

Year 9 Term 2 Homework

Student Name: _____	Grade: _____
Date: _____	Score: _____

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4 Year 9 Term 2 Week 4 Homework

4.1 Measurement

4.1.1 Length, mass, capacity and time

Exercise 4.1.1 Complete each of these conversions:

1. $150 \text{ mg} = \underline{\hspace{2cm}} \text{ g}$
2. $3520 \text{ mL} = \underline{\hspace{2cm}} \text{ kL}$
3. $5.06 \text{ kL} = \underline{\hspace{2cm}} \text{ L}$
4. $2\frac{5}{6} \text{ h} = \underline{\hspace{2cm}} \text{ min}$
5. $0.3 \text{ m} = \underline{\hspace{2cm}} \text{ km}$
6. $0.09 \text{ m} = \underline{\hspace{2cm}} \text{ mm}$
7. $196 \text{ L} = \underline{\hspace{2cm}} \text{ kL}$
8. $75 \text{ min} = \underline{\hspace{2cm}} \text{ h}$
9. $2.4 \text{ min} = \underline{\hspace{2cm}} \text{ s}$
10. $1.9 \text{ h} = \underline{\hspace{2cm}} \text{ min}$

4.1.2 Accuracy and precision

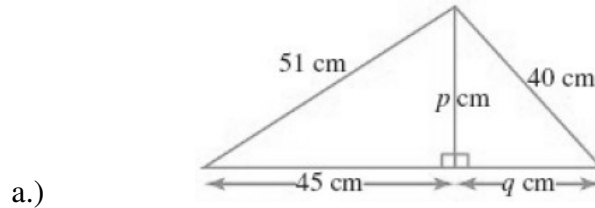
All measurements are accurate to within $\pm\frac{1}{2}$ of the smallest unit marked on the measuring instrument.

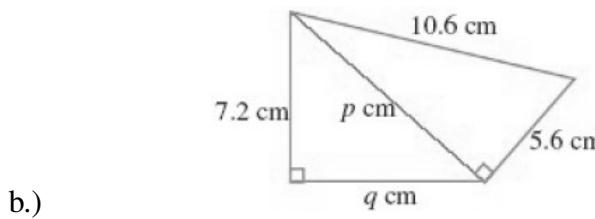
Exercise 4.1.2 State the lower and upper bounds of each of these measurements:

1. 23.6 cm _____
2. 50.0 km _____
3. 12.3 mm _____
4. 0.82 L _____
5. 24.5°C _____
6. 23.32 t _____

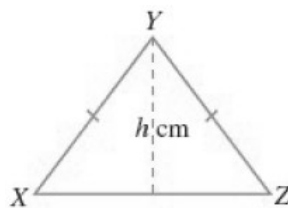
4.1.3 Pythagoras' theorem

Exercise 4.1.3 Find the values of p and q , then find the perimeter of each figure.





Exercise 4.1.4 In the isosceles triangle XYZ , $XY=YZ$ and $XZ = 20$ cm. If the perimeter of the triangle is 72 cm, find the height h cm.

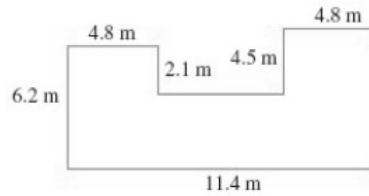


4.1.4 Perimeter, circumference and arc

Exercise 4.1.5 Consolidation

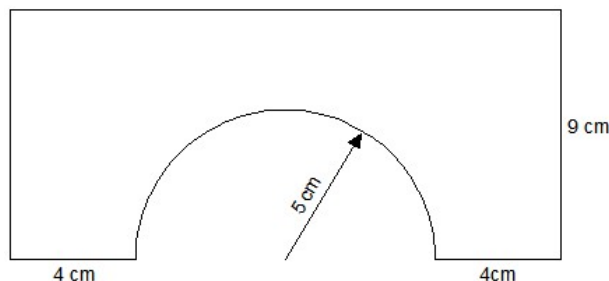
1. Three circles with centers O , P and Q are drawn in such way that each circle touches the other two. If these circles have the radius of 12 cm, 16 cm and 20 cm respectively. Find the perimeter of the triangle OPQ formed by the centers of these circles.

