Math 6 Unit 3

Lesson 11

Perimeter of Polygons

Exploration 1: Perimeter of Regular Polygons

Materials: Pencil

Find the perimeter of the regular polygons with a side length of 3 cm.

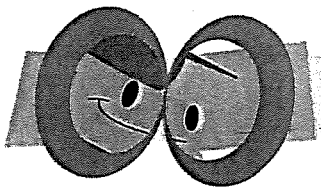
Regular Polygon	Number of Sides	Side Length (cm)	Perimeter (cm)
Equilateral Triangle	3	3	9
Square	4	3	12
Pentagon	5	3	
Hexagon			
Heptagon			
Octagon			
Nonagon			
Decagon			

1. What pattern do you notice in the perimeters of the regular polygons?

2. How would the pattern change if the side length is 4 cm?

3. A regular polygon has 15 sides. The side length is 4 units. What is the perimeter?

4. Write a rule to find the perimeter, **P**, of a regular polygon with **n** sides and a side length of **s**.



Let's Explore

Exploration 2: Perimeter of a Rectangle

Materials: String, Centimetre Ruler, Scissors, Pencil

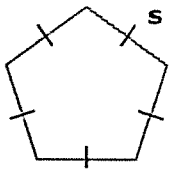
1. Cut a length of string that is 42 centimetres long.
2. Create at least six rectangles that have whole number side lengths. Record the measures in the given table.

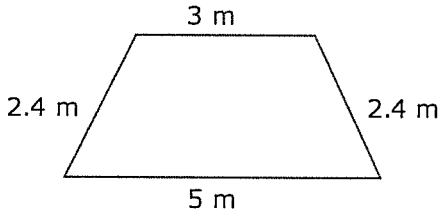
Length	Width	Perimeter

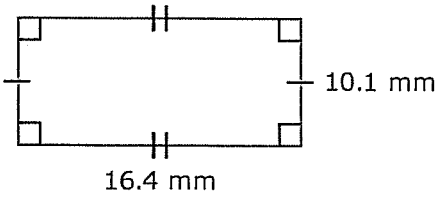
3. Do you notice a relationship between the side lengths and the perimeter?

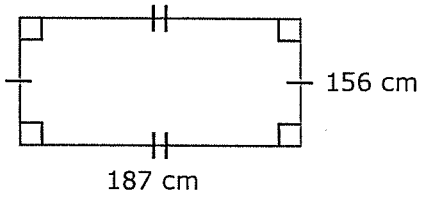
4. Write a rule for the perimeter, **P**, of a rectangle given the length, **l**, and the width, **w**.

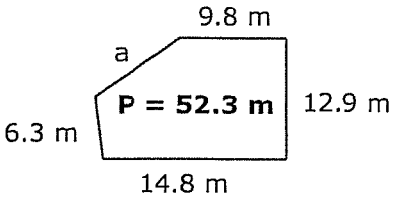
For 1 – 18: Find the perimeter or the missing measure of each polygon.

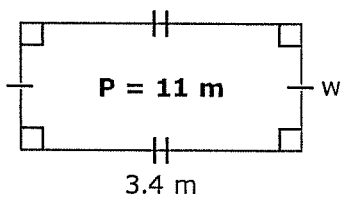
1. 

2. 

3. 

4. 

5. 

6. 

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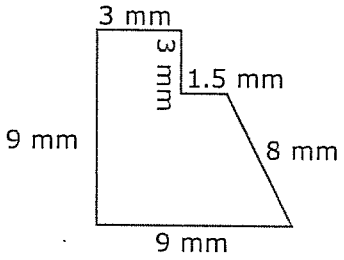

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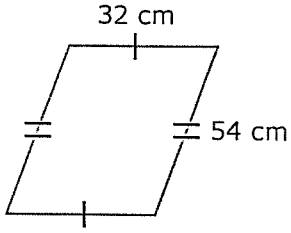

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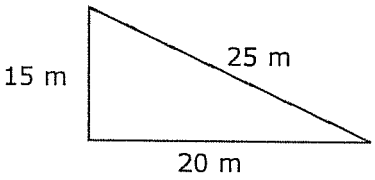

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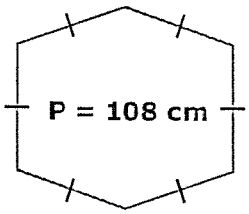


11. regular octagon, side length = 18 m

12. square, side length = 3.75 mm

13. nonagon, perimeter = 58.5 m

For 19 – 22: Use order of operations to find the perimeters of the given rectangles in three ways.

