12 in
AC = 6 in BD = 6 in

Perimeter of rectangle ABCD

$$P = 2L + 2W$$

P = 2(12) + 2(6) in

P = 24 +12 in

P = 36 in

Thus, the perimeter of rectangle ABCD is 36 inches.

Area of rectangle ABCD

$$A = L \times W$$

A = 12 in x 6 in

A = 72 sq. in

Thus, the area of rectangle ABCD is 72 sq. inches.

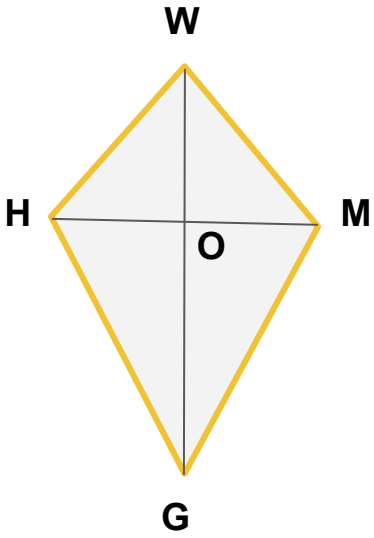
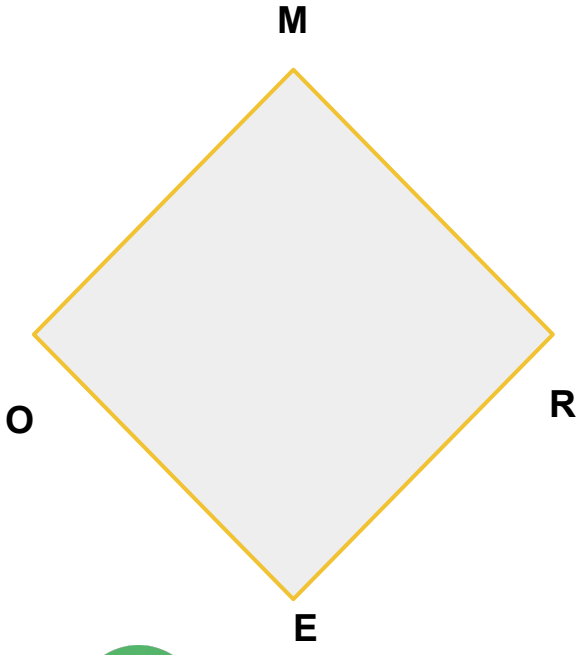


Figure HWMG is a kite. HM and GW are kite's diagonals. Find the measurement of angle MOW.

One of the properties of Kite is that: diagonals intersect at right angle. **Thus, angle MOW measures 90 degrees. It is a right angle.**

PRACTICE EXERCISES

NICE is a parallelogram. If NC measures 15 ft and CE measures 23 ft, what is the measure of EI and NI?



MORE is a rhombus. Enumerate which pairs of sides are parallel and equal.

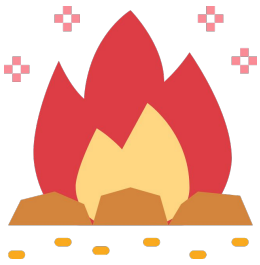


TABLE OF ACTIVITIES

WELCOME TO THE JUNGLE

Welcome to the jungle! Witness the beauty and diversity of this place by identifying the shape being described.

This is a quadrilateral whose opposite sides are equal and parallel and the opposite angles are equal.

1. _____

A parallelogram whose opposite sides are equal and parallel. All of its angles are right.

2. _____

A parallelogram whose all sides are parallel and equal. All angles measure 90 degrees.

3. _____

A parallelogram whose opposite sides are parallel, all sides and opposite angles are equal Its diagonals bisect each other.

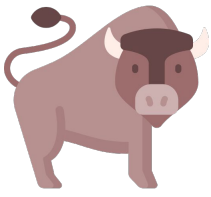
4. _____

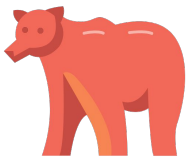
A quadrilateral whose a pair of opposite sides are parallel.

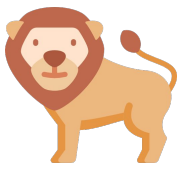
5. _____

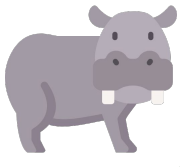
A quadrilateral with two pairs of equal adjacent sides, a pair of equal opposite sides

6. _____









RIDING THE JUNGLE JEEP

Have a ride on this jeep to visit the jungle animals. You need to decide first whether the following statements are always, sometimes, or never TRUE.

