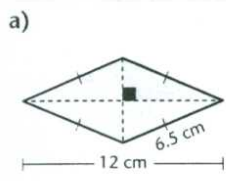


2.36

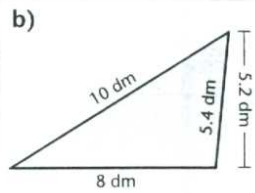
1 Complete the following equalities.

- a) $423 \text{ cm}^2 = \quad \quad \quad \text{mm}^2$
- b) $32.5 \text{ dm}^2 = \quad \quad \quad \text{m}^2$
- c) $65.3 \text{ dam}^2 = \quad \quad \quad \text{km}^2$
- d) $82 \text{ hm}^2 = \quad \quad \quad \text{m}^2$
- e) $0.563 \text{ dm}^2 = \quad \quad \quad \text{mm}^2$
- f) $12 \text{ cm}^2 = \quad \quad \quad \text{m}^2$
- g) $49.3 \text{ cm}^2 = \quad \quad \quad \text{dm}^2$
- h) $0.0034 \text{ m}^2 = \quad \quad \quad \text{dam}^2$

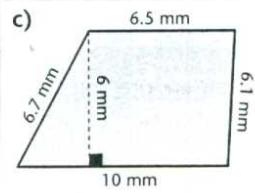
2 Calculate the perimeter P and the area A of the following figures.



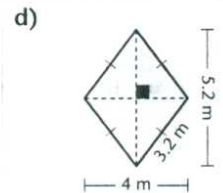
$P =$
 $A =$



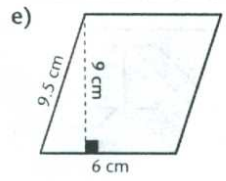
$P =$
 $A =$



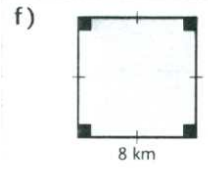
$P =$
 $A =$



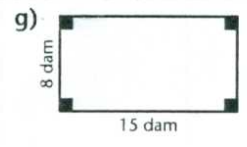
$P =$
 $A =$



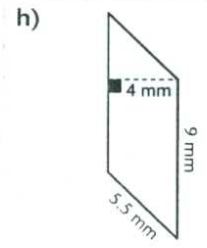
$P =$
 $A =$



$P =$
 $A =$

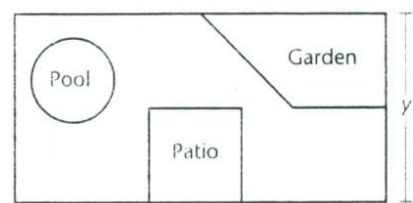


$P =$
 $A =$




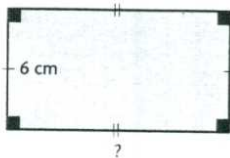
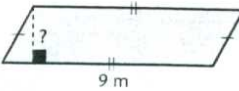

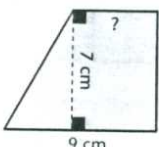
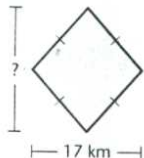
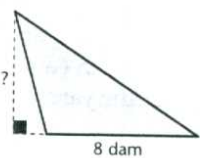
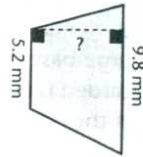
$P =$
 $A =$

3 A backyard, shown in the diagram on the right, is shaped like a rectangle that is twice as long as it is wide. The patio, whose area is 36 m^2 , occupies one eighth of the total area of the yard. The small base and the height of the trapezoid corresponding to the garden are each equal to half the width of the lot. The large base of the trapezoid which corresponds to the garden is half the length of the yard. What is the area of the garden?



L.36

4 Calculate the unknown measure in the following figures.

<p>a) Area = 441 dm^2</p>  <p>Answer:</p>	<p>b) Area = 19.2 cm^2</p>  <p>Answer:</p>	<p>c) Area = 21.6 m^2</p>  <p>Answer:</p>	<p>d) Area = 169 hm^2</p>  <p>Answer:</p>
<p>e) Area = 49 cm^2</p>  <p>Answer:</p>	<p>f) Area = 161.5 km^2</p>  <p>Answer:</p>	<p>g) Area = 25.6 dam^2</p>  <p>Answer:</p>	<p>h) Area = 45 mm^2</p>  <p>Answer:</p>

5 Complete the following table, given that the information in each line refers to a square, a rectangle or a parallelogram.