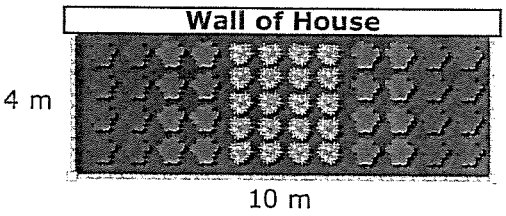
		P = l + l + w + w	P = 2l + 2w	P = 2(l + w)
	Example: l = 3, w = 2	P = 3 + 3 + 2 + 2 P = 10	P = 2(3) + 2(2) P = 6 + 4 P = 10	P = 2(3 + 2) P = 2(5) P = 10
19.	l = 3.5, w = 2.4			
20.	l = 10, w = 8			
21.	l = 7, w = 2.5			
22.	l = 52, w = 38			

23. Reflect: What can you say about the three rules that you used in problems 19 – 22?

For 24 – 27: Solve the problems using the rules for perimeter.

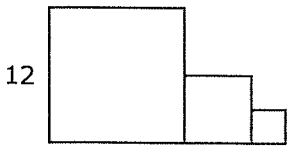
24. Zach and Nina each make a sign to put on the door of their bedroom. Both signs have a perimeter of 60 centimetres. Zach's sign is a rhombus. Nina's sign is a regular pentagon. How are the side lengths of their signs different?

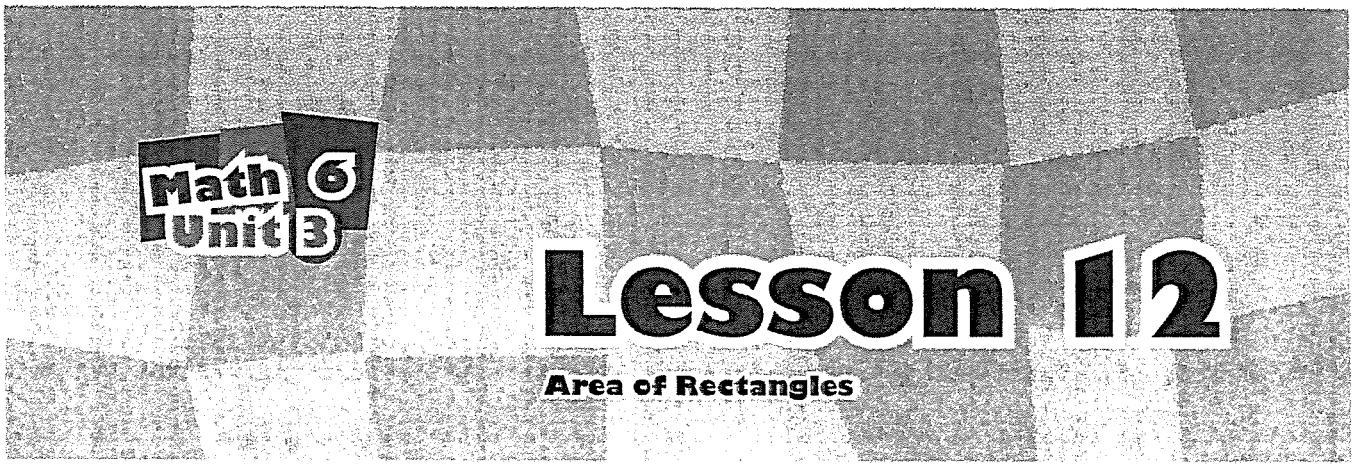
25. Cameron's mom has fenced a garden beside their house. The fence and the wall of the house form a rectangle. What is the total length of the fence?



