

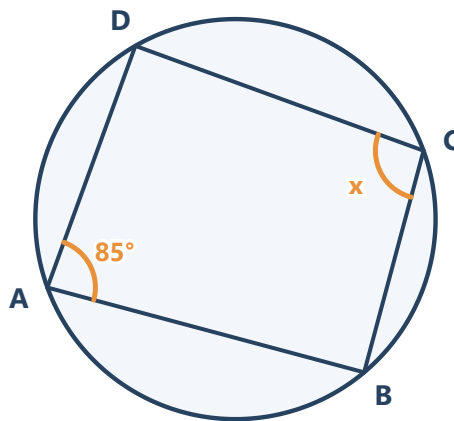
GCSE Maths: Cyclic quadrilaterals (Higher): answers

GCSE Maths - Circle Theorems - Higher - Lesson 26.5

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch26-circle-theorems/higher/cyclic-quadrilaterals/

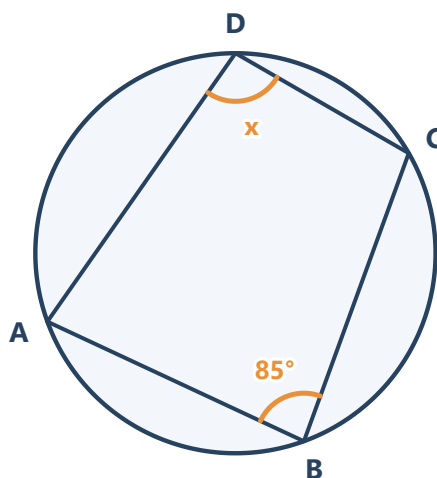
Exercise 26E Cyclic quadrilaterals Non-calculator

- 1 $ABCD$ is a cyclic quadrilateral. Angle $DAB = 85^\circ$. Work out the size of angle BCD . Give a reason for your answer.



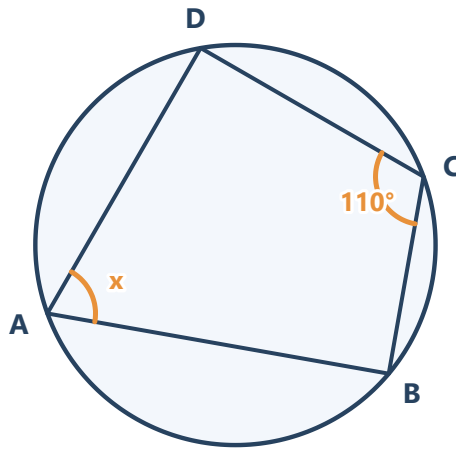
Answer: 95° (opposite angles of a cyclic quadrilateral add up to 180°)

- 2 $ABCD$ is a cyclic quadrilateral. Angle $ABC = 85^\circ$. Work out the size of angle CDA . Give a reason for your answer.



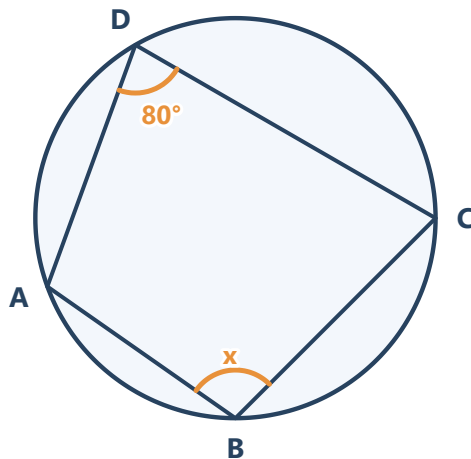
Answer: 95° (opposite angles of a cyclic quadrilateral add up to 180°)

- 3 $ABCD$ is a cyclic quadrilateral. Angle $BCD = 110^\circ$. Work out the size of angle DAB . Give a reason for your answer.



