

ΚΟΖΥΓΙΩΣΙΕΙ! ΜΑΤΕΡΙΑΛΙ ΠΡΟ ΥΨΟΥ ΑΔ,  
 ΚΑΕΡΙΝΙΚΑ, ΗΟΥΪΚΟΝΑ, ΒΥΚΕΝΙΚΟΝΑ,  
 ΜΑΤΤΥΡΕΚΣΣ 2006.

- h)  $\cos \alpha = 4 \cos^3 \frac{\alpha}{3} - 3 \cos \frac{\alpha}{3}$
- i)  $2 \cos \alpha = a$
- j)  $x^3 - 3x - a = 0$
- k)  $4\sqrt{3}$
- l)  $\sqrt[4]{m^4 n^8}$
- m)  $\sqrt{16b^2}$
- n)  $\sqrt[3]{a^5}$
- o)  $4^{-2}$

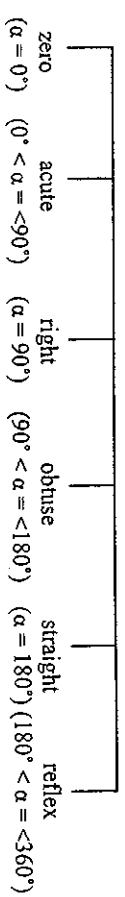
**FOCUS B**

**ANGLES AND TRIANGLES**

**I. Angles**

In plane geometry an angle is a figure which is formed by two straight lines which meet at a point. The lines of an angle are called the *sides*. The point where they meet is called the *vertex*. When the sides of an angle are *perpendicular* to each other, they form a *right angle*. A right angle has ninety degrees. An angle of less than 90° is an *acute angle*, and an angle of more than 90° but less than 180° is an *obtuse angle*. An angle of more than 180° is a *reflex angle*.

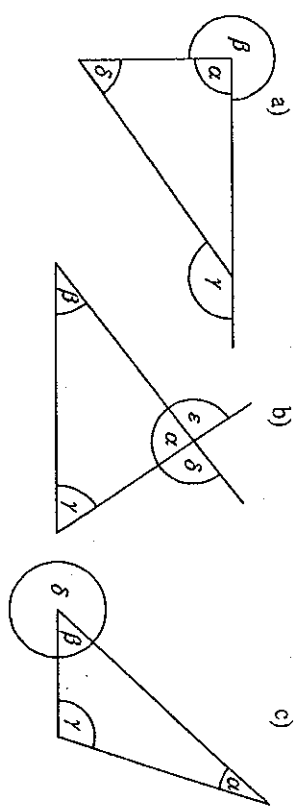
Classification of angles according to their *magnitude*:



**1. What kind of angle does a clock make at:**

- a) two o'clock?
- b) three o'clock?
- c) four o'clock?
- d) twenty to ten?
- e) twelve minutes past seven?
- f) twenty-nine minutes past twelve?

**2. Name the kinds of angles shown in these figures:**



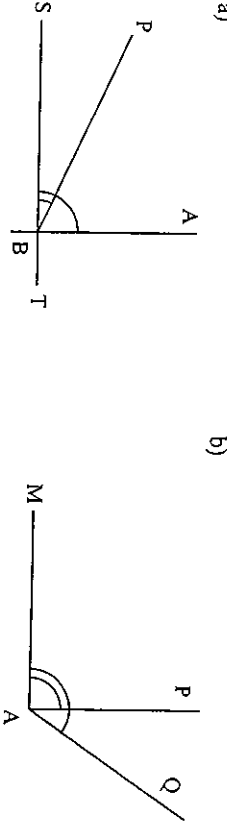
**5. Read out the following:**

- a)  $4a^2 \times 2a^2$
- b)  $x^y$
- c)  $3y^2xy$
- d)  $S = \pi r^2$
- e)  $\alpha = \frac{\pi}{2^n}$
- f)  $\sqrt{x^2}$
- g)  $\sqrt{a^2 b^2}$

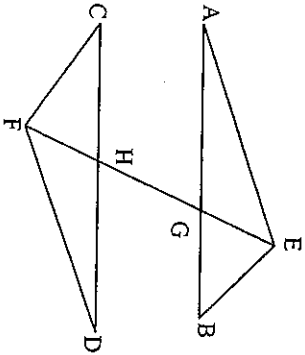
3. Are the following statements true or false?

