

FOCUS B

Geometry

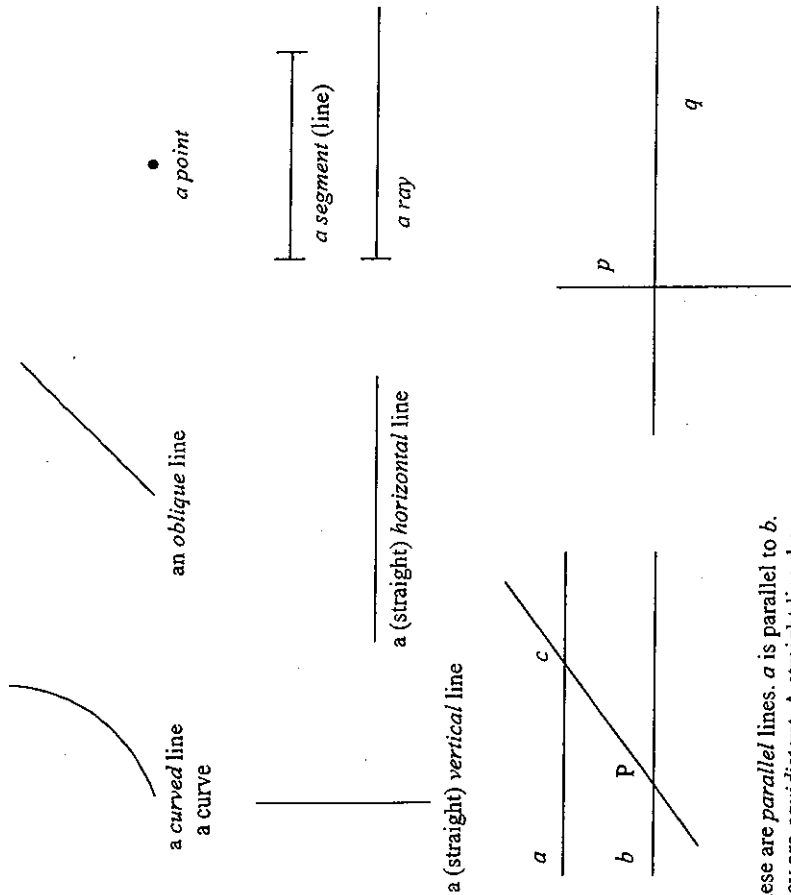
Fundamental signs:

- || is parallel
- ⊥ is perpendicular
- △ a triangle
- ∠ an angle
- ° degree
- ' minute
- " second

- is parallel
- is perpendicular
- a triangle
- an angle
- degree
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LINES

1. Look and read:

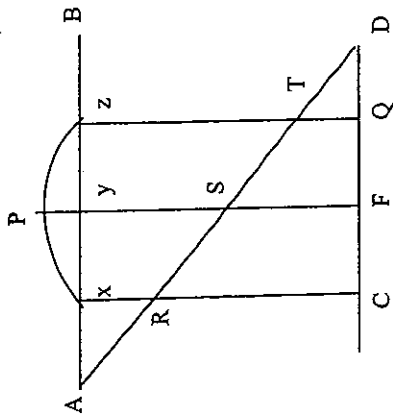


These are *parallel* lines. *a* is parallel to *b*. They are *equidistant*. A straight line drawn across a set of two or more parallel lines is called a *transversal*. Lines *c* and *b* intersect at the point P.

These are *perpendicular (orthogonal)* lines. *p* is perpendicular to *q*

2. Look at the figure and say which lines are:

- a) vertical
- b) transversal
- c) parallel
- d) oblique
- e) horizontal
- f) curved
- g) straight
- h) perpendicular



3. Using the words you have learned, describe the following capital letters:

Example: H – Letter H has two parallel vertical lines and one horizontal line.

- a) K c) M e) I g) A i) Z
- b) B d) E f) L h) X j) O

4. Which word (in capital letters) is being described below?

First letter

One full-length perpendicular line is joined at the top and at its centre point by two parallel lines, the former slightly longer than the latter, extending to the right horizontally.