Quadrilateral	Base (cm)	Height (cm)	Area (cm ²)	Perimeter (cm)
Square	6			
Rectangle	8			34
Parallelogram	6	8		35
Rectangle		3	12	
Square			81	
	4	8	32	40
	5	7	35	24
Square				52
	15		225	60
Parallelogram		6	72	50

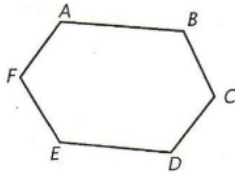
72b

Regular Polygons

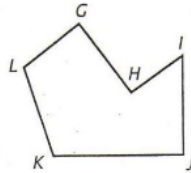


1. Classify each polygon as convex or concave. Explain why.

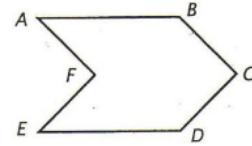
a)



b)

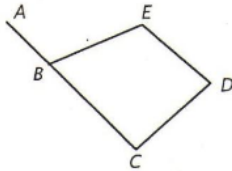


c)

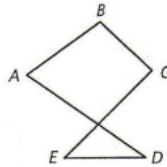


2. Circle the figures that are not polygons. Explain.

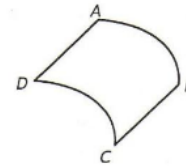
a)



b)

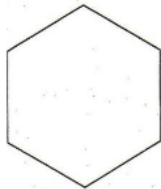


c)

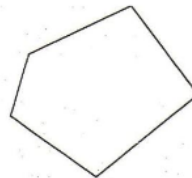


3. Draw the diagonals of each polygon.

a)



b)




4. Sketch each polygon.

a) A concave pentagon.

b) A convex quadrilateral.

Regular Polygons Cont'd

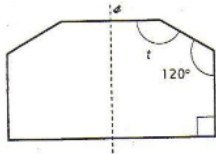

 Lesson 37

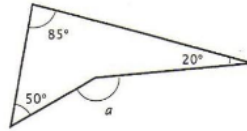
5. True or False?
- a) The only polygon with no diagonal is a triangle. _____.
- b) The sum of the interior angles of a pentagon is greater than that of a hexagon. _____.
- c) In a convex polygon, one angle must be greater than 180° . _____.
- d) In a convex polygon, the sum of the interior and exterior angles at each vertex is 180° . _____.
- e) It is possible to construct a concave triangle. _____.
6. Give the sum of the interior angles for:
- a) A pentagon: _____.
- b) An octagon: _____.
- c) A square: _____.
7. Calculate the number of sides in a polygon if the sum of the interior angles is:
(Use the guess and check "formula" backwards. Ex: $(n - 2)180 = \text{*interior angle*}$)
- a) 1980° _____.
- b) 3060° _____.
- c) 2160° _____.
8. Name the polygon that has a maximum of:
- a) 20 diagonals. _____
- b) 35 diagonals. _____
- c) 9 diagonals. _____
9. Give the sum of the interior angles for a polygon with:
- a) 100 sides: _____.
- b) 20 sides: _____.
- c) 12 sides: _____.
10. How many diagonals can be drawn in a polygon with:
- a) 12 sides? _____.
- b) 10 sides? _____.
- c) 7 sides? _____.

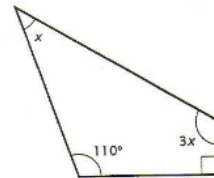
More on Polygons



11. Using the figures below, determine the measure of each angle represented by a variable.







12. A hexagon has five interior angles of 135° , 110° , 100° , 145° , and 120° respectively.

a) Determine the measure of the 6th angle of this hexagon. _____

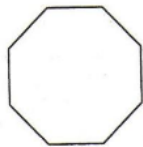
b) Determine the measure of the corresponding exterior angle. _____

Constructing Regular Polygons

1. What is a regular polygon? _____

2. Identify the regular polygons among the following figures. Explain why the others are not regular polygons.

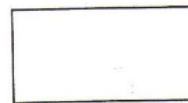
a)



b)



c)



3. what polygon has interior angles measuring:

a) 144° ?; _____.

b) 60° ?; _____.

c) 108° ?; _____.

