Area of a triangle

WALT - Understand triangle area rules by working on a practical investigation
- Use triangle area rules to solve area problems in a composite area problem

Success Criteria: I understand that a triangle can be ½ of a rectangle. I can divide a shape into triangular parts to calculate the area.

Try a practical investigation

Investigation 2 Area of a triangle

Follow the steps to develop a rule for finding the area of a triangle.

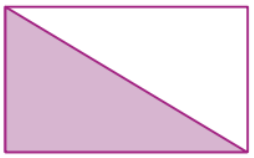
1 *Step 1*: Find the area of each rectangle.

a

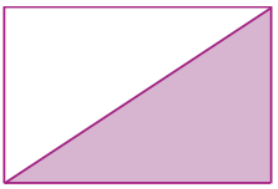
b

Step 2: Find the shaded area within each rectangle.

a

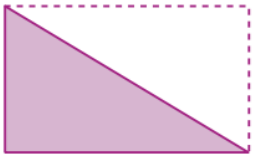


b

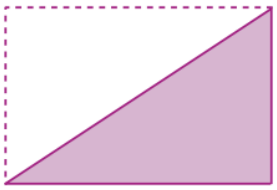


Step 3: Find the area of each shaded triangle.

a

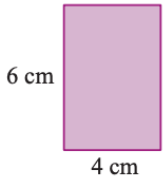


b

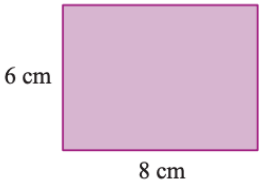


2 *Step 1*: Find the area of each rectangle.

a

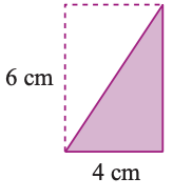


b

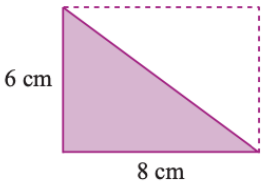


Step 2: Find the area of each shaded triangle.

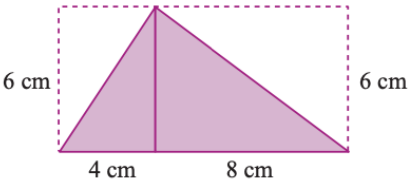
a



b

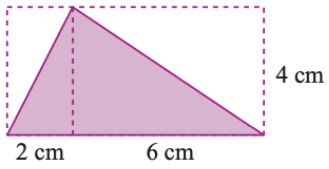


3 The rectangles in question **2** can be put together as shown. What is the area of the shaded triangle formed?

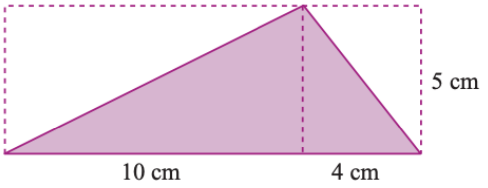


4 Find the area of each shaded triangle.

a

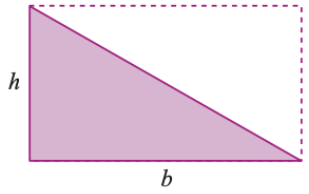


b

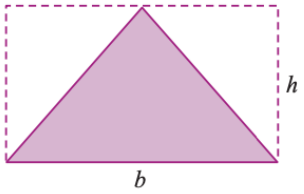


5 Find an expression for the area of each shaded triangle.

a



b

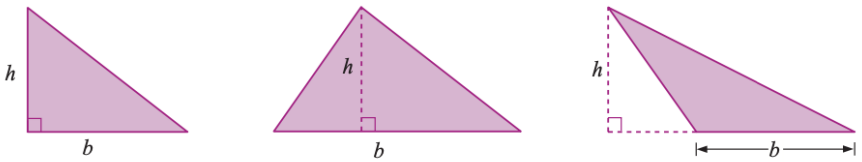


6 Copy and complete the following:

The area of a triangle with base b and perpendicular height h is $A = \frac{\square}{2}$.

In Investigation 2 you developed a rule for finding the area of a triangle.

The area of a triangle is half the area of the rectangle enclosing it.



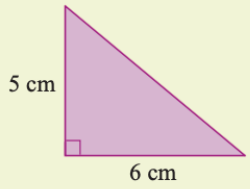
Area of triangle $= \frac{1}{2}$(base $\times$ height)

$$A = \frac{1}{2}bh \text{ or } A = \frac{bh}{2}$$

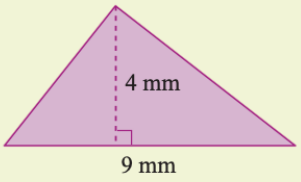
With obtuse-angled triangles, the perpendicular height is shown outside the triangle.

