O Level E Maths Tutorial 10: Angles, triangles and polygons

Syllabus :
• right, acute, obtuse and reflex angles

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1. For each of the following angles, state whether it is right angle, acute, obtuse or reflex.

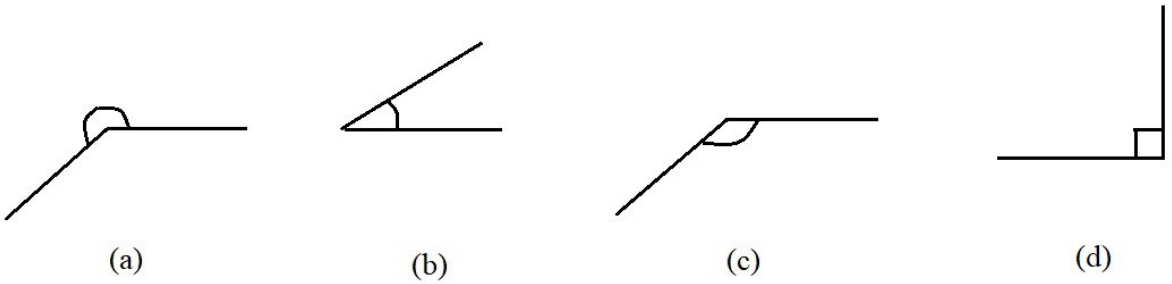

Figure 10-1

• vertically opposite angles, angles on a straight line and angles at a point

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2. Give the values of x, y and z in the following angles, stating the reasons.

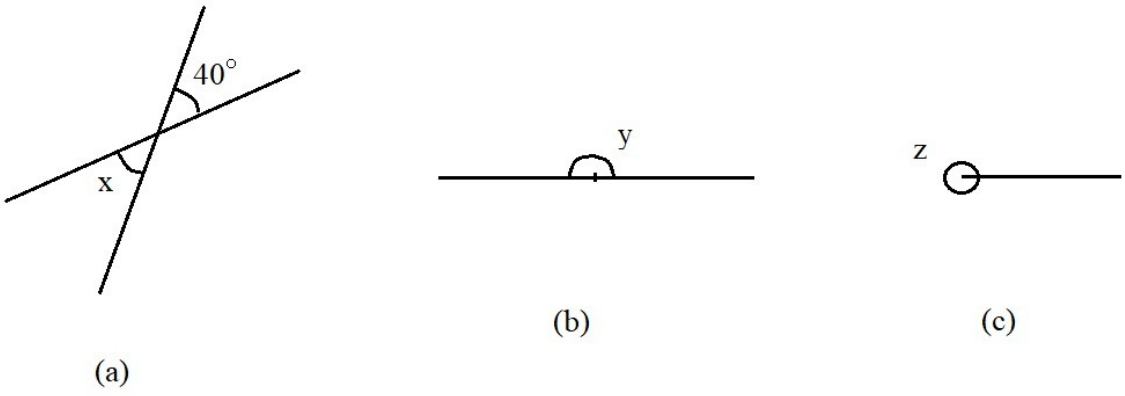

Figure 10-2

• angles formed by two parallel lines and a transversal: corresponding angles, alternate angles, interior angles

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3. Find the values of the angles x, y and z. State the reason in each case.

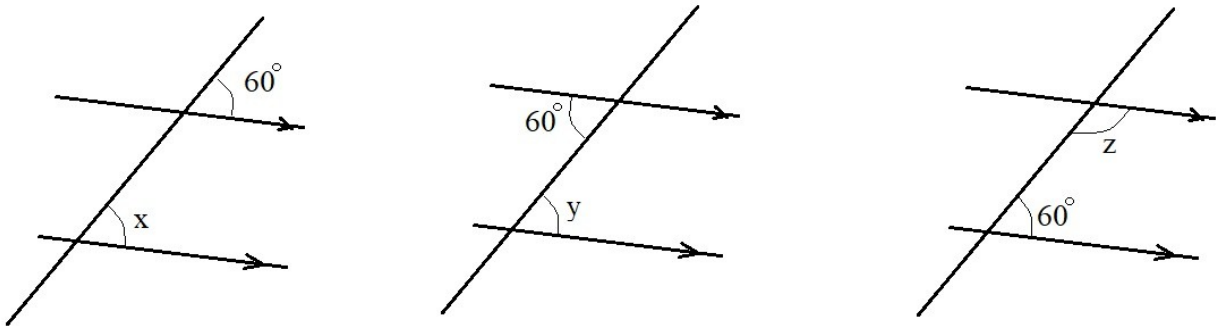

Figure 10-3

• properties of triangles, special quadrilaterals and regular polygons (pentagon, hexagon, octagon and decagon), including symmetry properties

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4. Sketch the following triangles. Indicate if there are equal angles or sides.