4. Determine the measure of interior angles of these polygons (One Vertex)

a) Regular dodecagon _____

b) Regular decagon _____

c) Regular octagon _____

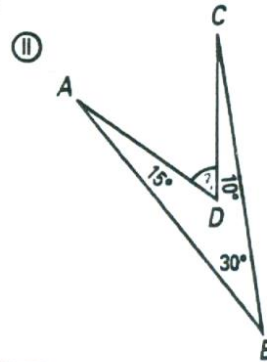
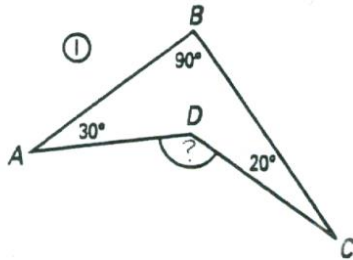
d) Regular hexagon _____

e) Regular pentagon _____

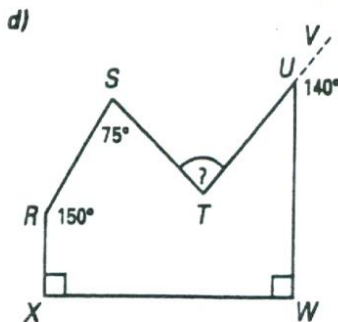
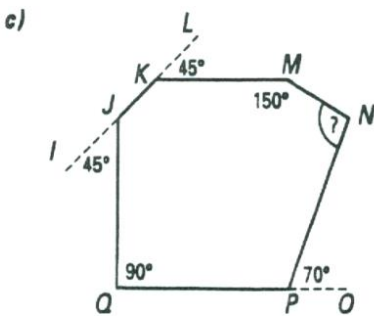
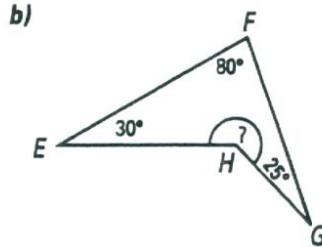
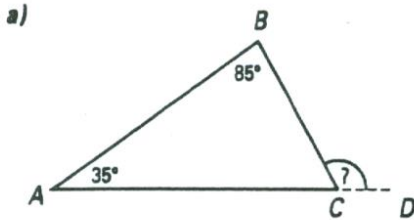
L.38

Lesson 100

① Find the exterior angle formed by the reflex angle.



② Calculate the measure of the indicated angle in each figure.



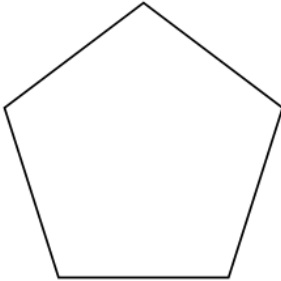
③ The measure of the largest angle in a triangle is double the smallest, and the third angle is 20° more than the smallest. Calculate the measures of the three angles in the triangle. (Draw the triangle representing the angles)

75a

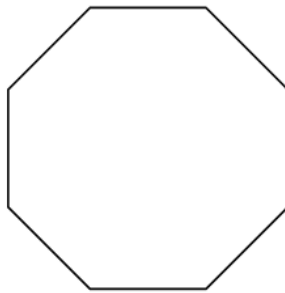
Lesson 39 AXES & Lesson 40 Constructions

5. Draw and give the number of axes of symmetry for each of these regular polygons.

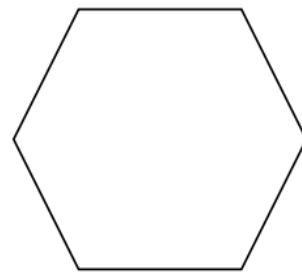
a)



b)



c)

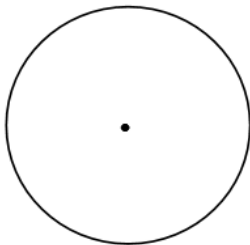


What do you notice? : _____

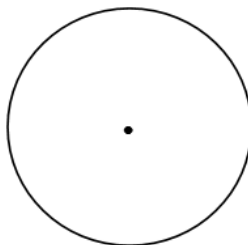
Lesson 40

6. In each circle, construct:

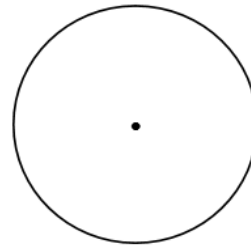
a) An equilateral triangle:



b) A regular octagon:



c) A regular hexagon:



Calculations?

