

Important Concepts . . .

Preview Review



Mathematics Grade 7
**W3 - Lesson 2: Area of Triangles and
Parallelograms**

Important Concepts of Grade 7 Mathematics

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W1 - Lesson 2	Decimal Numbers
W1 - Lesson 3	Fractions
W1 - Lesson 4	Improper Fractions, Mixed Numbers, Percents, and Decimals
W1 - Lesson 5	Integers, Number Lines, and Sequencing
W1 - Quiz	
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W2 - Lesson 2	Modeling Expressions, Equations, and the Preservation of Equality
W2 - Lesson 3	Algebra and Linear Equations
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W3 - Lesson 2	Area of Triangles and Parallelograms
W3 - Lesson 3	Line Segments
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W3 - Quiz	

Materials Required

Math Set
Calculator

No Textbook Required

This is a stand-alone course.

Mathematics Grade 7

Version 6

Preview/Review W3 - Lesson 2

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Preview/Review Concepts for Grade Seven Mathematics



W3 - Lesson 2:

***Area of Triangles and
Parallelograms***

W3 – Lesson 2: Area of Triangles and Parallelograms

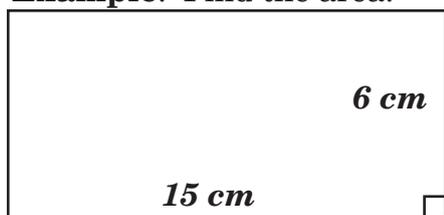
Review:

- *I can find the area of a rectangle.*

Calculating the area of a rectangle

The area of a rectangle can be found by multiplying **base** times **height**.

Example: Find the area.



$$\begin{aligned} \text{Area} &= \text{base} \times \text{height} \\ &= 15 \text{ cm} \times 6 \text{ cm} \\ &= 90 \text{ cm}^2 \end{aligned}$$

An area is always written as a unit squared.

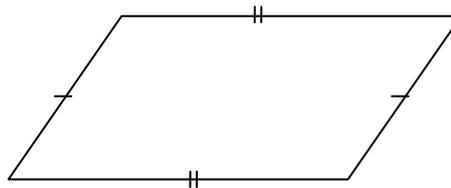
Objective:

- *I can find the area of a parallelogram.*

Parallelograms

What is a parallelogram?

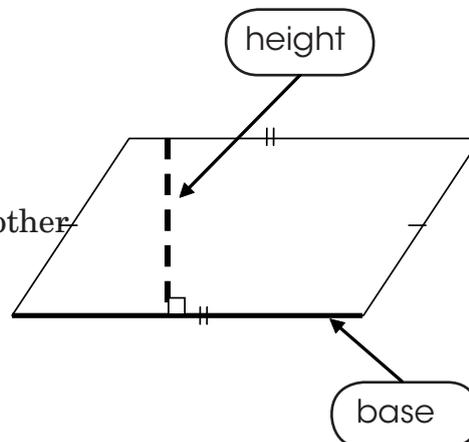
A parallelogram has two sets of parallel sides. Each set of sides are the same length.