2. Find the perimeter of the figure given below:



3. Find the perimeter of a semi-circle if the radius of the semi-circle is 12 cm.

4. Find the perimeter of the figure given below:



4.1.5 Converting units of area

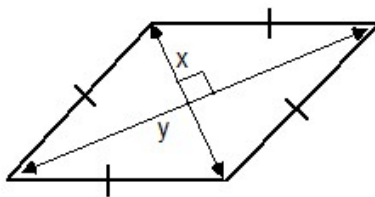
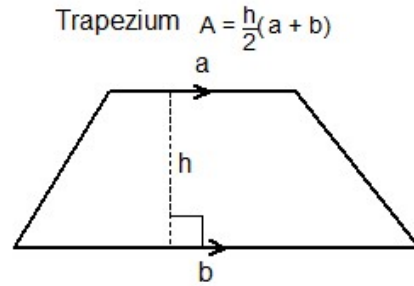
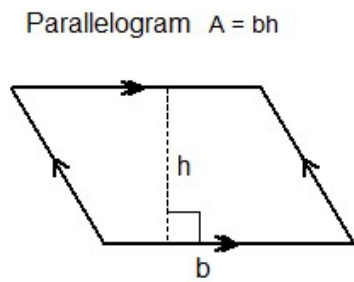
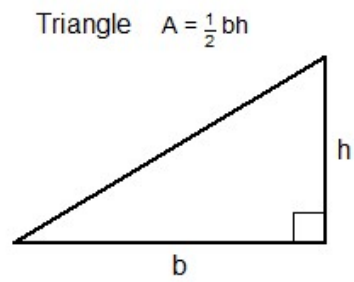
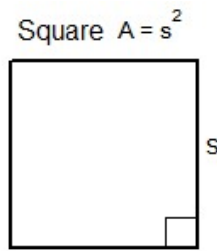
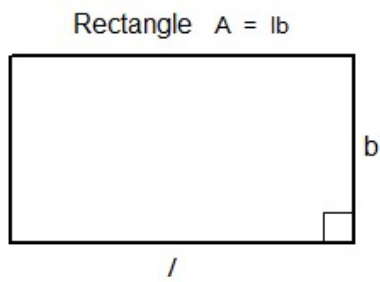
Converting units of area: multiply or divide by the square of the linear conversion factor.

1. $1 \text{ km}^2 = 1000 \text{ m} \times 1000 \text{ m} = 1000000 \text{ m}^2$
2. $1 \text{ ha} = 100 \text{ m} \times 100 \text{ m} = 10\,000 \text{ m}^2$
3. $1 \text{ m}^2 = 100 \text{ cm} \times 100 \text{ cm} = 10\,000 \text{ cm}^2$
4. $1 \text{ m}^2 = 1000 \text{ mm} \times 1000 \text{ mm} = 1\,000\,000 \text{ mm}^2$
5. $1 \text{ cm}^2 = 10 \text{ mm} \times 10 \text{ mm} = 100 \text{ mm}^2$

Exercise 4.1.6 Convert the following to the units given:

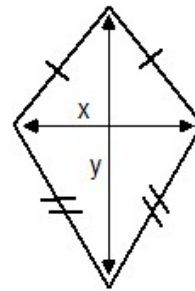
1. $3.8\text{m}^2 = \underline{\hspace{10em}} \text{ cm}^2$
2. $1.8\text{ha} = \underline{\hspace{10em}} \text{ m}^2$
3. $38\text{mm}^2 = \underline{\hspace{10em}} \text{ cm}^2$
4. $65\text{m}^2 = \underline{\hspace{10em}} \text{ mm}^2$
5. $2.8\text{cm}^2 = \underline{\hspace{10em}} \text{ mm}^2$
6. $23500\text{m}^2 = \underline{\hspace{10em}} \text{ ha}$
7. $13.8\text{km}^2 = \underline{\hspace{10em}} \text{ m}^2$
8. $0.8\text{m}^2 = \underline{\hspace{10em}} \text{ cm}^2$
9. $0.2\text{mm}^2 = \underline{\hspace{10em}} \text{ cm}^2$
10. $1234500\text{m}^2 = \underline{\hspace{10em}} \text{ km}^2$
11. $300\text{m}^2 = \underline{\hspace{10em}} \text{ ha}$
12. $0.0078\text{cm}^2 = \underline{\hspace{10em}} \text{ mm}^2$

4.1.6 Calculating area

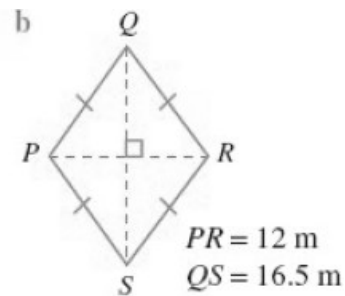
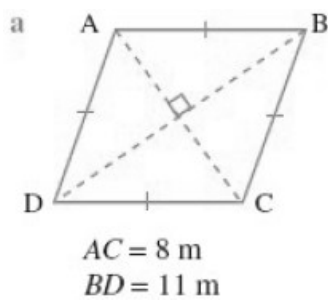


