Sample Paper 2014: Paper 2

Question 6A (25 marks)

Explanation:

Proof by contradiction is a form of proof that establishes the truth or validity of a proposition by showing that the proposition being false would imply a contradiction.

Example:

Prove $x+\frac{1}{x}\geq 2$ for all $x>0,\ x\in\mathbb{R}$.

To prove this let's assume it is false, i.e $x+\frac{1}{x}<2$ for all $x>0,\ x\in\mathbb{R}$.

$x+\frac{1}{x}<2$

$x^2+1<2x$

$x^2-2x+1<0$

$(x-1)^2<0$ [This statement is false for all values of x.]

This is a contradiction.

Question 6B (25 marks)

OECD is a cyclic quadrilateral because its opposite angles add up to 180°.

$|\angle OEC|+|\angle ODC|=90^\circ+90^\circ=180^\circ$

It follows that the other pair of opposite angles also add up to 180° as the four angles in a quadrilateral add up to 360°.

Cyclic Quadrilaterals

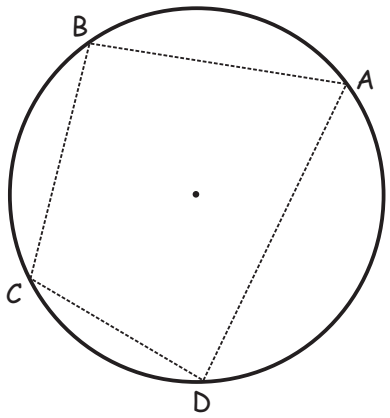
A cyclic quadilateral is a four sided figure whose vertices lie on a circle.

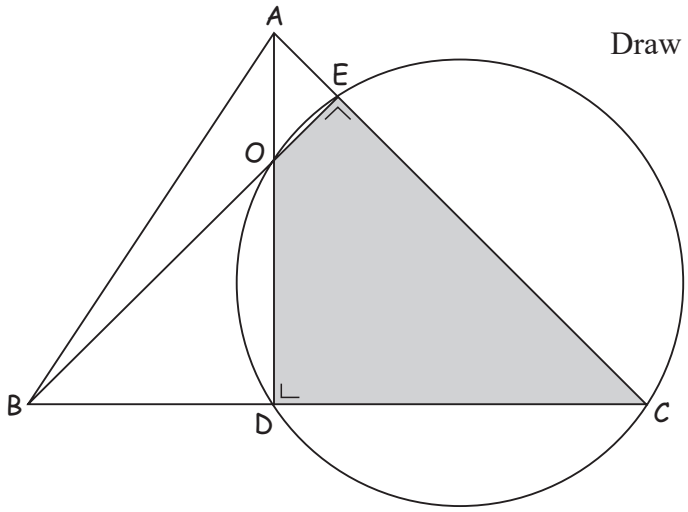
Opposite angles of a cyclic quadrilateral add up to 180°.

$$\angle A+\angle C=180^\circ$$

$$\angle B+\angle D=180^\circ$$

Conversely, if the opposite angles of a quadrilateral add up to 180° then it is a cyclic quadrilateral.





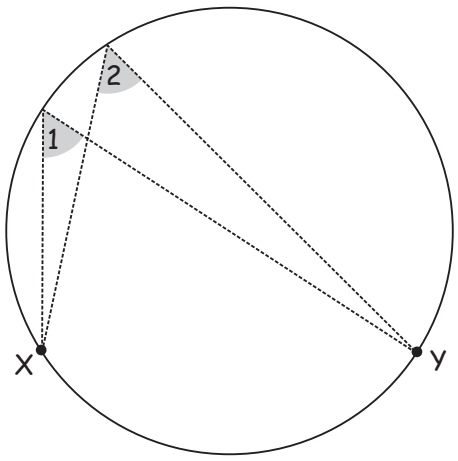
Draw a circle around the quadrilateral.

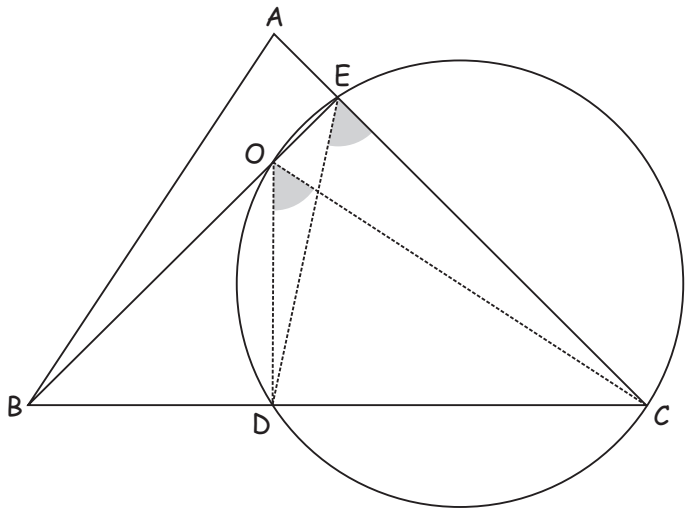
Angles standing on the same arc in a Circle

Angles 1 and 2 are standing on the same arc $[AB]$.

Angles standing on the same arc are equal.

$\therefore |\angle 1| = |\angle 2|$.





$|\angle DOC| = |\angle DEC|$ [Both angles are standing on arc $[DC]$]