**UNIT 9: Measurement and Geometry**

*TOPICS:*

* 5.1 The Area of a Parallelogram
* 5.2 The Area of a Triangle
* 5.4 Calculating Circumference
* 5.6 Calculating the Area of a Circle
* REVIEW Plotting Points
* 7.2 Comparing Positions on a Grid
* 7.3 Translations and Reflections
* 7.4 Rotations

**5.1 The Area of a Parallelogram**

$Area = base x height$**

**Units for Area** 🡪 square units

mm2, cm2, m2

The base and height must be perpendicular.

**Perpendicular** – Meet at right angle (90o)



Ex. 1) Calculate the area of the parallelogram given.

Ex. 2) The area of a parallelogram is 42 cm2. If it has a base of 4 cm, what is the height?

Ex. 3) Draw 2 different parallelograms that have an area of 32 m2.

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**5.2 The Area of a Triangle**



The area of a triangle will be half the area of a rectangle or parallelogram.

$$Area ∆=\frac{1}{2}base x height$$

***Reminder – The base and height must be perpendicular***.

Ex. 1) Calculate the area of the triangle given.

Ex. 2) The base of a triangle is 14 mm. The area of this triangle is 56 mm2. What is the height?



Ex. 3) Use a ruler to calculate the area of the triangle 2 different ways.

Ex. 4) The perimeter a right-angle triangle EFG is 14 cm. EF = GF = 10cm. What is the area of the triangle?



Ex. 5) Find the area of the shaded region given in the diagram. What are you assuming about the triangle?

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**5.4 Calculating Circumference**



**Circumference** – the boundary of a circle.

**Diameter** – The longest line segment that can be drawn inside a circle.

**Radius** – The distance from the circle of the circle to any point on the circumference. It is half the diameter.

$π (pi) $– The ratio of the circumference of a circle to the diameter.

The circumference of a circle is equal to $π$ times the diameter. $C=πd$

Ex. 1) Determine the circumference and diameter of a circle with each radius.

1. 5 cm b.) 7 mm

Ex. 2) Measure the radius, diameter, and circumference of the circle with a ruler.



Ex. 3) Determine the perimeter of the field on the right.



Ex. 4) What is the distance B? The circumference of the large circle is 50.24 cm. Distance A is 7 cm.

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**5.6 Calculating the Area of a Circle**



We can estimate the area of a circle by cutting it up into smaller triangular sections. The more sections, the better the estimate. When arranged together, they make a parallelogram. This parallelogram will have the same area as the circle.

The base of the parallelogram has a length of 1/2 the circumference or $\frac{1}{2}πd = \frac{1}{2}π(2r)=πr$

The height of the parallelogram has a length of r. So, the area of the parallelogram or circle is given by $πr∙r =πr^{2}$

$$A(circle)=πr^{2}$$

Ex. 1) Calculate the area given the following information.

1. Diameter = 10 cm b.) Radius = 25 mm

Ex. 2) Measure the area of the circle on the right using a ruler.

Ex. 3) Determine the area of half a circle with a diameter of 40 cm.

Ex. 4) Determine the area of the shaded region for A, B, and C.



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**REVIEW Plotting Points**

The **x coordinate** describes the horizon distance from the origin.

The letter in the front labels the point. A(x,y)



The **y coordinate** describes of vertical distance from the origin.

Ex. 1) Write the coordinates for r, s, x ,y.

Ex. 2) Plot each of the following points on the grid.

A(3,4), B(-2,-5), C(4,-1), D(-4, 3)

Ex. 3) What is the coordinate of the origin?

Ex. 4) What is the x coordinate for all points on the y-axis? Give 3 examples.

Ex. 5) What is the y coordinate for all points on the x-axis? Give 3 examples.

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**7.2 Comparing Positions on a Grid**

Ex. 1) On the grid given, draw each of the following lines.

1. x = -3 b.) y = 4

Ex. 2) Complete the sentence using above or below.

1. F(4,-5) is \_\_\_\_\_\_\_\_\_\_\_\_\_ G(1,3)
2. H(3,9) is \_\_\_\_\_\_\_\_\_\_\_\_\_ I(5, 3)

Ex. 3) Which of the three points is further to the left? How do you know?

 J(3,2), K(-4,5), L(1,4)

Ex. 4) A triangle is formed from the points A(1,1), B(6,1) and C(6, 4).

1. What is the base and height of this triangle?
2. What is the area?

Ex. 5) What is the horizontal distance between point C(-5,-2) and D(4,-2)?

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**7.3 Translations and Reflections**

**Translation** – moves every point of a figure by the same distance in a given direction.

A(3,4) 🡪 A’(4,6) 1 unit to right, 2 units up

**Reflection** – is the mirror point on the opposite side of the axis.

G(-5,2) reflected through y = 0 🡪 G’(-5,-2)



Ex. 1) Describe the translation that moves ABC to A’B’C’

Ex. 2) Points J(0,3), K(-5,-3), L(1,-4) were reflected across the y-axis. Draw J’K’L’

Ex. 3) $ΔDEF$ is transformed to $ΔD"E"F"$by applying the same translation twice. The coordinates for D was (-4, 3). Describe the translation and draw $ΔDEF.$

Ex. 4) The rectangle ABCD is reflected across the line x = 2. Draw the rectangle A’B’C’D’.



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**7.4 Rotations**

**Rotation** – rotates points around a centre of rotation.

**Centre of Rotation** – a fixed point which other points in a shape rotate in a clockwise (CW) or counter-clockwise (CCW) direction.

**Clockwise (CW)**

**Counter-Clockwise (CCW)**

Ex. 1) Rotate each point 90o CW around the origin. Write the coordinates of the new point.

1. A(2,0)
2. B(0,4)
3. C(-5,0)
4. D(-6,0)

Ex. 2) Rotate the rectangle EFGH 90o CCW around the origin. Draw and label the new shape.

Ex. 3) Rotation the points in the $Δ$JKL 90o CW around J.

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