26. Alyssa and her dad want to build a dog run. They would like the dog run to have a length of 18 metres and a width of 6 metres. What would be the perimeter of the dog run if the length is only half of this measure?

27. Each square in the pattern has a side length that is half the one before it. What is the perimeter of the whole figure?





Exploration 1: Generalize Area of a Rectangle

Materials: Square Tiles, or Grid Paper from the back of this unit in your Workbook, Pencil

1. Make rectangles on your Grid Paper, or with Square Tiles, using the side lengths shown in the table. Record the area of each rectangle.

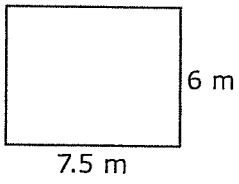
Length	Width	Area (square units)
2	4	
3	4	
4	4	
5	4	
6	4	
3	5	
3	6	
3	7	
3	8	
3	9	
3	10	

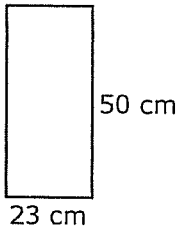
2. Do you notice a relationship between the area of the rectangle and the side lengths?

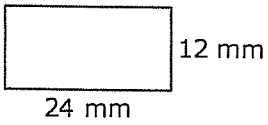
3. Write a rule for the area of a rectangle using the length, l, and the width, w.

4. Test your rule using a rectangle with a length of 8 units and a width of 4 units.

For 1 – 8: Find the area of each rectangle.

1. 

2. 

3. 

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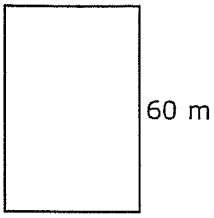

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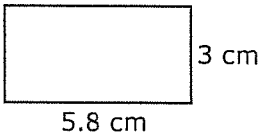

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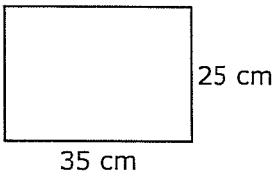


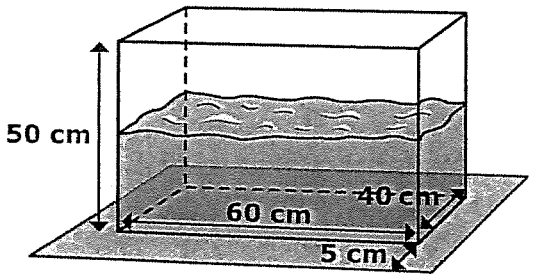
7. length = 25 mm, width = 10 mm

8. length = 8.5 mm, width = 8 mm

For 13 – 15: Solve the problems using area and perimeter formulas.

13. Lian has a rectangular puzzle that is 16 square units in area. Zach has a rectangular puzzle that has a perimeter of 16 units. Are the puzzles the same size? Explain your answer.

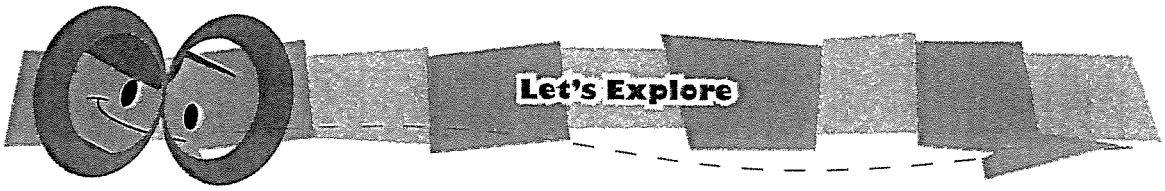
14. Cameron wants to place his aquarium on a mat to keep the table dry. He wants the mat to extend 5 cm on each side of the base of the aquarium. What is the perimeter of the mat? What is the area of the mat?



