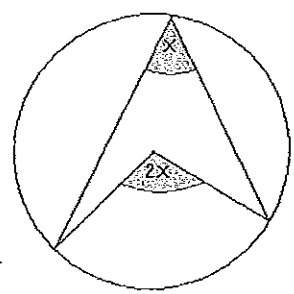
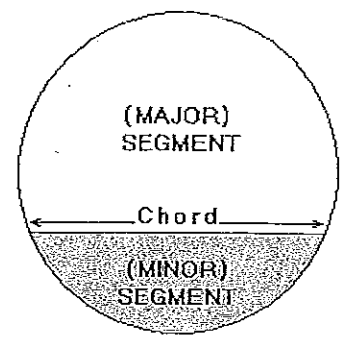
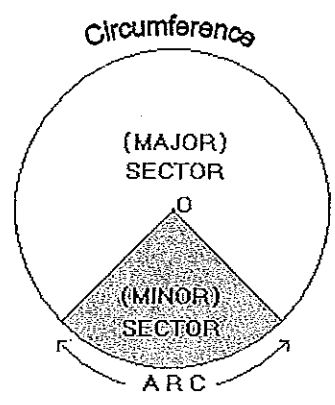
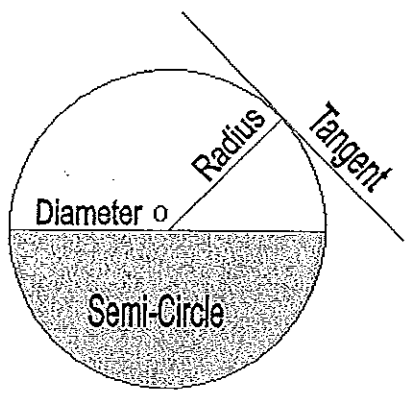
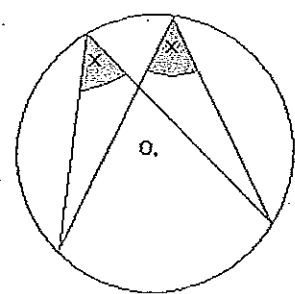


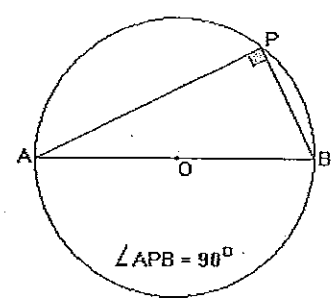
# CIRCLE PROPERTIES



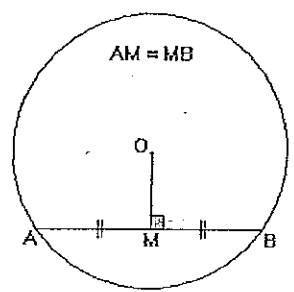
The angle at the centre is twice the angle at the circumference, when made from the same arc.



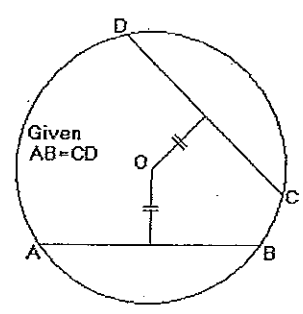
Angles at the circumference, made from the same arc, are equal.



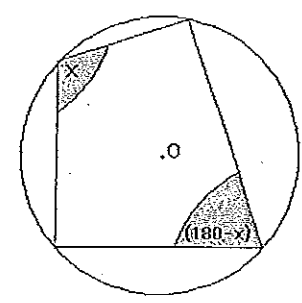
The angle in a semi-circle is a right-angle.