Lesson 41 constructions

7. a) Construct a regular pentagon with 3cm sides c) Construct a regular hexagon with 2cm sides

- b) Construct a square with diagonals of 6cm d) Construct a regular octagon with 2.5cm sides

8. Using a circle determine the central angle needed to construct:

a) A regular decagon:

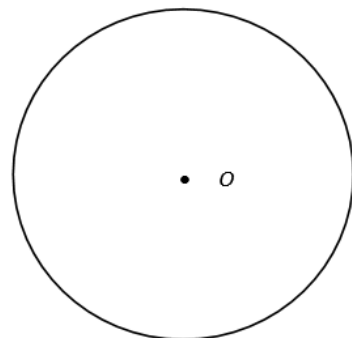
b) A square:

c) A regular pentagon:

9. Using this circle with centre O:

a) Construct a regular pentagon.

b) Use the dilatation method to reduce this pentagon so that its sides measure 2cm.



Perimeter of regular polygons



1. Complete the table by giving the name of each regular polygon.

Name					
Side Length	9.3cm	5.6cm	13.5cm	4.7cm	8.1cm
Perimeter	55.8cm	28cm	108 cm	32.9cm	97.2cm

2. Complete the table.

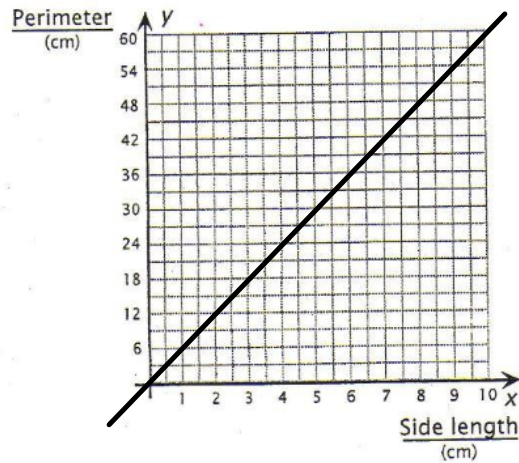
polygon	Square	Pentagon	Hexagon	Octagon	Decagon
Side Length (cm)		4.3	13.7		8.26
Perimeter (cm)	30			78.4	

3.

a) Complete the table (the values given are for regular hexagons)

Side Length (cm)	1	1.5	2	3	8.4	10
Perimeter (cm)						

b) Draw the graph of this situation on the grid.



c) Is this a proportional situation?

4. A regular pentagon has a perimeter of 36.5cm.

a) Find the perimeter of a regular decagon with the same side length. _____

b) Give the ratio: decagon perimeter/pentagon perimeter. _____



5. An equilateral triangle has a perimeter of 18cm.
- a) Determine the side length of a regular octagon with the same perimeter.
- _____
- b) Determine the perimeter of a square whose sides are twice the length of the sides of the triangle.
- _____
6. A regular heptagon has a perimeter of 84cm. Find the side length. _____
7. The traffic signs indicating a turn are shaped like squares. Some have 61cm sides, and others have 91.5cm sides.
- a) Calculate the perimeter of each type of sign. _____
- b) What is the ratio of these perimeters? _____
- c) Is the ratio of the perimeters equal to the ratio of sides? _____
8. Julie spent \$102 fencing in her garden which is shaped like a regular octagon. The fence costs \$4.25 a metre. Determine the length of one side of her garden.
- _____

9. The Canadian dollar (the famous loony) is shaped like a regular hendecagon (11 sides) with each side measuring approximately 7mm.

- a) Determine the perimeter of a \$1 coin?



- b) To the nearest unit, give the measure of an interior angle of such a polygon.

10. Calculate the perimeter of a regular hexagon with 6.5cm sides.



11. True or false?

- a) Two regular polygons with the same number of sides will always have proportional sides.
- b) A regular pentagon and its image are associated by a similarity transformation with ratio 3. The ratio of perimeters is therefore 15.
- c) When the length of the sides of a regular polygon are reduced by 20%, its perimeter is also reduced by 20%.

12. What is the side length of a regular octagon with a perimeter of 70cm?

13. Write an expression for the perimeter of each regular hexagon for the side length given by the following algebraic expressions.

a) r units: _____

c) $(2y - 5)$ units: _____

b) $3v$ units: _____

d) $(x + 4)$ units: _____

14. A regular pentagon has a perimeter of 43 cm. what would its perimeter be if its side lengths were doubled?

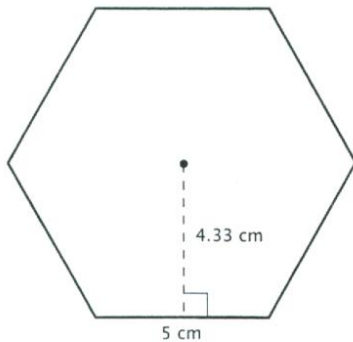
15. A rectangle has a 16cm base and a 10cm height. Give the side length of a regular pentagon with the same perimeter as this rectangle.



