C22

Geometrical vocabulary and construction

CHAPTER ASSIGNMENT · 10 MARKS

Name _____ Class _____ No. _____ Date _____

> Use a sharp pencil, a ruler and a pair of compasses. Leave all your construction arcs showing. Diagrams are not drawn to scale.

Practice questions from *Cambridge IGCSE Mathematics Core and Extended* (4th edition), Chapter 22 (Geometrical vocabulary and construction), for classroom use. Where a question depends on a figure in the book, the figure is described in words here (see the book page). The Check yourself and Chapter quiz questions are Guru Jazzy's own.

Exercise 22.1 · Congruent triangles

22.1.1 In the diagrams below (Exercise 22.1 on page 284 of the book), identify pairs of congruent triangles. Give reasons for your answers. The triangles are described here:

Triangle	What the diagram shows
a	right angle; the side next to the right angle is 5 cm; the hypotenuse is 8 cm
b	angles of 50° and 35°; a side of 10 cm
c	angles of 35° and 50°; a side of 10 cm
d	sides of 8 cm and 10 cm with an angle of 120° between them
e	sides of 10 cm and 8 cm with an angle of 120° between them
f	right angle; the side next to the right angle is 5 cm; the hypotenuse is 8 cm
g	three sides: 8 cm, 10 cm and 6 cm
h	three sides: 10 cm, 8 cm and 6 cm

Exercise 22.2 · Quadrilaterals

22.2.1 Copy and complete the following table. The first line has been started for you (rectangle: opposite sides equal in length, Yes; all sides equal in length, No).

Property	A	B	C	D	E	F
Opposite sides equal in length	Yes					
All sides equal in length						
All angles right angles						
Both pairs of opposite sides parallel						
Diagonals equal in length						
Diagonals intersect at right angles						
All angles equal						

The shapes are: A Rectangle, B Square, C Parallelogram, D Kite, E Rhombus, F Equilateral triangle.

Exercise 22.3 · Nets

22.3.1 On squared paper, draw: Two other possible nets of a cube.

22.3.2 On squared paper, draw: The net of a cuboid (rectangular prism).

22.3.3 On squared paper, draw: The net of a triangular prism.

22.3.4 On squared paper, draw: The net of a cylinder.

22.3.5 On squared paper, draw: The net of a square-based pyramid.

22.3.6 On squared paper, draw: The net of a tetrahedron.

Exercise 22.4 · Constructing triangles

22.4.1 Using only a ruler and a pair of compasses, construct: ΔABC where AB = 10 cm, AC = 7 cm and BC = 9 cm

22.4.2 Using only a ruler and a pair of compasses, construct: ΔLMN where LM = 4 cm, LN = 8 cm and MN = 5 cm

22.4.3 Using only a ruler and a pair of compasses, construct: ΔPQR, an equilateral triangle of side length 7 cm

22.4.4 Using only a ruler and a pair of compasses, construct: (a) ΔABC where AB = 8 cm, AC = 4 cm and BC = 3 cm · (b) Is this triangle possible? Explain your answer.

Exercise 22.5 · Scale drawings

22.5.1 In the following questions, both the scale to which a map is drawn and the distance between two objects on the map are given. Find the real distance between the two objects, giving your answer in metres.

(a) 1 : 10 000, 3 cm	(b) 1 : 10 000, 2.5 cm	(c) 1 : 20 000, 1.5 cm	(d) 1 : 8000, 5.2 cm

22.5.2 In the following questions, both the scale to which a map is drawn and the true distance between two objects are given. Find the distance between the two objects on the map, giving your answer in cm.

(a) 1 : 15 000, 1.5 km	(b) 1 : 50 000, 4 km	(c) 1 : 10 000, 600 m	(d) 1 : 25 000, 1.7 km

22.5.3 A rectangular pool measures 20 m by 36 m. The corners of the pool are A, B, C and D, with the side of 36 m along AB and the side of 20 m along AD (see the diagram on page 290 of the book). (a) Construct a scale drawing of the pool, using 1 cm for every 4 m. (b) A boy sets off across the pool from D in such a way that his path is in the direction of a point which is 40 m from D and 30 m from C. Show, by construction, the path that he takes. (c) Work out the distance the boy swam.

