

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

Table of Contents

10 Year 7 Term 3 Week 10 Homework	1
10.1 Measurements	1
10.1.1 Solving area problem	1
10.2 Solids	2
10.2.1 Naming and classifying solids	2
10.2.2 Faces, vertices and polyhedra	4
10.2.3 Nets of solids	6
10.3 Miscellaneous exercises	7
10.4 Maths challenge	9

This edition was printed on February 17, 2009.

Camera ready copy was prepared with the **L^AT_EX₂^ε** typesetting system.

Copyright © 2000 - 2009 Yimin Math Centre (www.yiminmathcentre.com)

10 Year 7 Term 3 Week 10 Homework

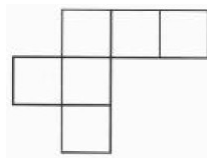
10.1 Measurements

10.1.1 Solving area problem

Exercise 10.1.1

1. If the total surface area of a cube is 486 cm^2 , what is the length of a side of the cube?

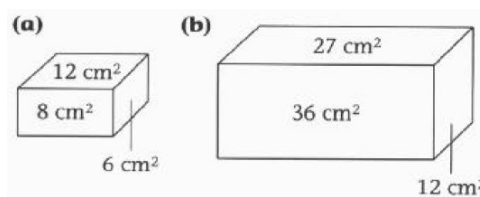
2. The figure shown below consists of 6 congruent squares.



(a) If the area is 294 cm^2 , what is the perimeter?

(b) If the perimeter is 84 cm , what is the area?

3. Raymond remembers the areas of the faces of these boxes, but not the dimensions. Can you help him find the dimensions of the boxes?



(a) Find the dimensions and hence find the volume of the box.

(b) Find the dimensions and hence find the volume of the box.

10.2 Solids

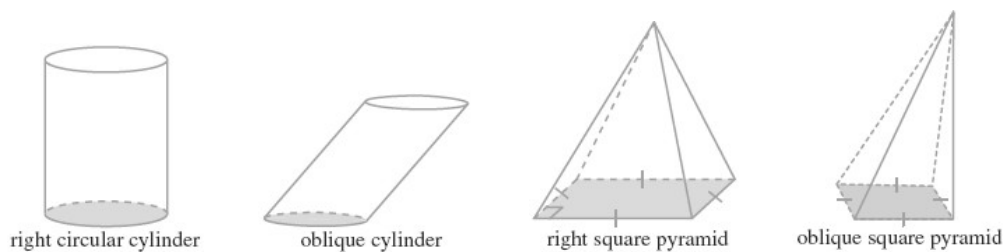
10.2.1 Naming and classifying solids

Prisms and pyramids:

- A prism is a solid with plane or flat surfaces that has a uniform cross-section.
- Each cross-section is equal in size to a pair of parallel faces called bases.
- A Pyramid is a solid with plane of flat surfaces in which all vertices lie in the base, except one.
- The vertex that does not lie in the base is called the apex.
- The base of a pyramid can be any polygon but all other faces are triangles.
- Pyramids are named according to the shape of their base. (i.e. square pyramid, rectangular pyramid and triangular pyramid.)

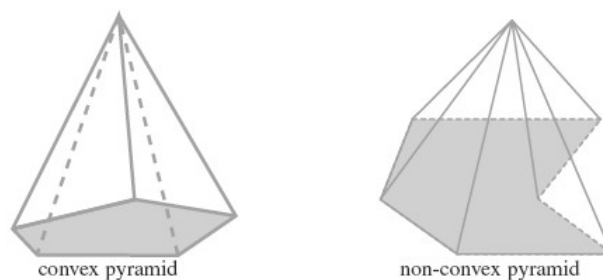
Right an oblique solid:

- A prism or cylinder is a right prism or right cylinder if the lines joining corresponding points in the base are perpendicular to the bases.
- A prism or cylinder is an oblique prism or oblique cylinder if the lines joining corresponding points in the base are not perpendicular to the bases.