Find the areas of the following triangles.

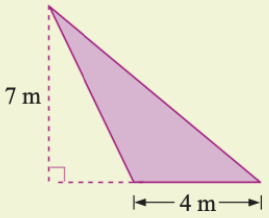
a



b



c



a $A = \frac{1}{2}bh$

$= \frac{1}{2} \times 6 \times 5$

$= 15 \text{ cm}^2$

b $A = \frac{1}{2}bh$

$= \frac{1}{2} \times 9 \times 4$

$= 18 \text{ mm}^2$

c $= \frac{1}{2}bh$

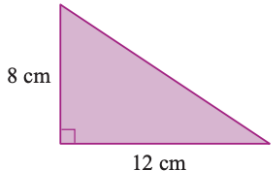
$= \frac{1}{2} \times 4 \times 7$

$= 14 \text{ m}^2$

View the video

1 Complete to find the areas of the following triangles.

a

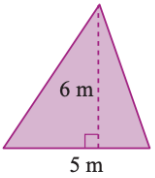


$A = \frac{1}{2}bh$

$= \frac{1}{2} \times \_\_\_ \times 8$

$= \_\_\_ \text{ cm}^2$

b

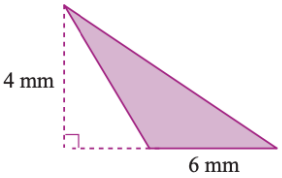


$A = \frac{1}{2}bh$

$= \frac{1}{2} \times 5 \times \_\_\_$

$= \_\_\_ \text{ m}^2$

c



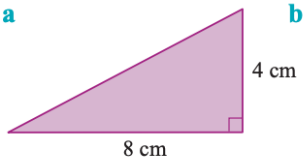
$A = \frac{1}{2}bh$

$= \frac{1}{2} \times \_\_\_ \times \_\_\_$

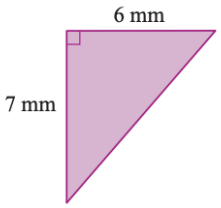
$= \_\_\_ \text{ mm}^2$

2 Find the areas of the following triangles.

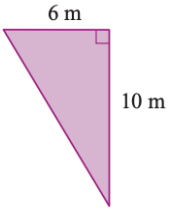
a



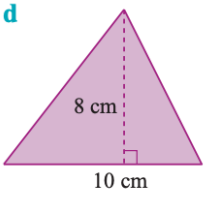
b



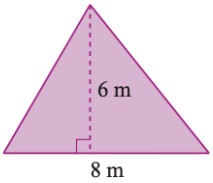
c



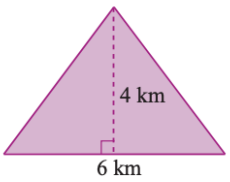
d



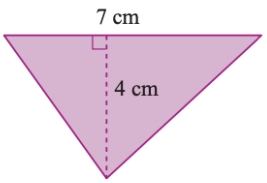
e



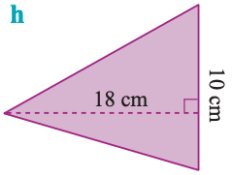
f



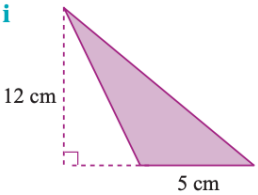
g



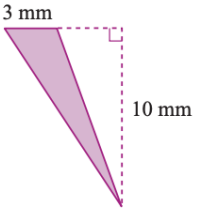
h



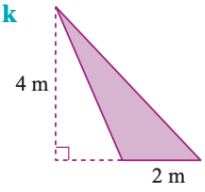
i



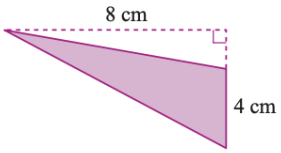
j



k

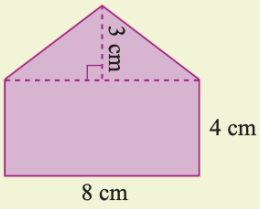


l

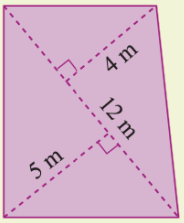


Find the areas of the following shapes.

a



b



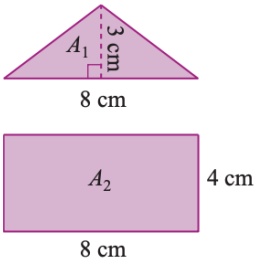
a This shape is made up of a rectangle and a triangle.