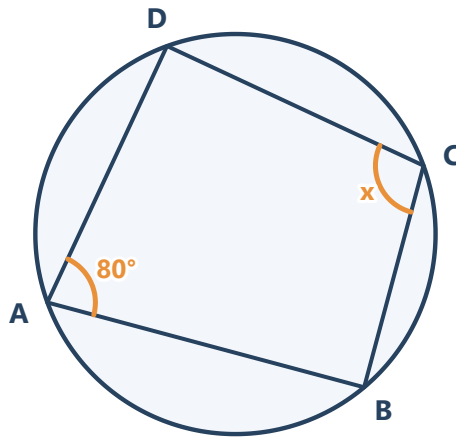
Answer: 70° (opposite angles of a cyclic quadrilateral add up to 180°)

- 4 $ABCD$ is a cyclic quadrilateral. Angle $CDA = 80^\circ$. Work out the size of angle ABC . Give a reason for your answer.



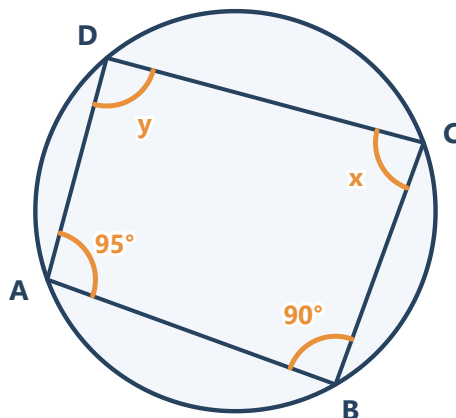
Answer: 100° (opposite angles of a cyclic quadrilateral add up to 180°)

- 5 $ABCD$ is a cyclic quadrilateral. Angle $DAB = 80^\circ$. Work out the size of angle BCD . Give a reason for your answer.



Answer: 100° (opposite angles of a cyclic quadrilateral add up to 180°)

- 6 $ABCD$ is a cyclic quadrilateral. Angle $DAB = 95^\circ$ and angle $ABC = 90^\circ$. Work out the other two angles of the quadrilateral.



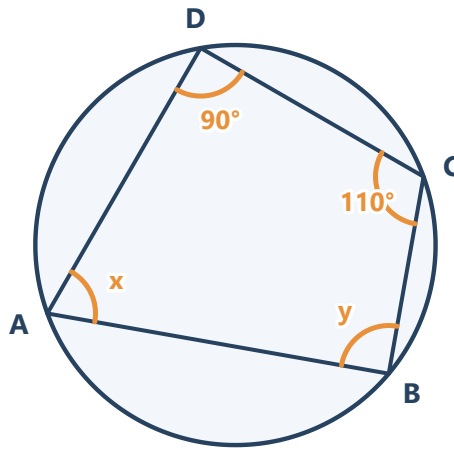
- (a) Work out angle BCD .

Answer: 85°

- (b) Work out angle CDA .

Answer: 90°

- 7 $ABCD$ is a cyclic quadrilateral. Angle $BCD = 110^\circ$ and angle $CDA = 90^\circ$. Work out the other two angles of the quadrilateral.



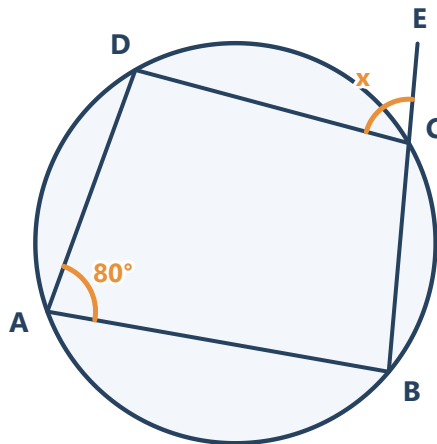
- (a) Work out angle DAB .

Answer: 70°

- (b) Work out angle ABC .

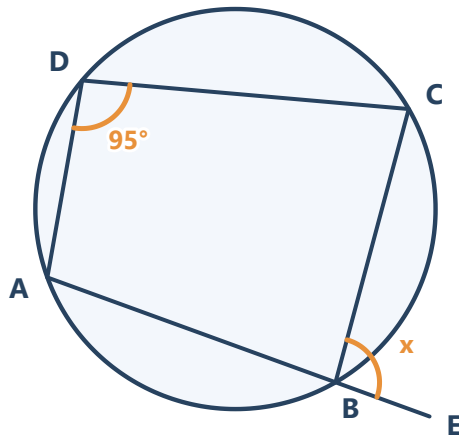
Answer: 90°

- 8 $ABCD$ is a cyclic quadrilateral. The side BC is extended to the point E . Angle $DAB = 80^\circ$. Work out the size of angle ECD . Give a reason for each step.