Convex and non-convex solids

- A prism or pyramid is convex if its base is convex, that is all diagonals of the base lie entirely within the base.
- A prism or pyramid is non-convex if its base is non-convex, that is if at least one diagonal of the base does not lie entirely within the base. For example:



Exercise 10.2.1

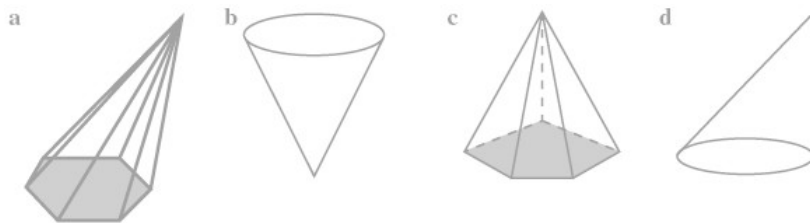
1. Name each solid and state the number and shape of the faces:



(a) _____

(b) _____

2. State whether each solid is a right pyramid or cone or an oblique pyramid or cone:



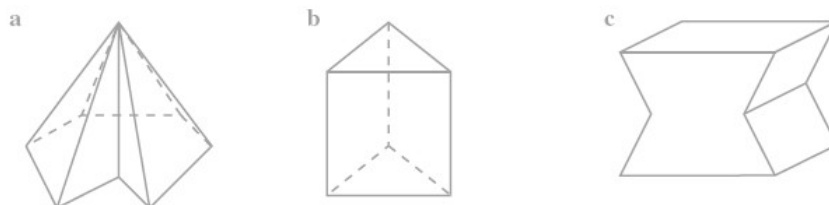
(a) _____

(b) _____

(c) _____

(d) _____

3. State whether each of these solid is convex or non-convex:



(a) _____

(b) _____

(c) _____

10.2.2 Faces, vertices and polyhedra

- A polyhedron is a solid that has only plane of flat surfaces.
- Polyhedra may be right or oblique, convex or non-convex.
- All prisms and pyramids are polyhedra.
- Each plane surface in a polyhedron is called a face.
- In a convex polyhedron, the intersection of exactly two faces is called an edge.
- The intersection of three faces is called a vertex.
- Two lines are parallel if the distance between them remains constant.
- Two lines are perpendicular if they intersect at right angles.
- Two lines are skew if they do not lie in the same plane. That is, they neither intersect nor are they parallel.

Exercise 10.2.2

1. Complete the table for the solid listed below:

Solid	No. of faces (F)	No. of vertices (V)	No. of edges (E)	$F + V$
Rectangular prism				
Triangular prism				
Hexagonal prism				
Square pyramid				
Triangular pyramid				
Pentagonal pyramid				

2. Use your results from the table to write down Euler's formula for polyhedra, linking the number of faces, vertices and edges of these solids.

3. $MNOP$ is a triangular pyramid with apex N . Which line is skew to:

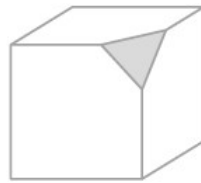
(a) NO ? _____

(b) OP ? _____

(c) NP ? _____

Exercise 10.2.3

1. Each corner of a cube is removed by cutting it as shown below:

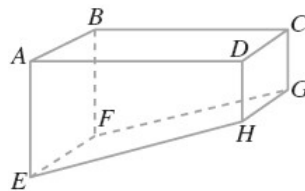


(a) How many faces, vertices and edges will it have?

(b) Is the solid a polyhedron? _____

(c) Does Euler's formula still hold for this solid? _____

2. ADHE is a trapezium and the solid is a trapezoidal prism.



(a) Name two pairs of parallel lines. _____

(b) Name two pairs of perpendicular lines. _____

(c) Name two pairs of skew lines. _____

3. Euler's formula does not necessarily hold for solid that have curved surfaces. Give an example of a solid that has a curved surface for which the formula:

(a) does hold _____

(b) does not hold _____

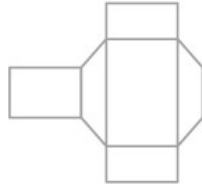
4. Does Euler's formula necessarily hold for solid that are non-convex?

10.2.3 Nets of solids

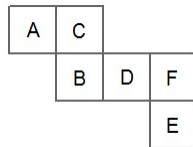
A plane shape which can be folded to produce a solid is called a net for the solid.