- The exterior angles of a triangle are always obtuse.
- Only two angles of a triangle can be obtuse.
- The smallest angle of a triangle is opposite the shortest side.
- The point where the sides of an angle meet is called the vertex.
- A triangle with two obtuse angles is called an obtuse triangle.

4. Describe the lines and angles in the following figures:



5. Look at this and describe the figure:



6. Look at the figure above and read the following:

- $\angle AGH = \angle EGB$  They are *vertically opposite* angles. (Vert. opp.  $\angle$ s)
- $\angle AGH = \angle CHF$  They are *corresponding* angles. (Corr.  $\angle$ s)
- $\angle AGH = \angle GHD$  They are *alternate* angles. (Alt.  $\angle$ s)
- $\angle AGH + \angle AGE = 180^\circ$  They are *adjacent* angles on a straight line. (Adj.  $\angle$ s)
- $\angle AGH + \angle CHG = 180^\circ$  They are *interior* angles on the same side of the transverse line (Int.  $\angle$ s)
- $\angle AGH = \angle EAG + \angle AEG$  The exterior angle of a triangle equals the sum of the interior opposite angles. (Ext.  $\angle$  of  $\Delta$ )

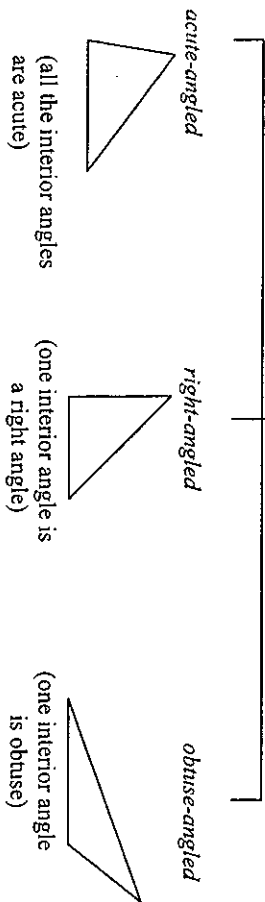
• Now make similar statements about EGB:

• Find other angles in the diagram which are equal and say why. If EB is equal and parallel to CF, compare  $\Delta CHF$  and  $\Delta EGB$ . Give reasons for what you say.

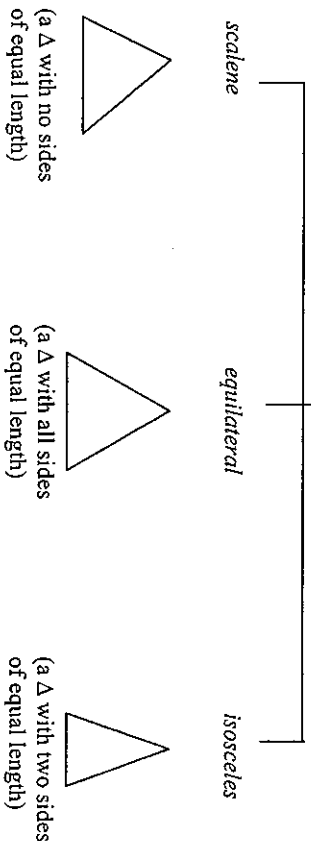
### II. A triangle

A triangle is a three-sided figure. The three sides of a triangle meet at points called *vertices* (sg. *vertex*), the vertex at the top of a triangle may be called the *apex*, and the line at the bottom may be called the *base*. Triangles are often named according to their angles. A right-angled triangle has one right angle and two acute angles. An obtuse triangle has one obtuse and two acute angles. An acute triangle has three acute angles.

Classification of triangles according to their *angles*:



Classification of triangles according to their *sides*:



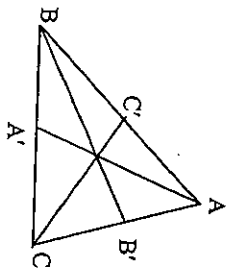
1. Fill in the missing expressions:

- If each of the angles in a triangle is equal to  $60^\circ$ , the triangle is called .....
- If two angles of a triangle are equal to  $45^\circ$ , the triangle is called a ..... triangle.
- If two lines meet at an angle of  $90^\circ$ , they are ..... to each other.
- Each triangle has three points, or .....