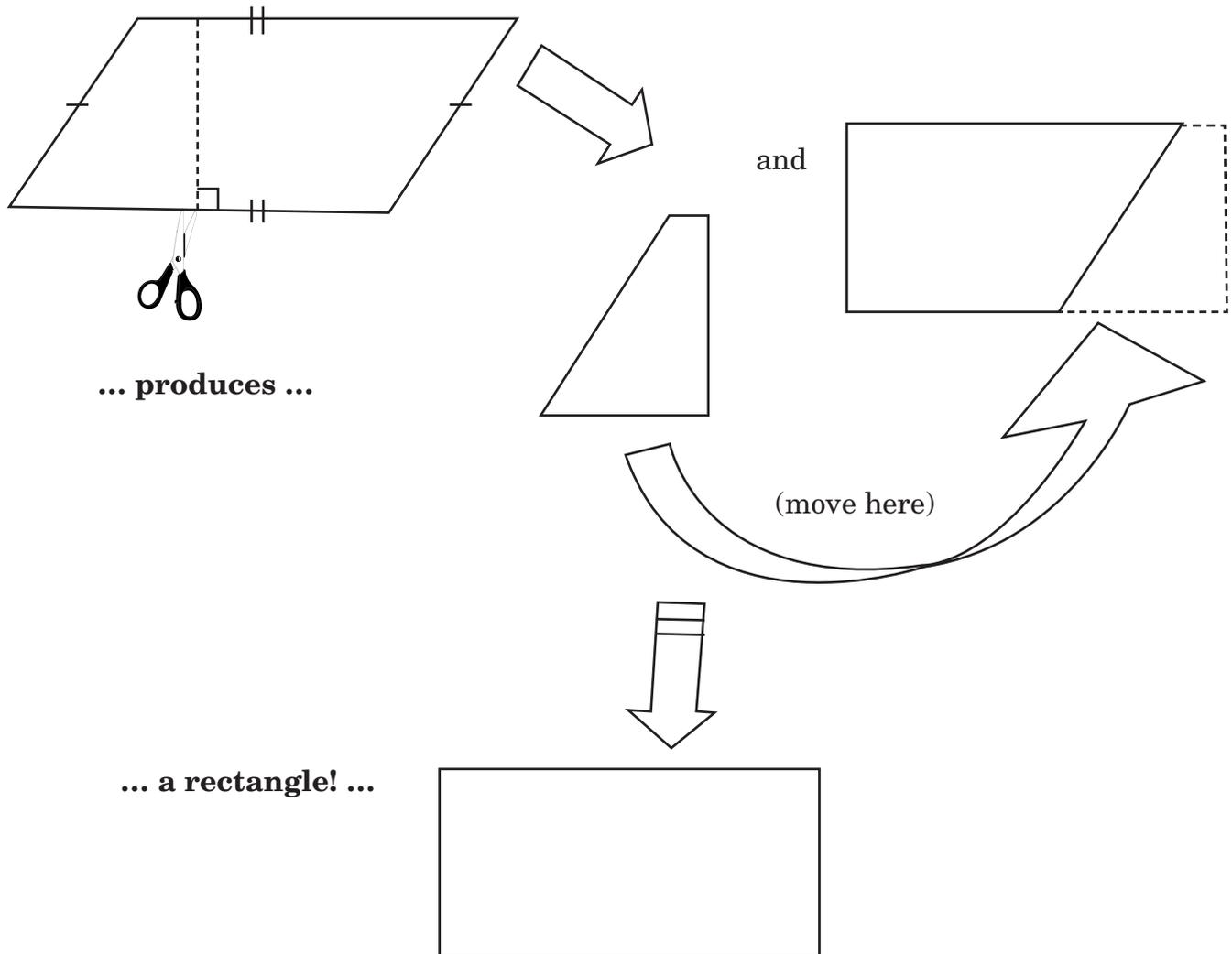
Base and Height of a parallelogram

The **base** can be any one of the sides.

The **height** must be 90° to the base and must touch the other



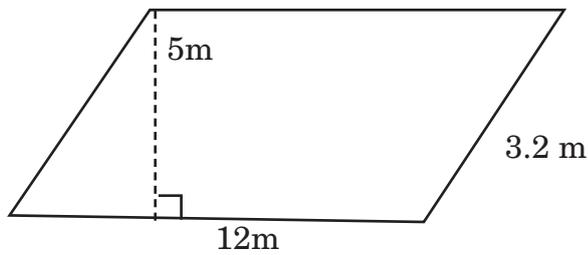
Cutting the parallelogram along the height, and then rearranging the pieces...



Therefore, the area of a parallelogram can be calculated using the same formula as the area of a rectangle.

$$\text{Area} = \text{base} \times \text{height}$$

Example: Find the area of:



$$\begin{aligned} \text{Area} &= \text{base} \times \text{height} \\ &= 12 \text{ m} \times 5 \text{ m} \\ &= 60 \text{ m}^2 \end{aligned}$$

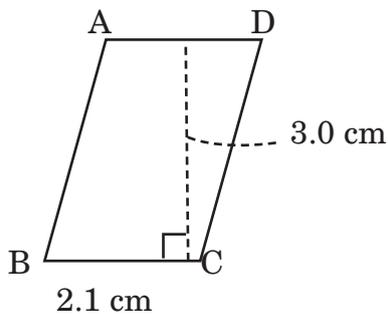
Example 2: A parallelogram has a height of 4m and an area of 24 m². What is the length of the base?

$$\begin{aligned} \text{Area} &= b \times h \\ (24) &= 4b \\ 24 \div 4 &= 4b \div 4 \\ 6 &= b \end{aligned}$$

The base is 6 m long.