16. A regular decagon with a 70cm perimeter is linked to another regular decagon by a similarity transformation centred at O and with a ratio of 0.4. What is the side length of the image decagon?

1. Calculate the area

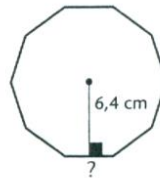
a)



Area: _____

b)

The area of the regular polygon is 66.56 cm^2 .



Answer:

L.43

2 Find the length of the apothem for a regular pentagon with 4 cm sides and an area of 27.5 cm^2 .

3 A regular polygon with 5 cm sides and an apothem of 6.04 cm has an area of 120.8 cm^2 . Which regular polygon is it?

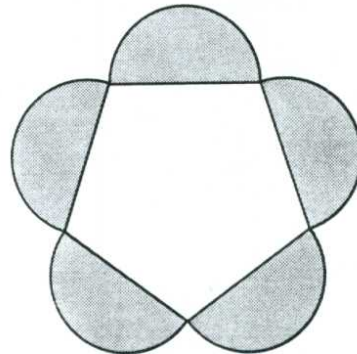
4 Complete the following table.

Name of the regular polygon	Number of sides	Measure of one side (cm)	Measure of the apothem (cm)	Perimeter of the polygon (cm)	Area of the polygon (cm^2)
Pentagon		6	4.1		
Octagon		9	10.9		
	7	8	8.3		
	11	4	6.8		

80a

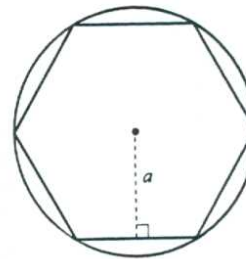
- 5 Semi-circles are constructed on each side of a regular pentagon. The perimeter of the pentagon is 20 cm. What is the area of the shaded sections?

L.43

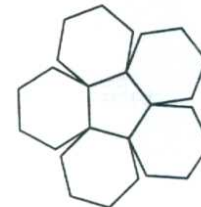


Use
 $\pi \approx 3.14$.

- 6 A hexagon is inscribed in a circle. If the radius of the circle is 8 cm, and the area of the hexagon is 166.32 cm², determine the length of the apothem.



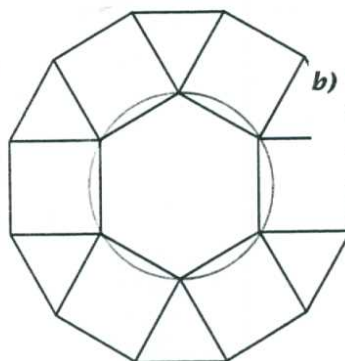
- 7 In the figure below, all the polygons are regular and all the hexagons are congruent. The measure of one side of one hexagon is 4 cm and the apothem measures 3.46 cm. The measure of the apothem of the pentagon is 2.75 cm. What is the difference between the area of one hexagon and the area of one pentagon? Express your answer in square metres.



Answer:

Squares and equilateral triangles have been placed around the edges of a regular hexagon to form a regular dodecagon.

- a) The regular hexagon is inscribed in a circle with a diameter of 6 cm. Determine the perimeter of the regular dodecagon.



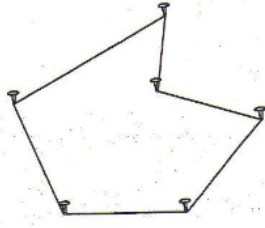
- b) The area of the hexagon is 23.4 cm². Calculate the area of the regular dodecagon.

806

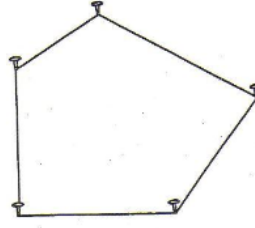
Polygons Review LESSONS 36 to 43

1. Each of the polygons below was formed by joining nails with a string. Draw all the diagonals in each polygon.

a)



b)



How many diagonals can be drawn in a polygon made from 12 nails joined by string? _____