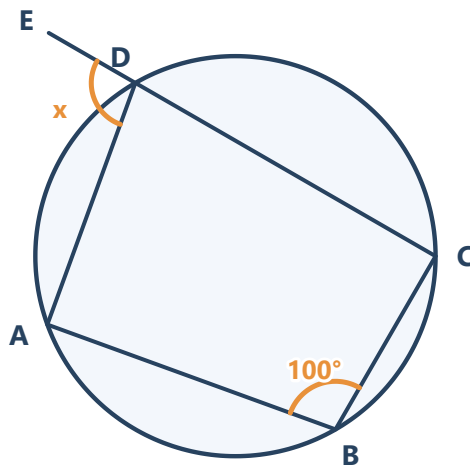
Answer: 80° (opposite angles of a cyclic quadrilateral add up to 180° ; angles on a straight line add up to 180°)

- 9 $ABCD$ is a cyclic quadrilateral. The side AB is extended to the point E . Angle $CDA = 95^\circ$. Work out the size of angle EBC . Give a reason for each step.



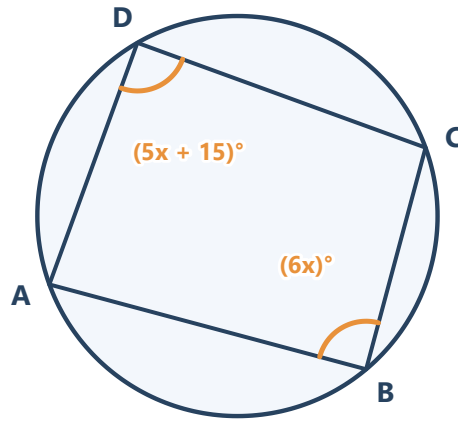
Answer: 95° (opposite angles of a cyclic quadrilateral add up to 180° ; angles on a straight line add up to 180°)

- 10** $ABCD$ is a cyclic quadrilateral. The side CD is extended to the point E . Angle $ABC = 100^\circ$. Work out the size of angle EDA . Give a reason for each step.



Answer: 100° (opposite angles of a cyclic quadrilateral add up to 180° ; angles on a straight line add up to 180°)

- 11** $ABCD$ is a cyclic quadrilateral. Angle $ABC = (6x)^\circ$ and angle $CDA = (5x + 15)^\circ$.



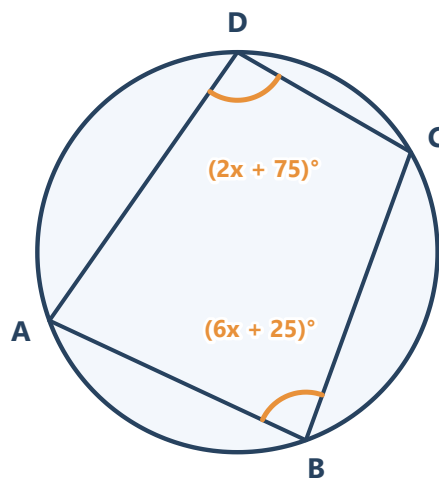
- (a) Work out the value of x .

Answer: $x = 15$

- (b) Work out angles ABC and CDA .

Answer: 90° and 90°

- 12** $ABCD$ is a cyclic quadrilateral. Angle $ABC = (6x + 25)^\circ$ and angle $CDA = (2x + 75)^\circ$.



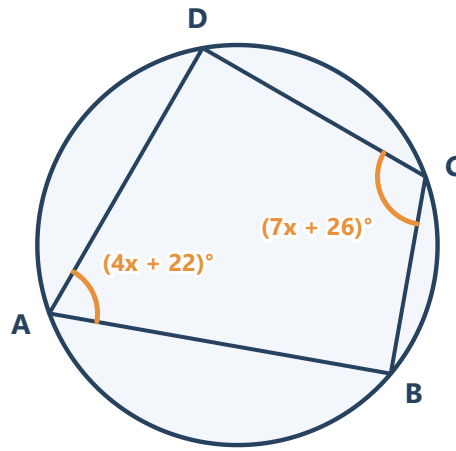
- (a) Work out the value of x .