Practice:

1. Calculate the area of parallelogram ABCD.



2. A parallelogram has a height of 0.8 m and an area of 5.6 m². What is the base of the parallelogram?

Objective:

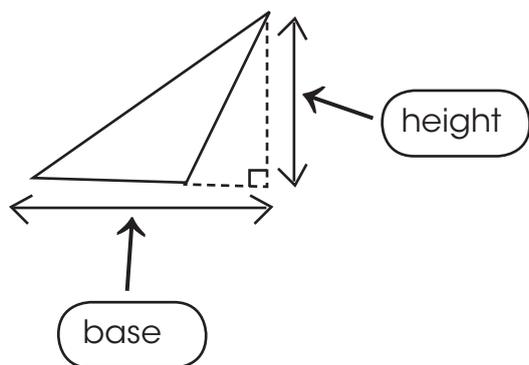
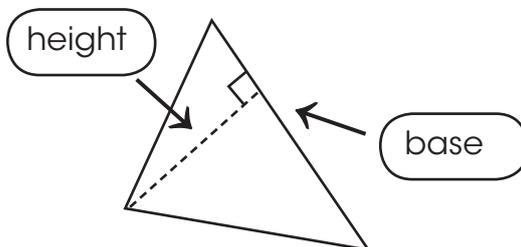
- *I can find the area of a triangle.*

Triangles

Base and Height of a triangle

The **base** can be any one of the sides.

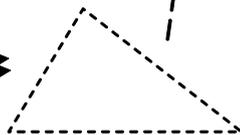
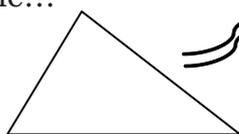
The **height** must be 90° to the base and must touch the angle on the opposite side.



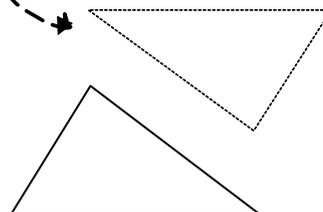
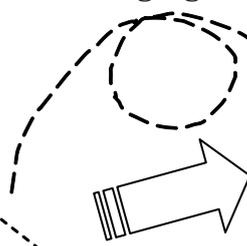
Getting a right angle sometimes means going outside the triangle, or using a different side as the base.

Formula for the area of a triangle

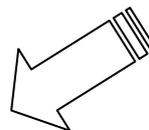
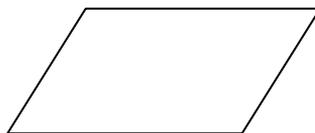
Duplicating a triangle...



... rearranging the pieces ...



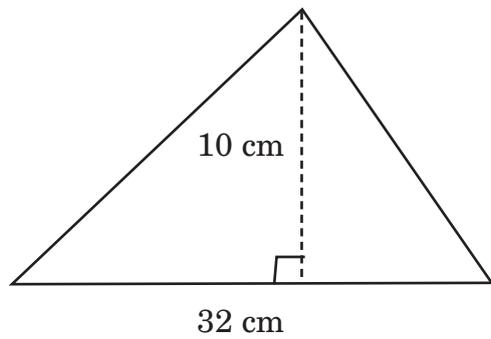
... produces a **parallelogram!**



Therefore area of a triangle is half of the area of a parallelogram.

$$\begin{aligned} \text{Area of Triangle} &= \frac{1}{2} (\text{area of parallelogram}) \\ &\text{or} \\ &= \frac{1}{2} (\text{base} \times \text{height}) \end{aligned}$$

Example: Find the area of:



$$\begin{aligned} \text{Area} &= \frac{1}{2} (\text{base} \times \text{height}) \\ &= \frac{1}{2} (32\text{cm} \times 10 \text{ cm}) \\ &= \frac{1}{2} (320 \text{ cm}^2) \\ &= 160 \text{ cm}^2 \end{aligned}$$

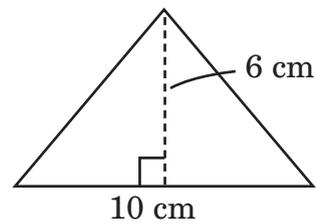
Example 2: A triangle has a height of 8m and an area of 32 m². What is the length of the base?

$$\begin{aligned} \text{Area} &= \frac{1}{2} (b \times h) \\ (32) &= \frac{1}{2}(8)b \\ 32 &= 4b \\ 32 \div 4 &= 4b \div 4 \\ 8 &= b \end{aligned}$$

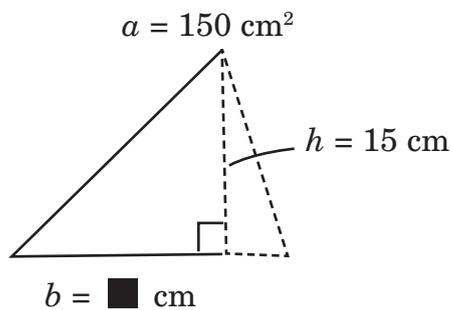
The base is 8 m long.