1. Trapezoid is a parallelogram.

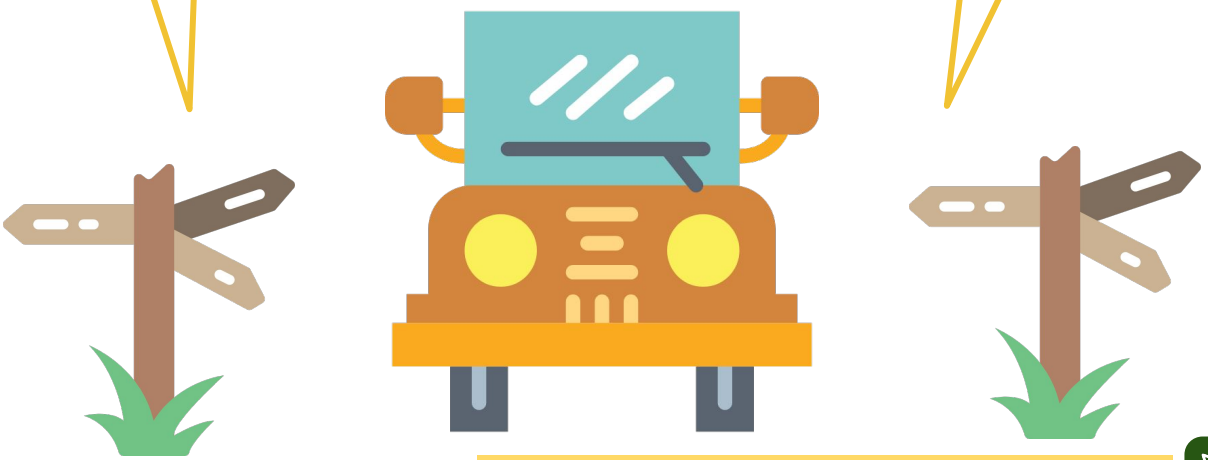
2. Parallelogram is a trapezoid.

3. Rhombus is a kite.

4. Square is a quadrilateral.

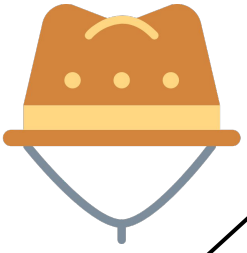
5. A rectangle is a square.

6. A parallelogram is a kite.

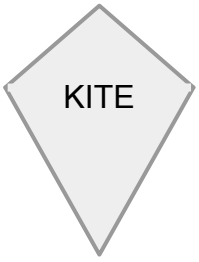


THE EXPLORER HAT

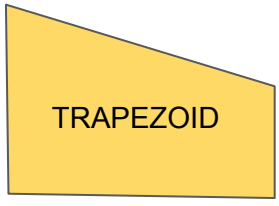
Be an explorer by completing the hierarchy of shapes chart. As you write the names of the quadrilaterals, give two properties of the indicated shape. Make sure to do it perfectly.



QUADRILATERAL



1.

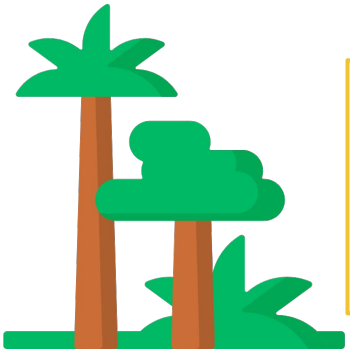


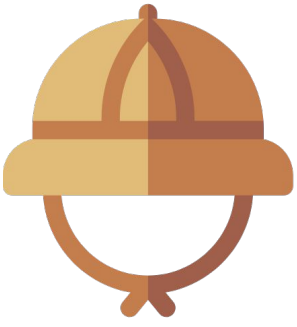
2.

3.

4.

5.





KING OF THE JUNGLE

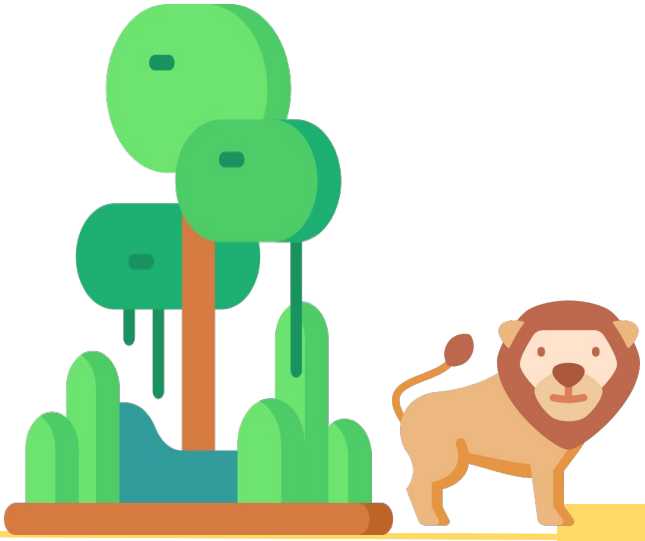
Meet the King of the Jungle by exploring the properties of rectangle.