$A = A_1 + A_2$

$= \frac{1}{2}(8 \times 3) + (8 \times 4)$

$= 12 + 32$

$= 44 \text{ cm}^2$



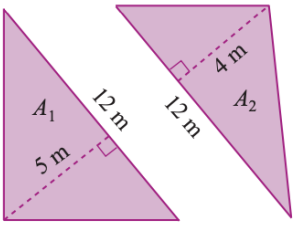
b This shape is made up of two triangles.

$A = A_1 + A_2$

$= \frac{1}{2}(12 \times 5) + \frac{1}{2}(12 \times 4)$

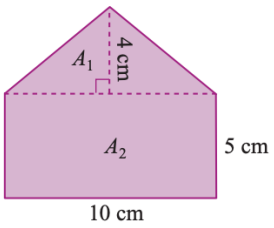
$= 30 + 24$

$= 54 \text{ m}^2$



3 Complete the following to find the area of these shapes.

a



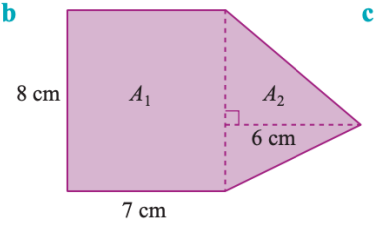
$A = A_1 + A_2$

$= \frac{1}{2}(\_\_\_ \times 4) + (10 \times \_\_\_)$

$= \_\_\_ + \_\_\_$

$= \_\_\_ \text{ cm}^2$

b



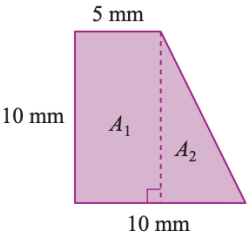
$A = A_1 + A_2$

$= (8 \times \_\_\_) + \frac{1}{2}(8 \times \_\_\_)$

$= \_\_\_ + \_\_\_$

$= \_\_\_ \text{ cm}^2$

c



$A = A_1 + A_2$

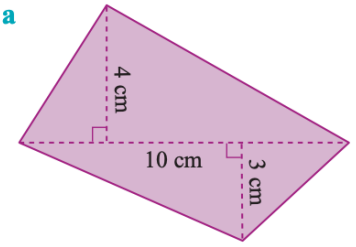
$= (10 \times \_\_\_) + \frac{1}{2}(\_\_\_ \times \_\_\_)$

$= \_\_\_ + \_\_\_$

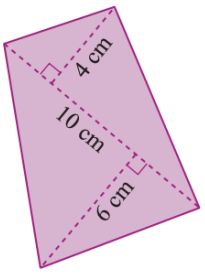
$= \_\_\_ \text{ mm}^2$

4 Find the areas of the following shapes.

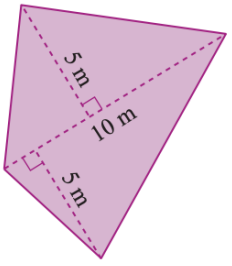
a



b



c



Check your answers

1 **a** $A = \frac{1}{2} \times 12 \times 8 = 48 \text{ cm}^2$

b $A = \frac{1}{2} \times 5 \times 6 = 15 \text{ m}^2$

c $A = \frac{1}{2} \times 6 \times 4 = 12 \text{ mm}^2$

2 **a** 16 cm^2 **b** 21 mm^2 **c** 30 m^2 **d** 40 cm^2

e 24 m^2 **f** 12 km^2 **g** 14 cm^2 **h** 90 cm^2

i 30 cm^2 **j** 15 m^2 **k** 4 mm^2 **l** 16 cm^2

3 **a** $A = \frac{1}{2}(10 \times 4) + (10 \times 5) = 20 + 50 = 70 \text{ cm}^2$

b $A = (8 \times 7) + \frac{1}{2}(8 \times 6) = 56 + 24 = 80 \text{ cm}^2$

c $A = (10 \times 5) + \frac{1}{2}(10 \times 5) = 50 + 25 = 75 \text{ mm}^2$

4 **a** 35 cm^2 **b** 50 cm^2 **c** 50 m^2