2. Give the sum of the measures of the interior angles of each polygon.

a) Decagon: _____ b) Quadrilateral: _____

3. Match the sets of interior and exterior angle measures to each regular polygon listed.

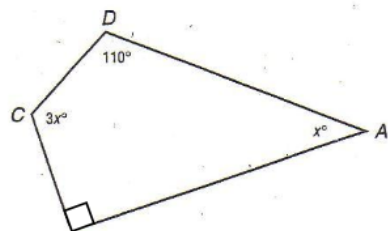
Interior Angles:	1) 135°	2) 108°	3) 156°	4) 144°
Exterior Angles:	5) 24°	6) 45°	7) 36°	8) 72°

- a) Regular Pentagon: **Int:** _____ **Ext:** _____
- b) Regular Decagon: **Int:** _____ **Ext:** _____
- c) Regular Octagon: **Int:** _____ **Ext:** _____
- d) Regular 15-sided Polygon: **Int:** _____ **Ext:** _____

4. How many sides does a polygon have if the sum of its interior angle measures is:

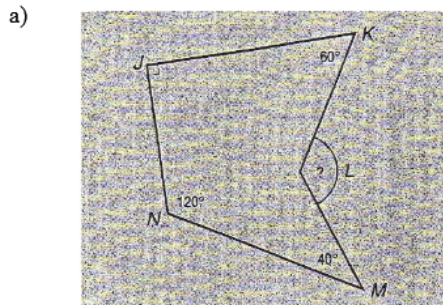
a) 900° ? _____ b) 4140° ? _____

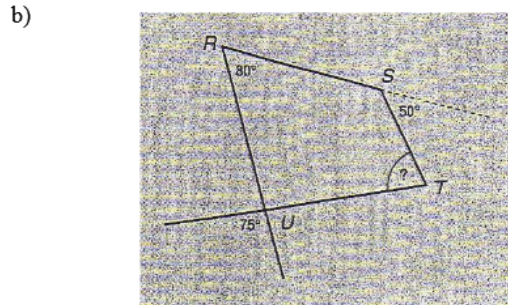
5. Find the missing measures in this block of marble.



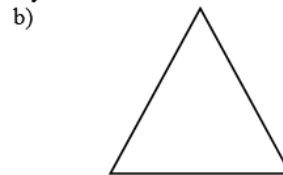
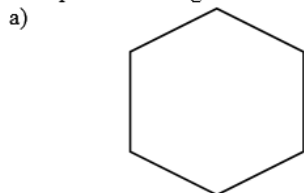
Lesson 36-43

6. A surveyor maps two plots of land as shown. Find the missing angle measure indicated in each. Justify your answer.





7. Two placemat designs are shown. Draw in all axes of symmetry.



8. Anthony wants to create flower bed shaped like a regular pentagon for the middle of his yard. Calculate the measure of the central angle of one of the isosceles triangles that make up the pentagon.

9. Construct these figures.

a) A regular pentagon with 4cm sides.

b) An equilateral triangle with a perimeter of 15cm.

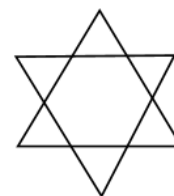
10. Construct a regular octagon using a circle with a diameter of 7cm.



11. a) Write the algebraic expression that represents the length of the side of a regular pentagon with a perimeter of $(15t - 20)$ units.

b) Oliver draws a regular octagon with 3cm sides, then applies a size transformation with a scale factor of 3 : 4. Calculate the perimeter of the image polygon.

c) Find the perimeter of a star formed by drawing an equilateral triangle on each side of a regular hexagon with a perimeter of 42cm.



- d) Marilyn, an architect, is working on the plans for an office building. She wants the windows to be regular octagons with perimeters of 280cm and apothems of 42.25cm. Calculate the area of one of the windows.

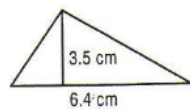


- e) Marcello wants to make a wood frame for a mirror shaped like a regular octagon with sides of 9dm. If the wood costs \$1.65 a metre, how much will Marcello's frame cost?

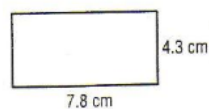
- f) Kim gets a board game as a birthday present. The board is a regular hexagon with a side of 9cm and an area of 210.33cm². find the measure of the apothem of the hexagon.

12. After expressing the area by its respective formula, calculate the area of each of the following polygons.

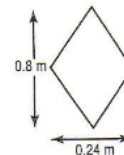
a)



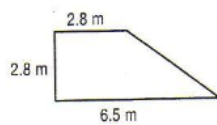
b)



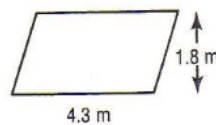
c)



d)



e)



f)