Answer: $x = 10$

- (b) Work out angles ABC and CDA .

Answer: 85° and 95°

- 13** $ABCD$ is a cyclic quadrilateral. Angle $DAB = (4x + 22)^\circ$ and angle $BCD = (7x + 26)^\circ$.



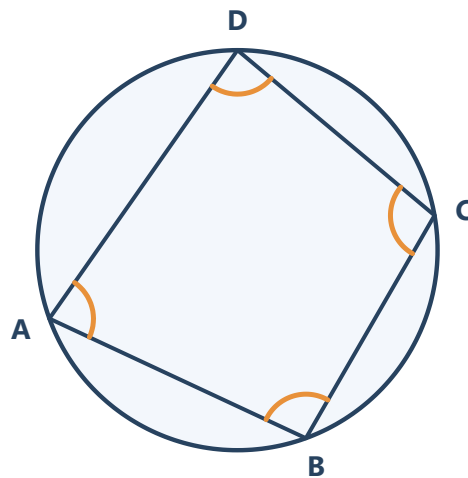
- (a) Work out the value of x .

Answer: $x = 12$

- (b) Work out angles DAB and BCD .

Answer: 70° and 110°

- 14** $ABCD$ is a cyclic quadrilateral. Angle $DAB = (2x + 40)^\circ$, angle $BCD = (3x + 40)^\circ$, angle $ABC = (5y + 20)^\circ$ and angle $CDA = (3y + 40)^\circ$. The angles are marked on the diagram.



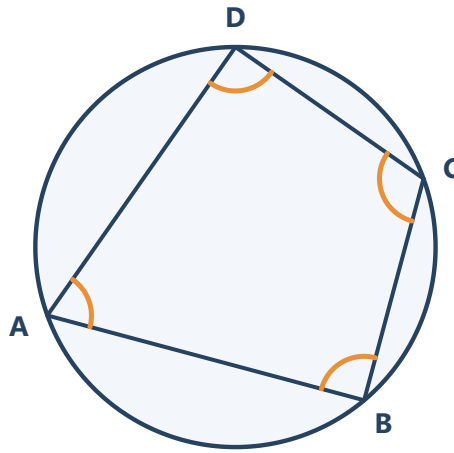
- (a) Work out the value of x .

Answer: $x = 20$

- (b) Work out the value of y .

Answer: $y = 15$

- 15** $ABCD$ is a cyclic quadrilateral. Angle $DAB = (4x + 30)^\circ$, angle $BCD = (7x + 40)^\circ$, angle $ABC = (6y + 18)^\circ$ and angle $CDA = (3y + 54)^\circ$. The angles are marked on the diagram.



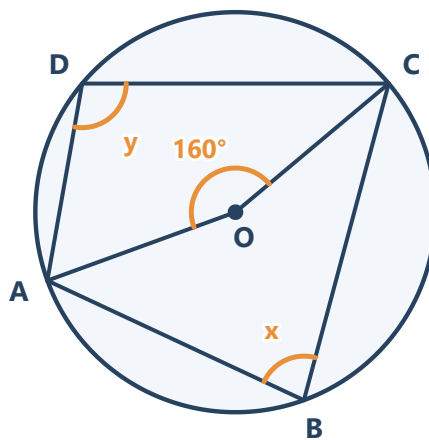
- (a) Work out the value of x .

Answer: $x = 10$

- (b) Work out the value of y .

Answer: $y = 12$

- 16** A, B, C and D are points on a circle with centre O . Angle $AOC = 160^\circ$ (the angle at O inside the quadrilateral on the side of D). Give a reason for each answer.