A B

C D

1. Put tick marks and other symbols on rectangle ABCD to show its properties.

2. In a given rectangle, AB is four times as long as BC. If BC is 4.5 ft, what is the perimeter and area of the rectangle.



3. What is the sum of the angles of rectangle? Explain its properties that you used to answer this question.

FOREST MAP

Discover what the forest map leading us to! Do it by answering some exercises regarding square.

1. What is the perimeter and area of a square whose side measures 22.5 in?

2. If the perimeter of a square is 72 cm, compute for its area.

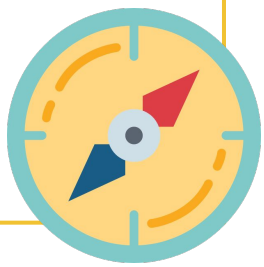
3. What will happen to the area of a square if its side is doubled? Provide an example.

4. What will happen to the perimeter of a square if its side is tripled? Provide an example.

COMPASS POINT

Which direction is it pointing? Find it out while dealing with parallelograms.

1. Create parallelogram whose dimensions are 10 cm and 12 cm, respectively. Put proper marks/labels to indicate its properties.

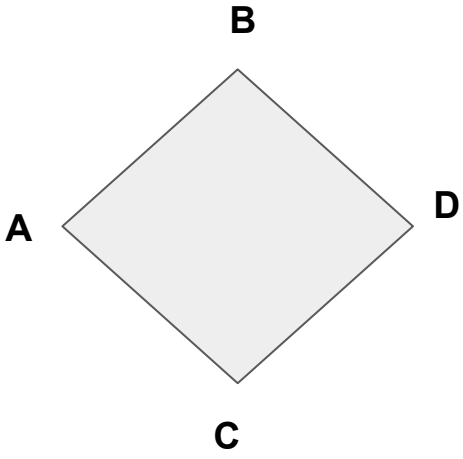


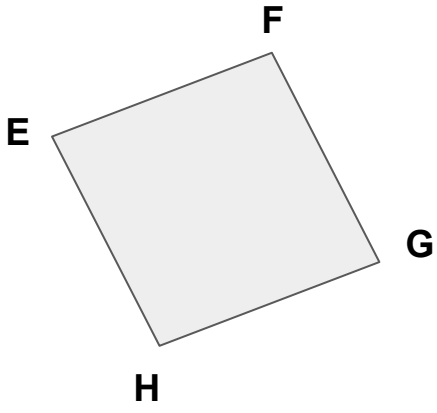
2. MGBC is a parallelogram. If angle BMG is 88°, what is the measurement of angle BCG?

3. If angle CGM measures 110°, find the measures of the remaining three angles.

THE ELEPHANT TUSK

Take care of the elephant's task by completing these tasks involving rhombuses.





1. A. Which side is parallel to AB? _____

   B. Which angle has the same measure with ∠ B? _____

   C. Is m∠ C = m∠ D? Why or why not?

_____

_____

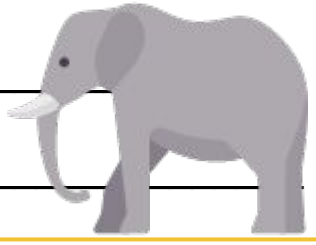
2. A. If EF is 15 units, then GH is _____

   B. m∠ F = 85°, what is m∠ G ? _____

   C. Is EF parallel to GH? Why or why not?

_____

_____



MEET THE GIRAFFE

Look at the giraffe! It needs help to eat his food. Help him out by applying your understanding about trapezoid.