Second letter

A symmetrical, wedge-shaped figure: two straight but oblique lines slanting down to the base from a common point at the top; these are bisected by a single horizontal line.

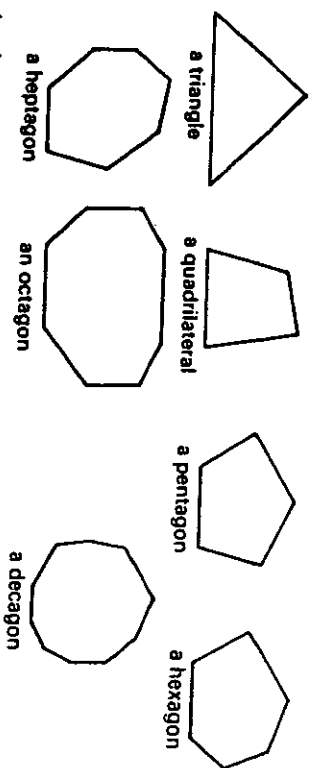
Third letter

A long vertical line is connected at two points – at the top and halfway down – to a curved, semi-circular line running to the right. From the centre intersection a sloping line drops to the baseline at an angle 45 degrees to the perpendicular, again to the right.

5. Complete the following sentences:

- a) Lines may be or curved. lines may be divided into three groups: vertical, and
- b) Pairs of lines may be divided into two groups: those which and those which are at all points, which are called lines.

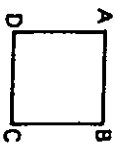
Plane figures



A triangle has three sides and three angles.
A triangle is a three-sided figure.

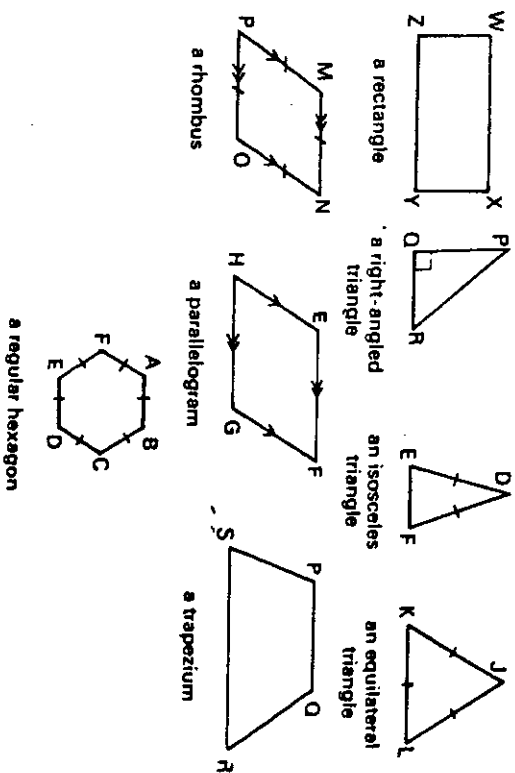
Now make similar statements about the other figures.

6. Look and read:



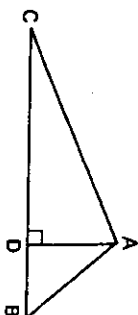
ABCD is a square.
It is a four-sided figure.
All its sides are equal.
All its angles are right angles.
Opposite sides are parallel.

Now describe these figures:

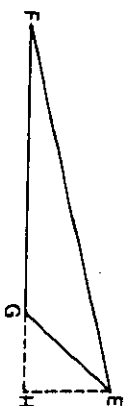


Section 2 Development

10. Look and read:

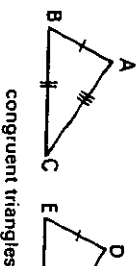


AD is an altitude of the triangle.
BC is the base.
What is the area of $\triangle ABC$?

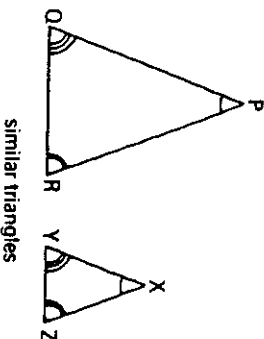


AD is equal to EH and BC is equal to FG.
The altitudes of the two triangles are equal and so are the bases.
Therefore the areas are the same.
 $\triangle ABC$ has the same area as $\triangle EFG$.