Rhombus and Kite

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



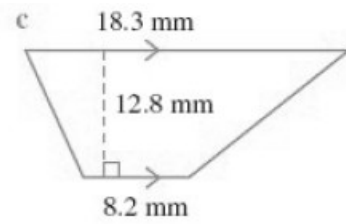
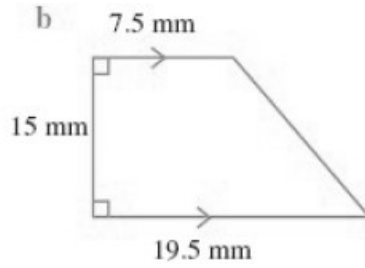
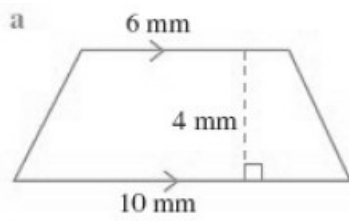
Exercise 4.1.7 Find the area of each rhombus:



a Area = _____

b Area = _____

Exercise 4.1.8 Find the area of each trapezium:

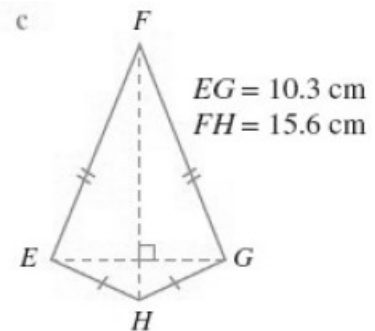
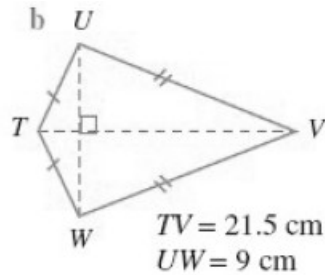
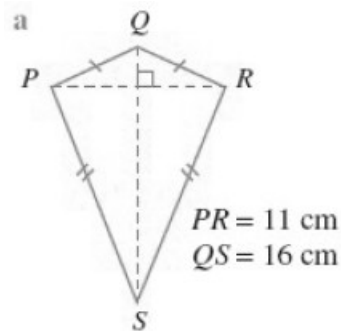


a Area = _____

b Area = _____

c Area = _____

Exercise 4.1.9 Find the area of each kite:



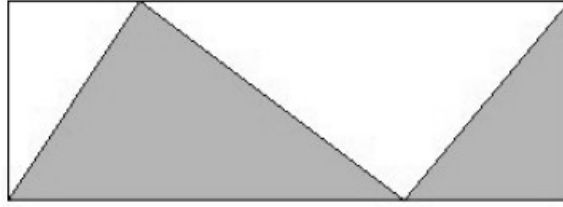
a Area = _____

b Area = _____

c Area = _____

Exercise 4.1.10 Consolidation

1. For the figure given below:



(a) What fraction of this rectangle has been shaded?

(b) State the area of the shaded triangle if the area of the rectangle is 86 cm^2 .

(c) Find the perimeter of the rectangle if the length of the rectangle is 8 cm .

2. Find the area of a square whose perimeter is 168 cm .

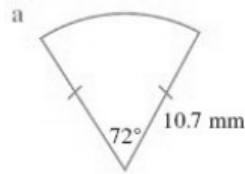
3. Find the perimeter of a square whose area is 1024 cm^2 .

4. Find the side length of a square whose area is equal to that of a rectangle with dimensions 32 cm by 18 cm .

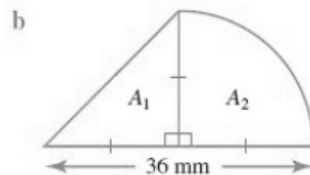
4.1.7 Area of a circle

1. The area of a circle with radius r unit is given by $A = \pi r^2$
2. The area of a sector which subtends an angle θ at the centre is given by $A = \pi r^2 \times \frac{\theta}{360}$

Example 4.1.1 Find the area of each figure, correct to 4 significant figures.



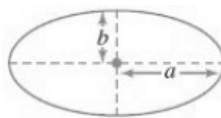
a.) *Solution:* $A = \pi r^2 \times \frac{\theta}{360}$
 $= \pi \times 10.7^2 \times \frac{72}{360}$
 $= 71.94 \text{ mm}^2$ (4 significant figures)



b.) *Solution:* $A_1 = \frac{1}{2} \times 18 \times 18 = 162 \text{ mm}^2$
 $A_2 = \pi r^2 \times \frac{\theta}{360} = \pi \times 18^2 \times \frac{90}{360} = 254.5 \text{ mm}^2$ (4 significant figures)
 $A = A_1 + A_2 = 162 + 254.5 = 416.5 \text{ mm}^2$

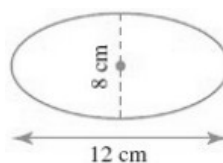
4.1.8 Area of an ellipse

The area of an ellipse is given by the formula $A = \pi ab$.



