

7

Introduction to Geometry

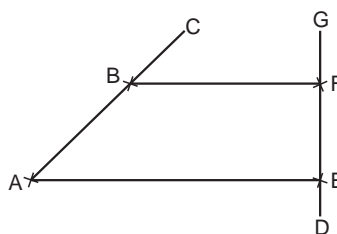
Let's Review

1. Points, Lines and Planes

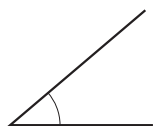
In the figure, A and B are points.

AC , DG and BF are lines.

$ABFE$ is a plane.



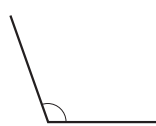
2. Types of Angles



Acute angle



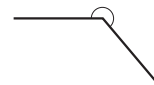
Right angle



Obtuse angle

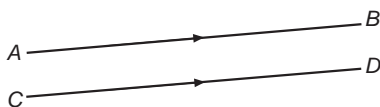


Straight angle

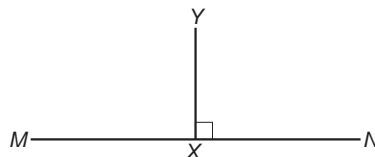


Reflex angle

3. Lines



AB and CD are parallel lines, $AB \parallel CD$.

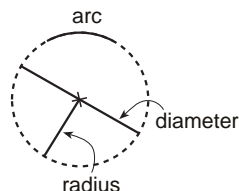
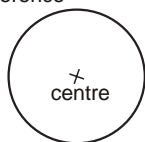


MN and XY are perpendicular lines, $MN \perp XY$.

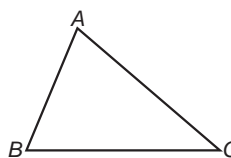
4. Plane Figures

A. Circles

circumference



B. Triangles



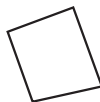
A , B and C are vertices.
 $\angle A + \angle B + \angle C = 180^\circ$
 (\angle sum of Δ)

C. Polygons

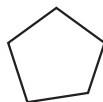
Triangle



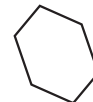
Quadrilateral



Pentagon

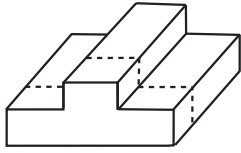


Hexagon

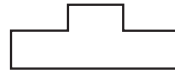


Regular polygons are polygons with equal sides and equal angles.

5. Solids

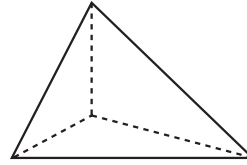
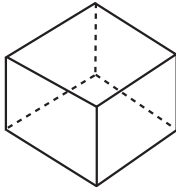


Cross-section of the solid:



A solid has three dimensions.

6. Polyhedrons



A polyhedron is a solid built from joining edges of polygons.

Let's Practise

Level 1

For questions 1 – 6, state whether the statements are true or false.


Read figure 1 for questions 1 – 3.

True / False

1. a is a right angle. _____

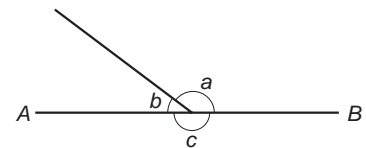
2. b is an acute angle. _____

3. c is an obtuse angle. _____

4.  is an equilateral triangle. _____

5.  is an isosceles triangle. _____

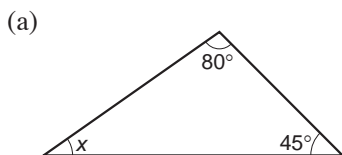
6.  is a hexagon. _____



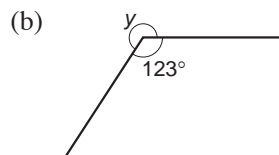
Note: AB is a straight line.

Figure 1

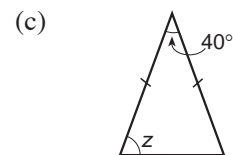
7. Find the values of the unknowns in the following figures.



$x =$ _____



$y =$ _____



$z =$ _____



Extended Question

In the figure, $\angle ADB = \angle ABC$.

Prove that $\triangle ADB \sim \triangle ABC$.

Proof: $\angle ADB =$ _____ (given)

$\angle DAB =$ _____ (common)

$\angle ADB + \angle DAB + \angle DBA = 180^\circ$ (_____)

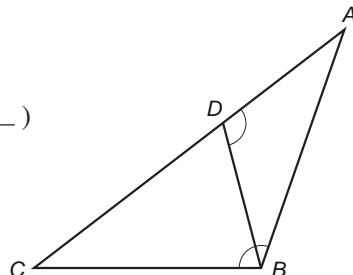
$\angle CAB + \angle ABC +$ _____ $= 180^\circ$ (\angle sum of Δ)

$\angle ABD = 180^\circ - \angle ADB - \angle DAB$

$= 180^\circ - \angle ABC - \angle BAC$

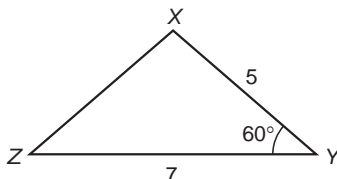
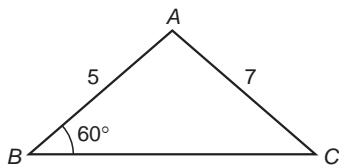
$=$ _____

$\therefore \triangle ADB \sim \triangle ABC$ (_____)



Learning from Mistakes

There is a mistake in the following deduction. What is the mistake?