Exercise 10.2.4

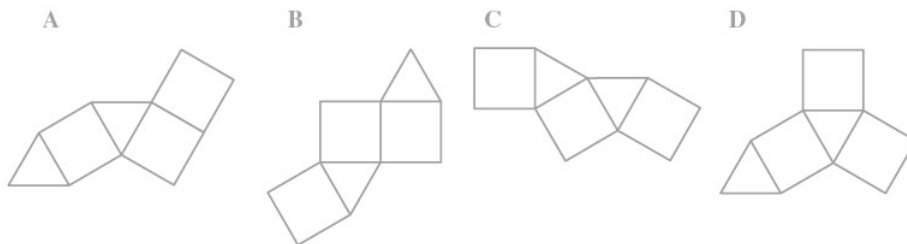
1. Name the solid that has this net and state the number of faces, vertices and edges of the solid.



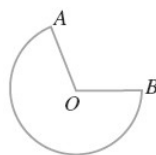
2. This is a net of a cube. When the sides are folded up and joined, which would be opposite each other?



3. State which one of the following could **not** be the net of a triangular prism? _____



4. Which open shape could be formed by joining the edges OA and OB? _____



10.3 Miscellaneous exercises

Exercise 10.3.1

1. If $x = 1$, what does $\frac{x}{x+999}$ equal? Now if we make x a very large number, which whole number is closest to $\frac{x}{x+999}$

2. On a cube, a dot is put on every corner of and three dots on every edge. How many dots are there altogether?

3. A square has an area of 144 cm^2 .

- (a) If this square is divided into twelve congruent rectangles in two different ways, as shown below, what is the perimeter of one of the rectangles in each case?



i. perimeter = _____

ii. perimeter = _____

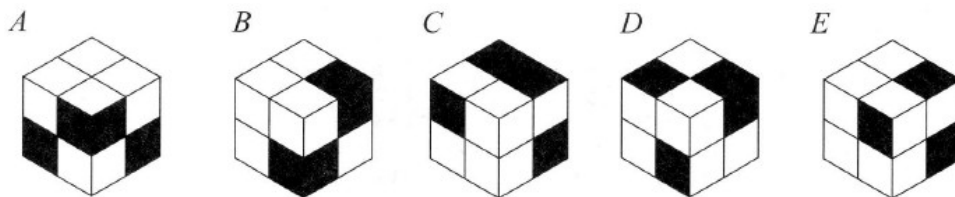
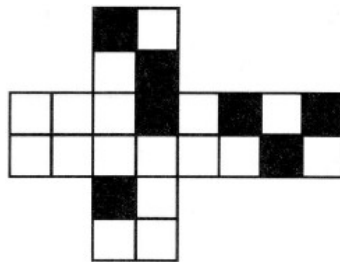
- (b) If it is divided into congruent rectangles of which each perimeter is 18 cm, what is the total number of rectangles?

4. A large container is one-third full of water. 20L is added and this makes it half full. How many more litres of water is need to fill the container?

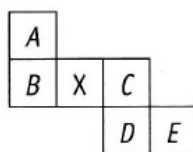
Exercise 10.3.2

1. Water is poured into a container so that its volume doubles every minute. If the container is full at 11 a.m., at what time was it half full?

2. Which of the cubes shown could be made from the following net?



3. The net shown here is cut out and folded to form a cube. Which face is then opposite the face marked X?

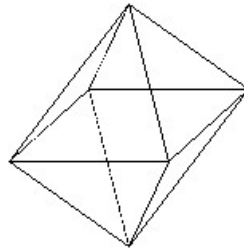


4. How many tiles are needed to completely cover a floor 3 m by 9 m with tiles measuring 20 cm by 30 cm?

10.4 Maths challenge**Exercise 10.4.1**

1. Adam has a piece of string where $\frac{1}{8}$ of its length is red, $\frac{1}{3}$ of its length is green and the remaining piece is 13 cm long. How long is the piece of string?

2. The faces of a regular octahedron are to be painted so that any two faces with an edge in common have different colours. What is the minimum number of different colours needed?



3. A case $\frac{1}{2}$ full of oranges has a mass of 8 kg. The same case $\frac{1}{4}$ full of oranges has a mass of 5 kg. What is the mass of the empty case?

4. It cost Cathy \$16 to take a train trip with her two children to city. If a child's ticket is $\frac{3}{4}$ of the price of an adult's ticket, what is the cost of a child's ticket?