Where a , b are the semi-major and semi-minor axes respectively.

Example 4.1.2 Find the area of the ellipse given below:



Solution: $A = \pi ab = 3.14 \times 4 \times 6 = 75.4 \text{ cm}^2$

Exercise 4.1.11 Consolidation

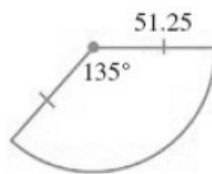
1. Find the radius of a circle whose area is $9\pi \text{ cm}^2$.

2. Find the diameter of a circle whose area is $64\pi \text{ cm}^2$.

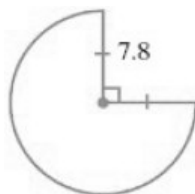
3. Find the exact area of a circle whose circumference is $16\pi \text{ cm}$.

4. Calculate the area of each figure, correct to 1 decimal place. All measurements are in cm.

(a) Area = _____



(b) Area = _____

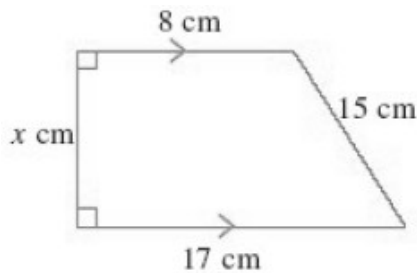


4.1.9 Miscellaneous exercises

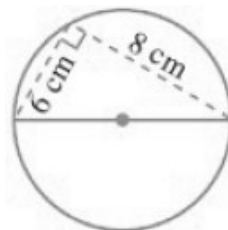
Exercise 4.1.12 Convert the following to the units given:

1. $3.8 m^2 = \underline{\hspace{2cm}} mm^2$
2. $0.00028 ha = \underline{\hspace{2cm}} cm^2$
3. $120,000 cm^2 = \underline{\hspace{2cm}} ha$
4. $0.000000755 km^2 = \underline{\hspace{2cm}} mm^2$
5. $750000 mm^2 = \underline{\hspace{2cm}} m^2$
6. $0.0008 m^2 = \underline{\hspace{2cm}} mm^2$

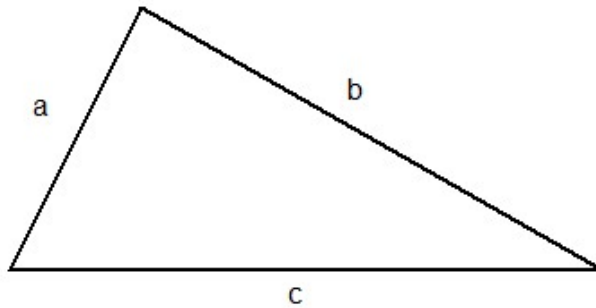
Exercise 4.1.13 Find the value of x and hence calculate the area of the trapezium.



Exercise 4.1.14 For the following figure find the length of radius and hence find the area of the circle, correct to 1 decimal place.



Exercise 4.1.15 The sides of a triangle are in the ratio 8:15:17.



1. If the perimeter of the triangle is 160 cm, find its area.

2. Find the area using Heron's formula.

(Heron's formula states that the area of any triangle with sides a , b , c is given by $A = \sqrt{s(s-a)(s-b)(s-c)}$, where $s = \frac{(a+b+c)}{2}$).

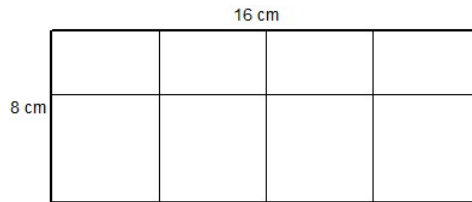
3. Show that the triangle is a right-angle triangle.

4. Verify your answer using $A = \frac{1}{2} \times b \times h$ if it is a right-angle triangle.

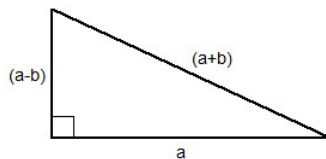
4.2 Maths challenge

Exercise 4.2.1

1. A rectangular piece of cardboard measures 8 cm by 16 cm. It is cut into 8 pieces along the lines shown in the diagram below. What would be the sum of the perimeters of the pieces in centimetres?



2. In the diagram, find b in terms of a .



3. The two isosceles right-angles triangles shown below are congruent. The length of the side of the inscribed square in the the triangle on the left is 18 cm. Find the area of the inscribed square in the triangle on the right?