1. PQRS is a trapezoid. PQ has the same length with RS. What type of trapezoid is PQRS? Why?

_____

_____

_____

_____

_____

2. Illustrate trapezoid PQRS. Make sure to include proper labels of its properties.

3. What makes a trapezoid a unique type of polygon?

_____

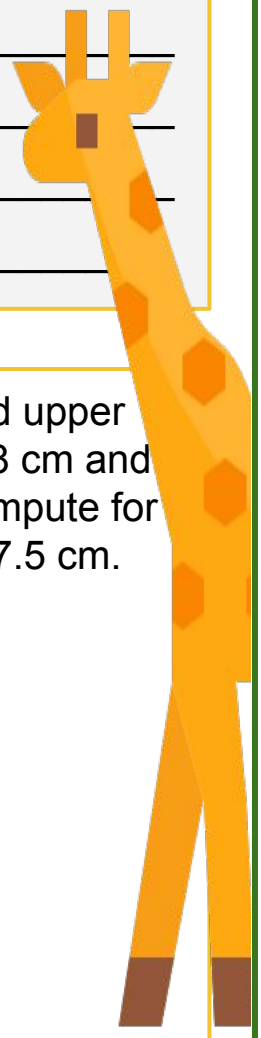
_____

_____

_____

_____

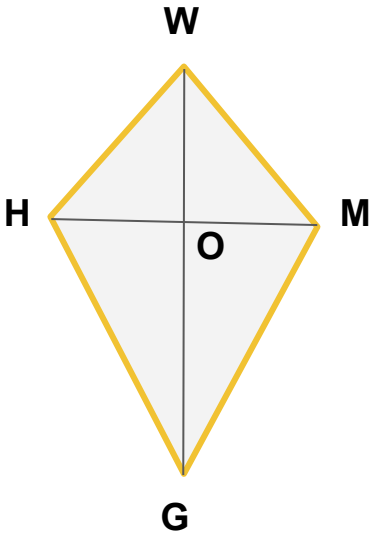
_____



4. If the lower base and upper base of a trapezoid is 8 cm and 12 cm respectively, compute for its area given that h = 7.5 cm.

CAMPFIRE

Keep the fire burning as you explore the properties of kite.



TRUE or FALSE?

_____1. HW = MW

_____2. HG = WM

_____3. m∠GHW = m∠GMW

_____4. m∠HWG = m∠ MWG

_____5. m∠HOG = 90°

6. If m∠WOM = 90°, what is the measurement of angle WOH, HOG, and MOG?

7. If HG is twice the length of HW, and MW = 11.5 cm, find the measurement of HG and HW.

IT'S TIME FOR AFRICA

Make way for Africa by having the most diverse safari in the world! Accomplish these tasks!

1. A quadrilateral has the following angle measures: 135°, 55°, and 20°. What is the measurement of the fourth angle? Illustrate the given with angle measures.

2. Compare rectangle and trapezoid based on their properties.

3. Which statement is TRUE? A square is a rectangle or a rectangle is a square. Justify your answer.

ANSWER GUIDE

Activity 1

1. Parallelogram
2. Rectangle
3. Square
4. Rhombus
5. Trapezoid
6. Kite

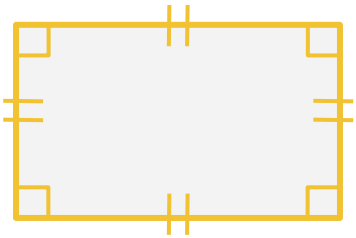
Activity 2

1. NEVER
2. SOMETIMES
3. SOMETIMES4. ALWAYS
5. NEVER
6. NEVER

Activity 3

1. Parallelogram
2. Rhombus
3. Rectangle
4. Isosceles trapezoid
5. Square

Activity 4



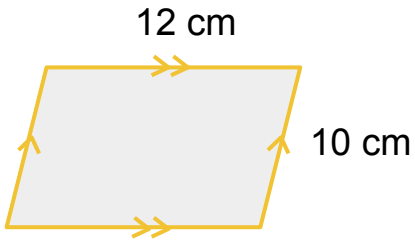
2. Perimeter = 2L + 2W = 2(4.5) + 2(18) = 9+36 = 45 ft
Area = LW = (4.5) x (18) = 81 sq. ft
3. 360 degrees because all of the four angles are right. When you get the sum of these four angles, the answer is 360 degrees.

Activity 5

1. Perimeter = 4S = 4(22.5) = 90 in Area= s x s = 22.5 x 22.5 = 506.25 sq. in
2. P = 72 cm.To get the length of the side, divide 72 by 4. S = 18.
Area = s x s = 18 x 18 = 324 sq. cm
3. The area will increase four times. 4. The perimeter will be tripled.

ANSWER GUIDE

Activity 6

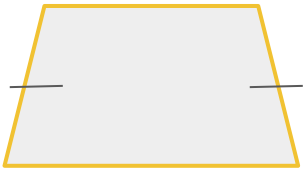


2. 88 degrees 3. Angle CMB = 110 degrees, angle CGM = 80 degrees, angle CBM = 80 degrees

Activity 7

1. A. CD B. angle C C. No. they are not opposite angles
2. A. 15 units B. angle G = 95 degrees C. Yes because they are opposite sides.

Activity 8



1. Isosceles trapezoid because it has a pair of sides that are equal in measure.
3. It has one pair of opposite sides that is parallel
4. 75 sq. cm

Activity 9

1. TRUE 2. FALSE 3. TRUE 4. TRUE 5. TRUE
6. 90 degrees as well 7. HG = 30 cm and HW = 11.5 cm

Activity 10

1. 150 degrees 2. Rectangle is a parallelogram whose opposite sides are equal. Its angles are all right. Trapezoid has only one pair of opposite sides parallel.
3. A square is a rectangle because based on the hierarchy, square has the properties of rectangle.

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