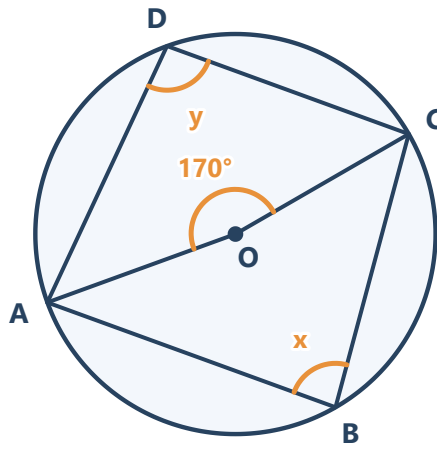
- (a) Work out angle ABC

Answer: 80° (the angle at the centre is twice the angle at the circumference)

- (b) Work out angle ADC

Answer: 100° (opposite angles of a cyclic quadrilateral add up to 180°)

- 17** A, B, C and D are points on a circle with centre O . Angle $AOC = 170^\circ$ (the angle at O inside the quadrilateral on the side of D). Give a reason for each answer.



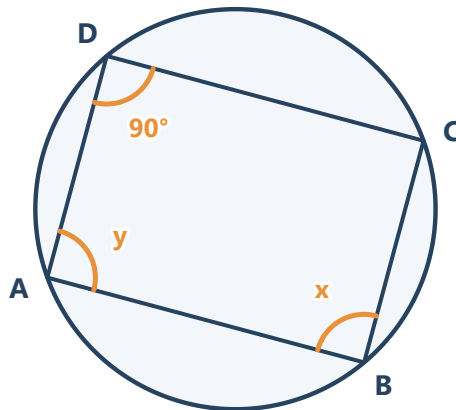
- (a) Work out angle ABC

Answer: 85° (the angle at the centre is twice the angle at the circumference)

- (b) Work out angle ADC

Answer: 95° (opposite angles of a cyclic quadrilateral add up to 180°)

- 18 $ABCD$ is a cyclic quadrilateral. AB is parallel to DC . Angle $ADC = 90^\circ$. Give a reason for each step.



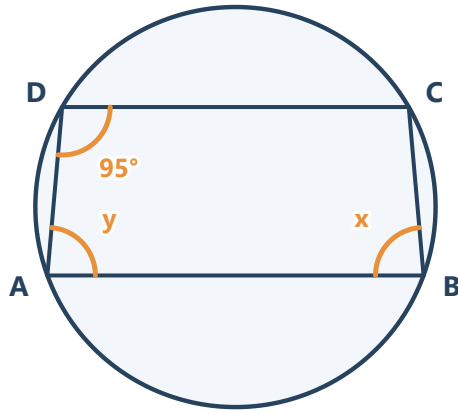
- (a) Work out angle ABC

Answer: 90° (opposite angles of a cyclic quadrilateral add up to 180°)

- (b) Work out angle BAD

Answer: 90° (co-interior angles between parallel lines add up to 180°)

- 19 $ABCD$ is a cyclic quadrilateral. AB is parallel to DC . Angle $ADC = 95^\circ$. Give a reason for each step.



- (a) Work out angle ABC

Answer: 85° (opposite angles of a cyclic quadrilateral add up to 180°)

- (b) Work out angle BAD

Answer: 85° (co-interior angles between parallel lines add up to 180°)

- 20** In a quadrilateral $ABCD$, angle $A = 85^\circ$ and angle $C = 100^\circ$. Explain why $ABCD$ cannot be a cyclic quadrilateral.

Answer: Opposite angles would have to add up to 180° , but $85^\circ + 100^\circ = 185^\circ$.

- 21** A parallelogram $ABCD$ is drawn with all four corners on a circle. Show that $ABCD$ must be a rectangle.

Answer: Opposite angles of a parallelogram are equal, and opposite angles of a cyclic quadrilateral add up to 180° , so each angle is 90° .

- 22** $ABCD$ is a cyclic quadrilateral. Show that the exterior angle at C (made by extending BC to E) is equal to angle BAD .

Answer: Angle $DCE = 180^\circ - \text{angle } BCD$ (straight line) and angle $BAD = 180^\circ - \text{angle } BCD$ (cyclic quadrilateral), so they are equal.