22.5.4 A triangular enclosure has sides of 8 m, 6 m and 10 m (see the diagram on page 291 of the book). (a) Using a scale of 1 cm for each metre, construct a scale drawing of the enclosure. (b) Calculate the true area of the enclosure.

Student assessment 1

SA1.1 Are the angles below acute, obtuse, reflex or right angles? The four angles are drawn on page 291 of the book: (a) a narrow angle with an arc marked inside it · (b) a wider angle opening beyond a right angle, with an arc inside · (c) an angle with the arc marked on the outside, the larger side of the two arms · (d) two arms at a corner marked with a small square.

SA1.2 Draw and label two pairs of intersecting parallel lines.

SA1.3 Identify the types of triangles below in two ways (for example, obtuse-angled scalene triangle). (a) a triangle with one wide angle at the top and three sides of different lengths · (b) a triangle with a right angle marked at its bottom left corner and three sides of different lengths (both drawn on page 291 of the book).

SA1.4 Draw a circle of radius 3 cm. Mark on it: (a) a diameter (b) a chord (c) a sector.

SA1.5 Draw a rhombus and write down three of its properties.

SA1.6 On squared paper, draw the net of a triangular prism.

SA1.7 Construct ΔABC such that AB = 8 cm, AC = 6 cm and BC = 12 cm.

SA1.8 A plan of a living room is shown on page 292 of the book. It has four sides: the top side is 5 m and the left side is 12 m, and these meet at a right angle at the top left corner. The right side is 8 m and the bottom slanting side is 7 m. A diagonal of 13 m joins the top right corner to the bottom left corner. (a) Using a pair of compasses, construct a scale drawing of the room using 1 cm for every metre. (b) Using a set square if necessary, calculate the total area of the actual living room.

SA1.9 In the following questions, both the scale to which a map is drawn and the true distance between two objects are given. Find the distance between the two objects on the map, giving your answer in cm.

(a) 1 : 20 000, 4.4 km	(b) 1 : 50 000, 12.2 km

Check yourself

C.1 Name the angles 89°, 91°, 180.5° and 300° as acute, right, obtuse or reflex. [2]

C.2 Two triangles have sides 6 cm, 8 cm and 10 cm. Which congruence test shows they are identical? [1]

C.3 Can a triangle have sides 4 cm, 5 cm and 10 cm? Explain. [2]

C.4 A map has a scale of 1 : 25 000. Two villages are 6.4 cm apart on the map. How far apart are they in km? [2]

C.5 A cylinder has radius 3 cm and height 10 cm. Describe its net, giving the length of the rectangle to 3 significant figures. [3]

Chapter quiz

Q1 An angle measures 215°. What type of angle is it?

A	B	C	D
Acute	Obtuse	Reflex	Right

Q2 Two lines meet at exactly 90°. What are the lines called?

A	B	C	D
Parallel	Perpendicular	Congruent	Similar

Q3 A triangle has sides 5 cm, 5 cm and 8 cm. What type is it?

A	B	C	D
Equilateral	Scalene	Isosceles	Right-angled

Q4 Which is NOT a test for congruent triangles?

A	B	C	D
SSS	SAS	ASA	AAA

Q5 Which special quadrilateral has diagonals that cross at right angles and no parallel sides?

A	B	C	D
Kite	Rectangle	Parallelogram	Trapezium

Q6 A chord passes through the centre of a circle. What is it called?

A	B	C	D
Radius	Arc	Sector	Diameter

Q7 What is the name of a polygon with 8 sides?

A	B	C	D
Hexagon	Heptagon	Octagon	Decagon

Q8 How many faces does the net of a square-based pyramid have?

A	B	C	D
4	5	6	8

Q9 Which sides can form a triangle?

A	B	C	D
2, 3, 6 cm	3, 4, 8 cm	4, 4, 9 cm	5, 6, 10 cm

Q10 Scale 1 : 20 000. Two places are 3 cm apart on the map. How far apart are they really?

A	B	C	D
60 m	600 m	6 km	60 km

Q11 A model is built to scale 1 : 50. The real object is 6 m long. How long is the model?

A	B	C	D
12 cm	30 cm	120 cm	300 cm

End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/o-level-mathematics/chapter-22-geometrical-vocabulary-and-construction/