КОРЪИ РЪВЪЦИ МАТЕРИАЛЪТ Е РО ВЪУКУ АД,  
 КРЕПИВОСА, НОВЪКОВА, МАТЪРЪКЪС 2006

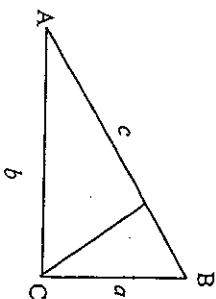
2. Look and read, and fill in the missing expressions:

A straight line drawn from any ..... of a triangle to the mid-point of the ..... is known as a *median* of a triangle. The ..... where they meet is called the *centroid*, or the *centre of gravity* of the triangle.



### III. A right-angled triangle

1. Look and read:



In a right-angled triangle the side *c* opposite the right angle is called the *hypotenuse*. A, B, C are vertices opposite the sides *a*, *b*, *c*. The line leading from the vertex C perpendicular to the hypotenuse is called an *altitude* of the triangle.

2. Complete this statement of Pythagoras's Theorem:

The square of the ..... is equal to the sum of the .....

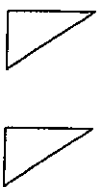
3. Label the three sides of  $\triangle ABC$  in relation to  $\angle CAB$ , using the words *hypotenuse*, *opposite* and *adjacent*.

4. Complete the following:

- a)  $\text{tangent} = \frac{\text{opposite}}{\text{adjacent}}$
- b)  $\text{sine} =$
- c)  $\text{cosine} =$
- d)  $\text{tan CAB} =$
- e)  $\text{sin CAB} =$
- f)  $\text{cos CAB} =$
- g)  $\text{cotangent} =$

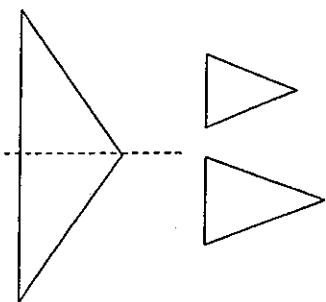
### IV. Congruence, similarity and symmetry

1. Read this:



Two triangles are *congruent* if the following parts are equal:

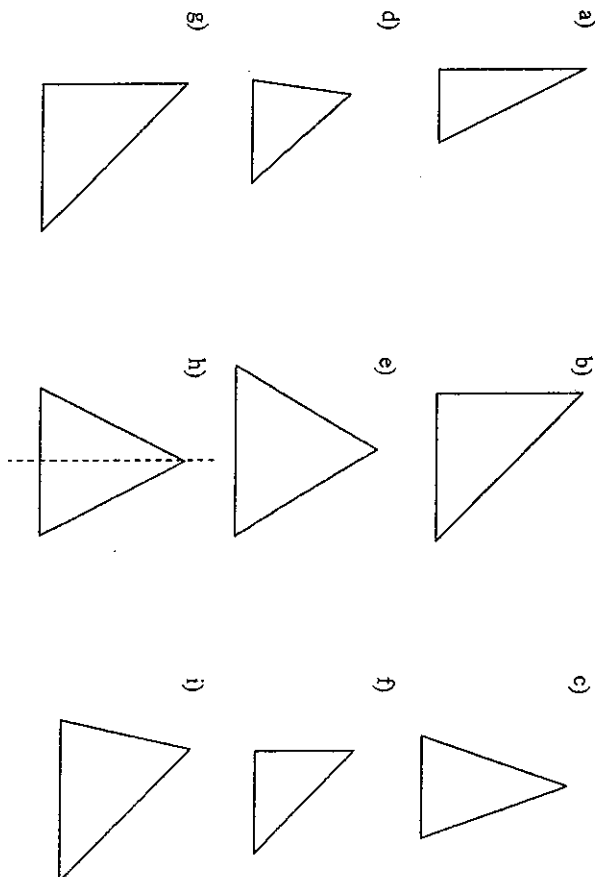
- two sides and the included angle; or
- a right angle, hypotenuse and side; or
- two angles and a corresponding side; or
- all three sides.



Two triangles are *similar* if they have their corresponding angles equal.

These two triangles are *symmetrical*, they are on either side of an axis of symmetry (or centre line).

2. Describe each triangle, and find any relationships between the triangles (i.e. symmetry, similarity or congruence):



### FOCUS C

#### ARTICLES

1. Use of the indefinite article (sg.: a, an; pl.: 0)

1. Instead of the number "one":

... for an object to be an element of  $A \cap B$ , it must be ...  
 ... look at the partial derivatives of  $f$  at a point  $P$  ...  
 In a paper on "Spaces of Type  $H_{\infty} + C$ " I learned ...