Now describe the following pairs of triangles:

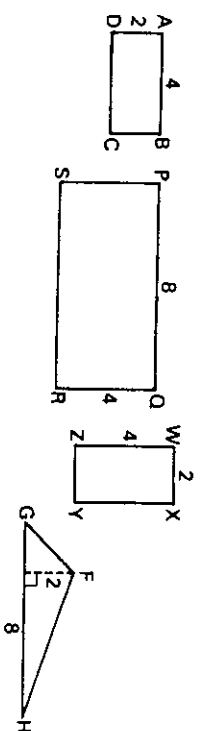


congruent triangles

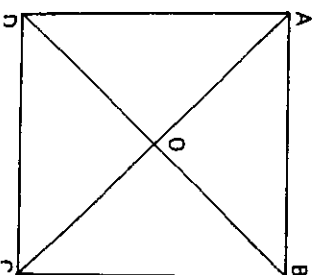


similar triangles

11. Compare these figures, saying whether they are congruent, similar or have the same area:



12. Look and read:



In square ABCD, the diagonals intersect at O.
 $OA = OC$ and $OD = OB$. The diagonals bisect each other.
 $\angle AOB = 90^\circ$. The diagonals intersect at right angles.
 $\widehat{DAO} = \widehat{BAO}$. The diagonals bisect the angles.

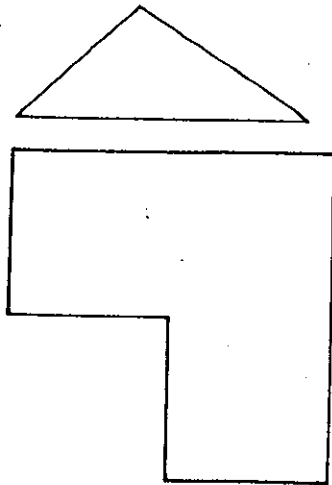
The History of Mathematics - BBC doc (part2)

<http://www.youtube.com/watch?v=eq1dat0jvxs&feature=related>

Listen to and watch the video, then decide whether the statements are true or false. Correct the false ones.

- 1) The Rhind Mathematical Papyrus originated in 1615 B.C.
- 2) Egyptian workers got money for their work.
- 3) After the division of bread, each person gets 1 half, 1 third, and one fifth.
- 4) Egyptians used fractions for practical purposes, e.g. trade.
- 5) Horus lost both his eyes in a fight.
- 6) The geometric series appeared first in the Rhind Papyrus.
- 7) The concept of infinity was also discovered in the ancient Egypt.
- 8) We do not know how the Egyptians calculated the area of a circle.
- 9) The Egyptians calculated the value of $\sqrt{10}$ to 3.14.
- 10) The Egyptians used larger shapes to capture smaller shapes.
- 11) Pyramids are impressive for a mathematician for their symmetry.
- 12) Pyramids use the concept of the Golden Ratio.
- 13) The relationship between the longest and the shortest side is the same as the sum of the two to the shortest.
- 14) Egyptians proved before Pythagoras the right angled triangle.
- 15) Egyptians used only concrete numbers, were not looking for general proofs.
- 16) The surface area of a pyramid was the first attempt at calculus.

18. PUZZLE



a) Divide this triangle into three figures with equal areas, using two straight lines.

b) Divide this figure into:
 i) two congruent figures
 ii) three congruent figures
 iii) four congruent figures

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AC = BD. The diagonals are equal.
 AB = DC. The opposite sides are equal.
 AB//DC. The opposite sides are parallel.

Now complete these tables:

	Opposite sides equal	Opposite sides parallel	Diagonals bisect each other	Diagonals bisect angles	Diagonals intersect at right angles	Diagonals equal
Square	✓	✓	✓	✓	✓	✓
Rhombus						
Parallelogram						
Trapezium						
Regular hexagon						

	Angles equal	Sides equal	Areas equal
Congruent figures			
Similar figures			