Practice:

1. Calculate the area of the triangle.



2. Calculate the base of the triangle.



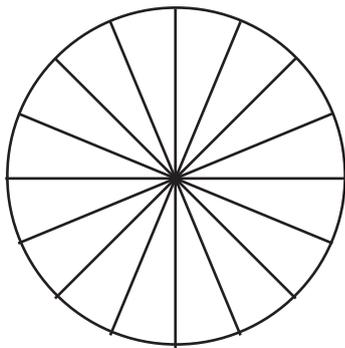
Objective:

- *I can find the area of a circle.*

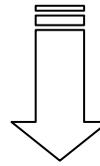
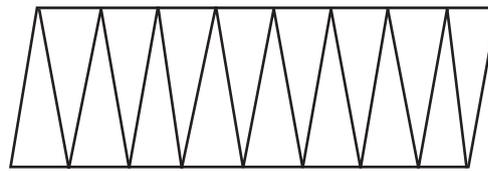
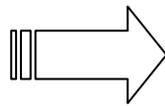
Circles

Formula for the area of a circle

Divide a circle into even pieces...



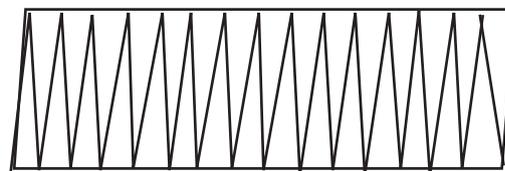
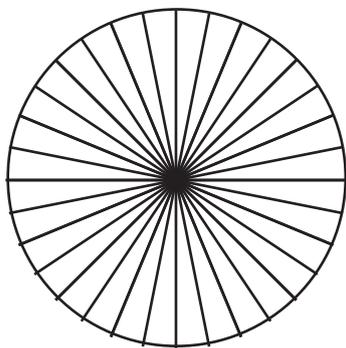
Rearrange the pieces...



... produces a parallelogram



The smaller the pieces the circle is cut into, the closer the rearranged shape gets to a **rectangle**.



Therefore area of a circle is the same as the area of a rectangle.

Area of Circle = base \times height

Base = $\frac{1}{2}$ circumference

= $\frac{1}{2} \pi d$ but ($\frac{1}{2} d$) is radius

Therefore, **Base = πr**

Height = radius

Area of a Circle = $\pi \times r \times r$

or

= πr^2

Example: Calculate the area of a circle with a diameter of 22 cm.

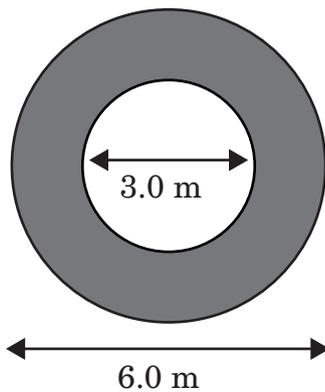
$$\begin{aligned} \text{Area} &= \pi r^2 \\ &= (3.14)(11)(11) \\ &= 379.9 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Radius} &= \frac{1}{2} d \\ &= \frac{1}{2} (22) = 11 \text{ cm} \end{aligned}$$

Example 2: Calculate the area of the shaded ring.

$$\text{radius of outer circle} = \frac{1}{2}(6) = 3 \text{ m}$$

$$\text{radius of inner circle} = \frac{1}{2}(3) = 1.5 \text{ m}$$



$$\begin{aligned} \text{Area of Outer circle} &= \pi r^2 \\ &= (3.14)(3)(3) \\ &= 28.3 \text{ m}^2 \end{aligned}$$

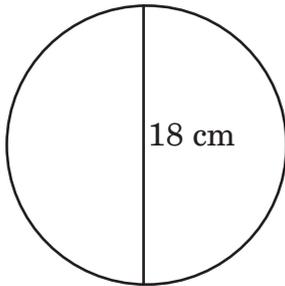
$$\begin{aligned} \text{Area of inner circle} &= \pi r^2 \\ &= (3.14)(1.5)(1.5) \\ &= 7.1 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of shaded} &= \text{outer circle} - \text{inner circle} \\ &= 28.3 - 7.1 \\ &= 21.2 \text{ m}^2 \end{aligned}$$

Practice:

1. Calculate the area of a circle with a radius of 7.3 cm.

2. Calculate the area of the circle.



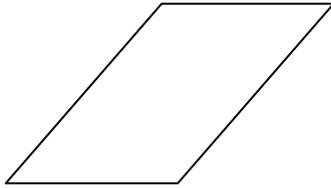
3. A hotel is tiling their new circular fountain. The fountain is 3.2 m across. What area will be tiled?
4. A table has an area of 153.9cm^2 what is the diameter of the table?