$AB = XY$ (given)

$AC = YZ$ (given)

$\angle ABC = \angle XYZ$ (given)

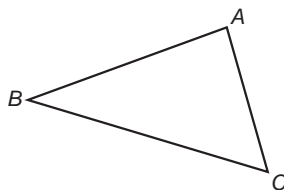
$\therefore \triangle ABC \cong \triangle XYZ$ (SSA)

Can we deduce that $\triangle ABC \cong \triangle XYZ$?



Open-ended Question

- (NF) Use ONLY a pair of compasses and a ruler to construct a similar triangle of $\triangle ABC$ as shown below. (Do not measure the lengths of any sides of $\triangle ABC$.)



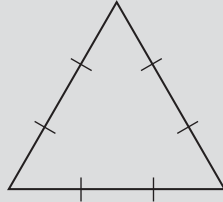


Enrichment Mathematics

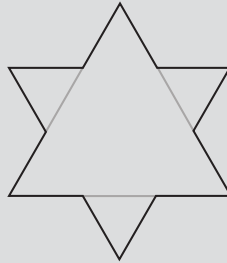
Snowflake

A snowflake can be constructed easily from an equilateral triangle.

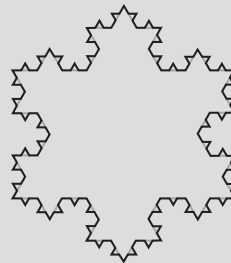
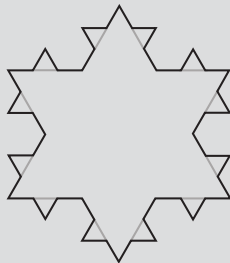
1. Divide each side into three segments of equal length.



2. For each side, draw an equilateral triangle that has the middle segment from step 1 as its base, and remove the segment.



3. We can have a snowflake by repeating the above steps over and over again.



Interestingly, you can find self-similarity in the snowflake upon magnification.

Glossary

angle bisector

congruent figure

corresponding side

perpendicular bisector

protractor

角平分線

全等圖形

對應邊

垂直平分線

量角器

a pair of compasses

corresponding angle

included angle

proportional

similar figure

圓規

對應角

夾角

成比例

相似圖形

Revision Test 2

Choose the most suitable answer from the four choices.

1. The L.C.M. of 24, 36 and 54 is

- A. 2×3 .
- B. $2^2 \times 3^2$.
- C. $2^3 \times 3^2$.
- D. $2^3 \times 3^3$.

2. Which of the following sequences is represented by the general term 2^n ?

- A. 2, 4, 6, 8, ...
- B. 2, 3, 4, 5, ...
- C. 2, 4, 8, 16, ...
- D. $2^2, 2^4, 2^6, 2^8, \dots$

3. $\frac{(-6x)^3}{-4x^2y} \div (-2y)^2 =$

- A. $\frac{27x}{2y^3}$
- B. $216xy$
- C. $-\frac{27x}{y}$
- D. $-\frac{27x^5}{2y^3}$

4. $(3x - 2)(-x + 1) =$

- A. $3x^2 + 5x - 2$
- B. $3x^2 + x - 2$
- C. $-3x^2 + x + 2$
- D. $-3x^2 + 5x - 2$

5. How many terms are there after expansion and simplification of $(3x^2 - 4x + 5)(-x^2 + 3x - 9)$?

- A. 4
- B. 5
- C. 6
- D. 9

6. Solve $\frac{11}{12} + \frac{1}{18x} = 1$.

- A. $x = \frac{2}{3}$
- B. $x = -\frac{2}{3}$
- C. $x = \frac{2}{5}$
- D. $x = 1$

7. The perimeter of a triangle is 30 cm. If each side of the triangle is increased by 3 cm, what is the new perimeter of the triangle?

- A. 33 cm
- B. 36 cm
- C. 39 cm
- D. 42 cm

8. When a number is decreased by 20%, it becomes 100. What is the number?

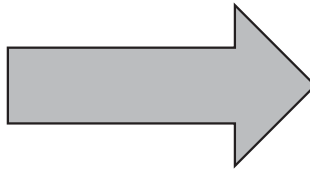
- A. 80
- B. 120
- C. 125
- D. 150

9. A buys an article at \$50 and sells it to B with a 40% profit. B sells it to C at a loss of 10%. At what price does C buy the article?

- A. \$80
- B. \$70
- C. \$63
- D. \$60

10 Area and Volume (1)

1. Miss Chow wants to make an arrow sign with an area of 124 cm^2 . Suggest two possible designs for her. State the dimensions of the arrow signs designed.



2. A carpenter cuts a cube into two solids as shown below. He thinks that since the surface area of the concave part (the shaded part) of solid *A* equals the surface area of the convex part (the shaded part) of solid *B*, the total surface areas of the two solids are the same. Do you agree with him? Explain your answer briefly.