Math 6 Unit 3

Lesson 13

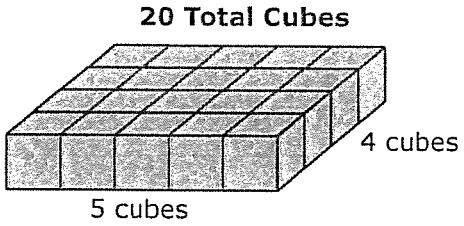
Volume



Exploration 1: A Rule for Volume

Materials: Centimetre Cubes, or Grid Paper from the back of this unit in your Workbook, Pencil

1. Build a rectangular prism that looks like this:



2. Record the volume in the chart. Make all rectangular prisms that you need to make to complete the volume of each in the chart.

Length	Width	Height	Volume
5	4	1	20
5	4	2	
5	4	3	
5	4	4	
5	4	5	
5	4	6	
5	4	7	
5	4	8	

3. Do you notice a pattern to the volume?

4. How does the pattern relate to the length and the width?

5. How does the volume relate to the dimensions?

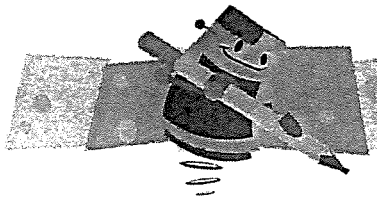
6. Make several rectangular prisms of your own. Record the dimensions and the volume of each rectangular prism in the chart.

Length	Width	Height	Volume

7. How does the volume relate to the dimensions?

8. Write a rule to find the volume of a rectangular prism given the dimensions. Use V for volume, l for length, w for width, and h for height.

9. Test your rule by finding the volume of a rectangular prism with the following dimensions: l = 2, w = 4, h = 3

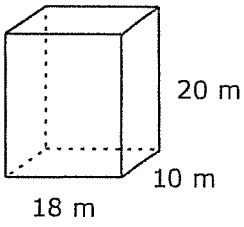


Let's Practice

1. Write the formula to find the volume of a rectangular prism, and then write the formula to find the volume of a cube with sides of length **s**.

For 2 – 6: Find the volume of the given figure using the formula V = l • w • h.

2.



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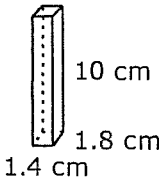

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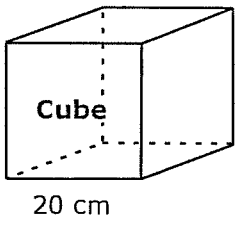

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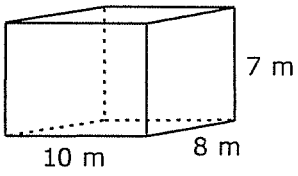

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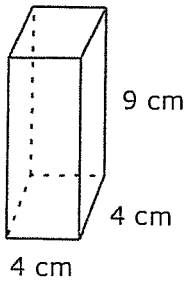
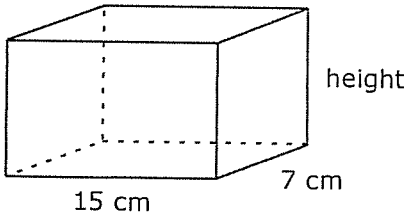
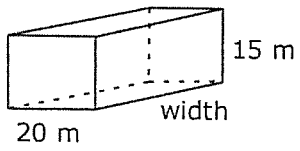


For 7 – 10: Find the missing dimension of the given rectangular prism.

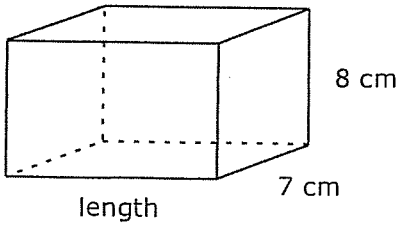
7. **V = 945 cm³**



8. **V = 12 000 m³**



9. **V = 672 cm³**



10. **V = 10 000 m³**