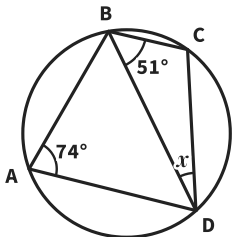


Circle Theorems: Cyclic Quadrilaterals *stretch*

ANSWERS

1

ABCD is a cyclic quadrilateral.
Find angle BDC, marked x .



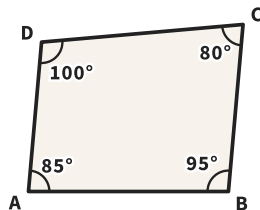
Not drawn accurately
 $\text{angle } BCD = 180 - 74 = 106^\circ$ (opposite angles of a cyclic quadrilateral)

$$x = 180 - 106 - 51 \text{ (triangle } BCD)$$

Answer $x = 23^\circ$

2

Mo says the corners of this quadrilateral could all lie on one circle.
Is Mo right? Explain.



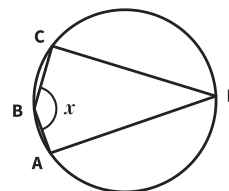
Not drawn accurately
opposite angles: $85 + 80 = 165^\circ$ (and $95 + 100 = 195^\circ$)

on a circle opposite angles add to 180°

Answer No

3

A metal frame ABCD has its corners on a circular rim. Angle ABC is four times angle ADC. Find angle ABC, marked x .



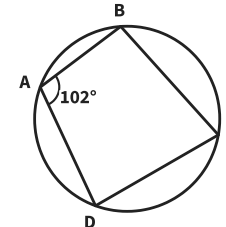
Not drawn accurately
 $ABC + ADC = 180^\circ$ (opposite angles): 5 parts = 180°

$$x = 4 \times 36$$

Answer $x = 144^\circ$

4

ABCD is a cyclic quadrilateral.
Ella says $\text{angle } ABC = 180 - 102 = 78^\circ$.
Explain her mistake. Which angle is 78° ?



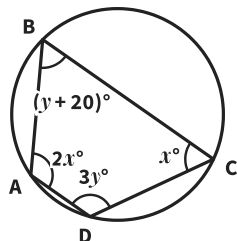
Not drawn accurately
 ABC is next to DAB , not opposite it: it need not be 78°

the opposite angle $BCD = 180 - 102 = 78^\circ$

Answer $\text{angle } BCD = 78^\circ$

5

ABCD is a cyclic quadrilateral.
Find the values of x and y .



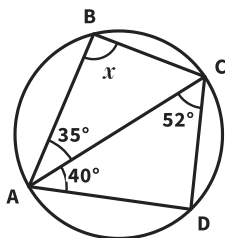
Not drawn accurately
 $2x + x = 180$, so $x = 60$ (opposite angles)

$$(y + 20) + 3y = 180, \text{ so } y = 40$$

Answer $x = 60, y = 40$

6

ABCD is a cyclic quadrilateral.
Find angle ABC, marked x .



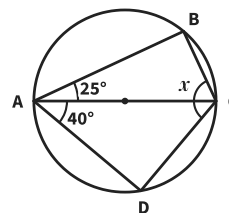
Not drawn accurately
 $\text{angle } ADC = 180 - 40 - 52 = 88^\circ$ (triangle ACD)

$$x = 180 - 88 = 92^\circ \text{ (opposite angles)}$$

Answer $x = 92^\circ$

7

AC is a diameter. Angle BAC = 25° and angle CAD = 40° . Find angle BCD, marked x , in two different ways.

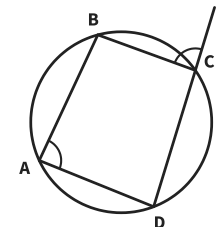


Not drawn accurately
opposite angles: $x = 180 - (25 + 40) = 115^\circ$
or $ABC = ADC = 90^\circ$ (semicircle):
 $65 + 50 = 115^\circ$

Answer $x = 115^\circ$

8

ABCD is a cyclic quadrilateral and DC is extended to E. Explain why angle BCE = angle BAD.



$BCD = 180 - \text{BAD}$ (opposite angles of a cyclic quadrilateral)

$BCE = 180 - BCD$ (angles on a straight line) = BAD

Reason $BCE = BAD$