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

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9 Year 7 Term 3 Week 9 Homework

9.1 Measurements

9.1.1 Solving perimeter problems

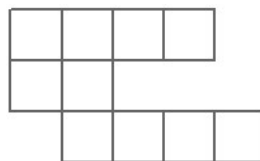
Exercise 9.1.1

1. Luke runs around the boundary of a local park every morning in order to keep fit. The dimensions of the park are 35 m by 50 m. How many laps of the park must he complete in order to run at least 2 km?

2. A print measuring 48 cm by 62 cm is to be surrounded by a wooden frame of width 5 cm. Find the perimeter of the framed print.

3. A rectangle with a breadth of 14 cm has the same perimeter as an equilateral triangle with side of 28 cm. Find the length of the rectangle.

4. Find the perimeter of the following figure which is made up of 2-cm squares.



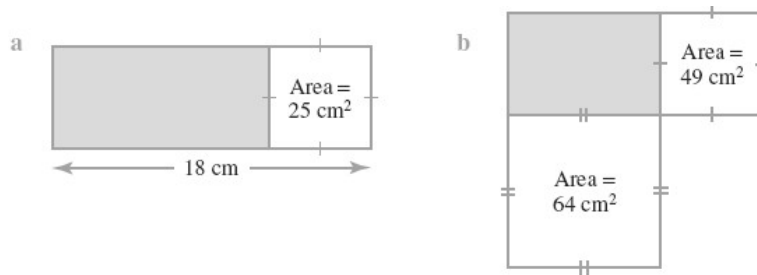
5. The length of a rectangle is 36 cm. Its breadth is $\frac{1}{6}$ its length. Find the perimeter of the rectangle.

9.1.2 Area of rectangles and squares

- Area is a measure of the space inside a two-dimensional or plane figure.
- The area of a square of side s units is given by the formula: $A = s^2$.
- The area of a rectangle with length l unit and breadth b units is given by the formula: $A = l \times b$.

Exercise 9.1.2

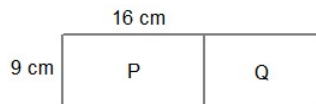
1. Find the shaded area in each of figure:



(a) Area = _____

(b) Area = _____

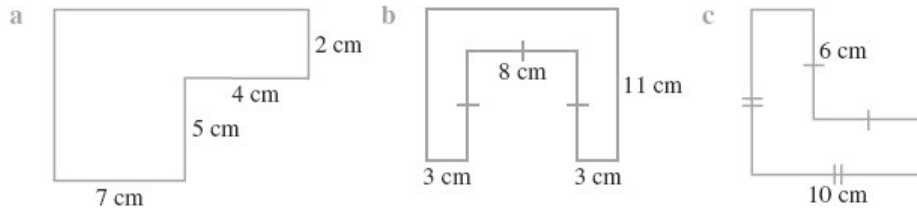
2. Rectangle P measures 16 cm by 9 cm and the perimeter of the whole figure is 96 cm.



(a) Find the length of rectangle Q.

(b) Find the area of the whole figure.

3. Find the area of each figure by subtraction of areas:

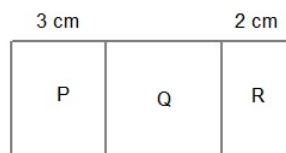


(a) Area = _____

(b) Area = _____

(c) Area = _____

4. Study the following figure carefully. Area of rectangle P is 24 cm^2 .



(a) Find the area of rectangle Q if the area of whole figure is 80 cm^2 .

(b) What is the perimeter of the whole figure?

9.1.3 Area conversions

- To convert to the smaller unit of area multiply the square of the conversion factor.
- To convert to a large unit of area, divide by the square of the conversion factor.

Exercise 9.1.3 Convert:

1. $10 m^2 =$ _____ cm^2
2. $25,000 cm^2 =$ _____ m^2
3. $5 ha =$ _____ m^2
4. $125,000 m^2 =$ _____ ha
5. $8 cm^2 =$ _____ mm^2
6. $255000 m^2 =$ _____ km^2
7. $3.5 cm^2 =$ _____ m^2
8. $5200 mm^2 =$ _____ cm^2
9. $0.0025 ha =$ _____ m^2
10. $2.35 ha =$ _____ m^2

Exercise 9.1.4

1. *A cattle farmer owns 150 ha of land. If he purchases 1.5 km² of land from an adjacent farm, how many hectares of land will he own then?*

2. *A couple purchased a 0.42 ha block of land in order to build their first house. The house is to occupy one-sixth of the area of the property. How many square metres of land will remain after the house is built?*

3. *The area of Australia is 768,230,000 ha. Express this area in square kilometres.*

9.1.4 Pick’s Rule

The area of a polygon that has been drawn in a lattice is given by the formula:

$$A = \frac{1}{2}P + I - 1$$

- where A is the number of square units in the area,
- P is the number of lattice points that lie on the perimeter
- I is the number of lattice points that lie inside the figure.