Summary and practice::

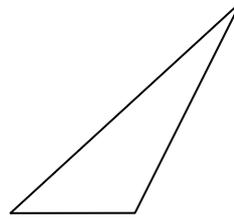
- *Using what you've learned, answer the following questions.*

1. Clearly label the base and height on each of the following figures.

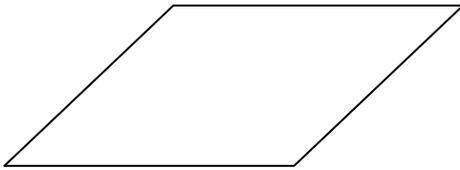
a.



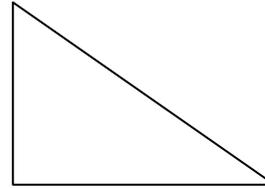
b.



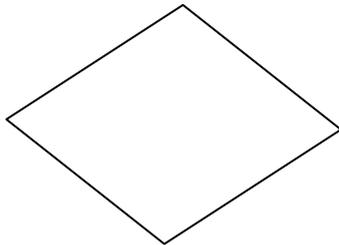
c.



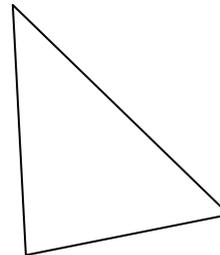
d.



e.



f.



2. Write the formula to calculate area for:

a. A rectangle:

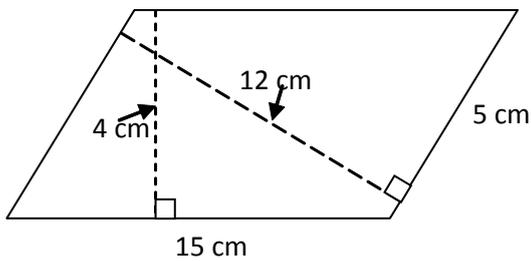
b. A triangle:

c. A parallelogram:

d. A circle:

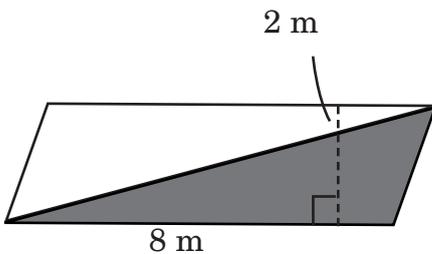
3. Henry wants to make a parallelogram surface with an area of 72 dm^2 . What are three possible measurement combinations he could make his table?

4. Calculate the area.



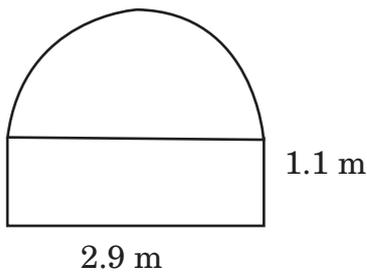
5. Parallelogram A has a base of 6.8 cm and an area of 49 cm^2 . Parallelogram B has a base that is 4 cm longer and it is 5 cm higher. What is the area of parallelogram B?

6. The flag below is made of two fabrics; the price of shaded fabric is $\$8.50$ per square meter. Calculate the cost of the shaded fabric.

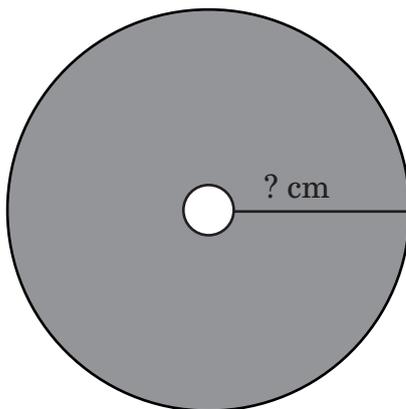


7. Sally drew a triangle with a base of 10 cm and a height of 7 cm. Frank drew one with a base of 9 cm and a height of 8 cm. How much greater is the area of the larger triangle?

8. A stained-glass window is a rectangle and a half circle as shown. What is the area of glass needed?



9. The area of the shaded circle is 254.3 cm^2 . The diameter of the hole in the centre is 2.8 cm. What is the radius of the entire circle from the centre of the smaller circle to the outer edge of the large circle?





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