(i) equilateral triangle
(ii) isosceles triangle
(iii) scalene triangle

5. Sketch a figure for each of the following special quadrilaterals . In each case, indicate if there are parallel sides or right angles.

(i) squares
(ii) rectangle
(iii) rhombuses
(iv) parallelograms
(v) trapezoids (trapezium)

(vi) kite

• classifying special quadrilaterals on the basis of their properties

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6. In each of the following cases, state the name of the quadrilateral with the given property.

(i) Opposite sides are parallel and equal in length, and opposite angles are equal.

(ii) A parallelogram with four right angles.

(iii) A parallelogram with all four sides equal in length.

(iv) A rectangle and a rhombus, having four right angles and all sides equal.

(v) A quadrilateral with exactly one pair of parallel sides.

(vi) A quadrilateral with two pairs of adjacent sides equal in length.

• angle sum of interior and exterior angles of any convex polygon

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7. (i) The interior angles of triangle ABC are given by *a*, b and c. State the value of $a + b + c$.

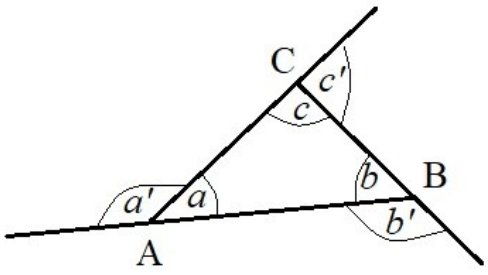

Figure 10-4

(ii) The figure also shows the exterior angles of a triangle - *a*', b' and c'. *a*' is related to *a* by

$a' = 180° - a$.

Write down the corresponding equations for b' and c'.

(iii) By summing the above equations for *a*', b' and c', show that sum of the exterior angles of the triangle is 360°.

8. The sum of exterior angles of a polygon is always 360°. This is true for a polygon with any number of sides, whether it is regular or not.

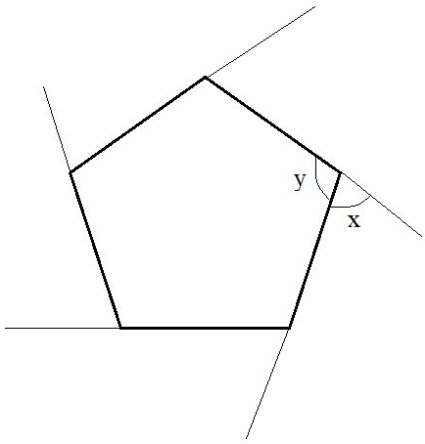

Figure 10-5

The figure above shows regular pentagon.

(i) Find the exterior angle x.

(ii) Find the interior angle y.

(iii) Hence find the total interior angles.

• construction of simple geometrical figures from given data using compasses, ruler, set squares and protractors, where appropriate

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(If you don't have a geometry set with you, do the following using a rough sketch.)

9.

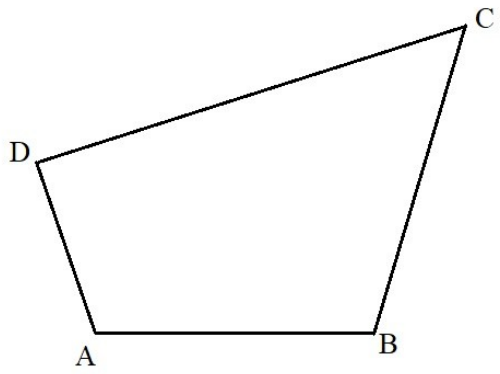

Figure 10-6

On the diagram,

(a) construct the bisector of angle AB,

(b) construct the perpendicular bisector of AB,

(c) shade the region ABCD that is closer to DC than to DA and closer to A than to B.

[N19/I/12]