Example 9.1.1

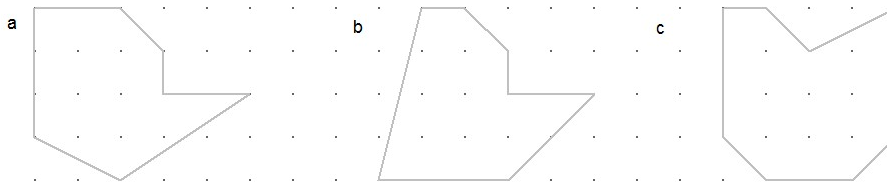
In the diagram shown:

P = 11, since there are 11 points on the perimeter, I = 6, there are 6 points inside the figure.



$$\therefore A = \frac{1}{2}P + I - 1 = \frac{1}{2} \times 11 + 6 - 1 = 10.5 \text{ units}^2$$

Exercise 9.1.5 Find the area of each figure below using Pick’s Rule.



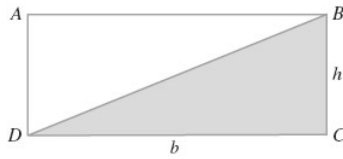
1. Area = _____

2. Area = _____

3. Area = _____

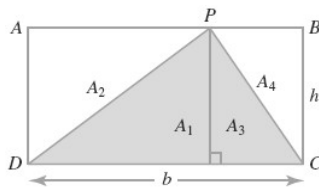
9.1.5 Area of a triangle

- Right-angled triangle: the shaded area is equal to the unshaded area.



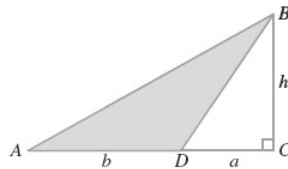
\therefore Area of $\triangle BCD = \frac{1}{2}$ area of rectangle ABCE.
 $\therefore A = \frac{1}{2} \times b \times h$

- Acute-angled triangles:



$\therefore A_1 = A_2$ and $A_3 = A_4$ $\therefore A_1 + A_3 = A_2 + A_4$
 \therefore Area of $\triangle DPC = \frac{1}{2}$ area of the rectangle ABCD = $\frac{1}{2} \times b \times h$

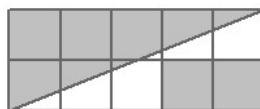
- Obtuse-angled triangles:



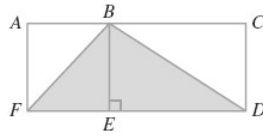
Area of $\triangle ABD =$ area of $\triangle ABC$ - area $\triangle DBC$
 $= \frac{1}{2} \times (a + b) \times h - \frac{1}{2} \times a \times h$
 $= \frac{1}{2}h(a + b) - \frac{1}{2}ah$
 $= \frac{1}{2}ah + \frac{1}{2}bh - \frac{1}{2}ah$
 $= \frac{1}{2} \times b \times h$

Exercise 9.1.6

1. What fraction of the figure is shaded? (give your answer in its simplest form)



2. What fraction of each of the following rectangles have been shaded?

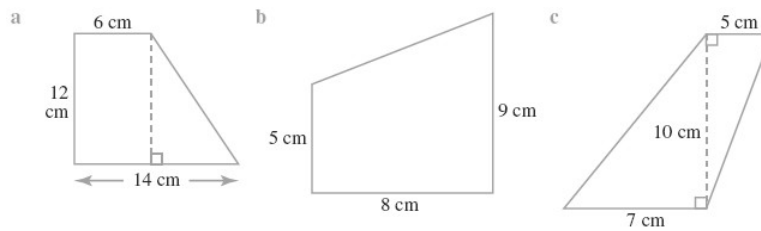


(a) $ABEF$ _____

(b) $BCDE$ _____

(c) $ACDF$ _____

3. Determine the area of each figure.

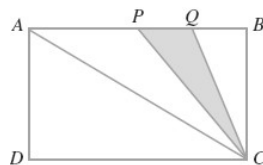


(a) Area = _____

(b) Area = _____

(c) Area = _____

4. What fraction of this rectangle is shaded that $AP = PB$ and $PQ = QB$.

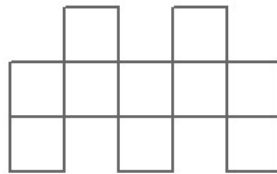


9.2 Maths Challenge

Exercise 9.2.1

1. The sum of 2 numbers is 53. When the bigger number is divided by the smaller number, the answer is 9 with a remainder of 3. Find the two numbers.

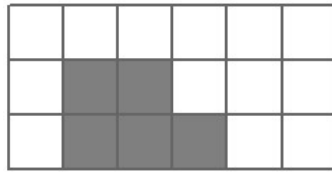
2. The figure is made up of 4-cm squares. Find the perimeter of the figure.



3. A string is used to form a square and a triangle. The area of the square is 100 cm^2 . The perimeter of the triangle is 24 cm shorter than that of the square. What is the length of the original string in metres?

4. Rebecca had some 50 ¢ and twice as many 20 ¢ coins. She exchanged all her 20 ¢ coins for the same value of 50 ¢ coins. She has eighteen 50 ¢ coins now. How many 20 ¢ coins did she have at the first?

5. The rectangle is made up of squares of the same size. The perimeter of the 5 shaded squares is 60 cm.



- (a) Find the perimeter of the rectangle.

- (b) Find the area of the shaded portion.

6. Andy has 27 marbles. How many marbles must he place on each edge of the squares so that they are equal number of marbles on each edge of the squares?



7. In a computer game, Richard gains 5 points if he manages to enter the secret chamber. He loses 3 points whenever he is shot by an enemy. At the end of the game, Richard successfully entered the secret chamber not more than 10 times. His score was 33 points. How many times has he been shot by the enemies?