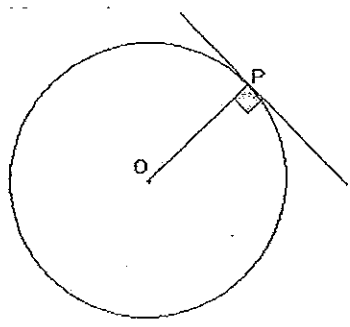
A line drawn from the centre to the mid-point of a chord, meets it at right-angles ( $90^\circ$ )



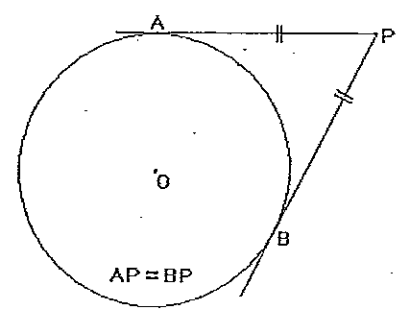
Chords of equal length are equidistant from the centre of the circle.



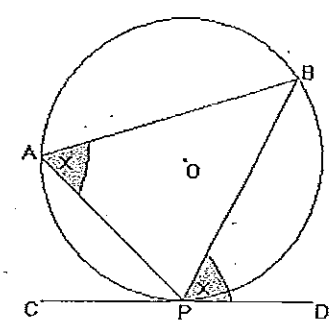
The opposite angles of a cyclic quadrilateral, are supplementary.



A Tangent meets a radius at its point of contact at right-angles.



Two tangents drawn from an external point are equal in length.



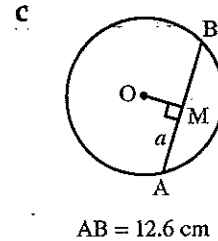
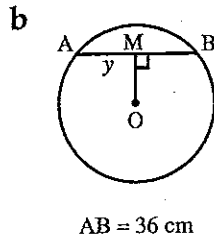
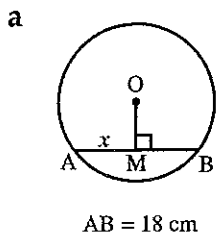
The angle between a chord and a tangent is equal to the angle in the alternate segment.

# CHAPTER 8

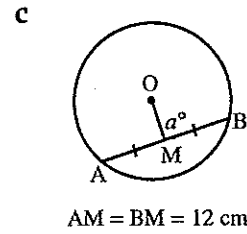
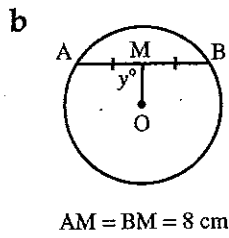
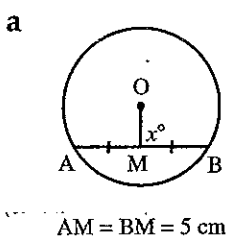
## Circle geometry (OPTION 5)

### UNIT 1: Chord properties of a circle

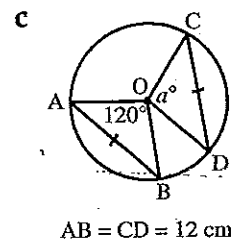
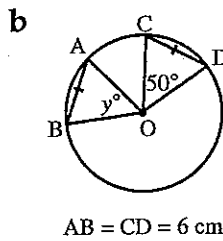
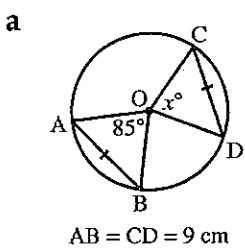
**QUESTION 1** Find the value of the pronumeral in the following questions.



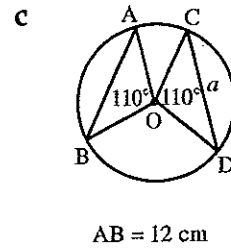
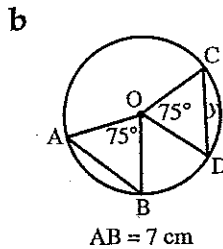
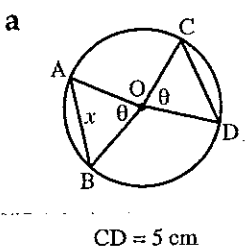
**QUESTION 2** Find the value of the pronumeral in the following questions.



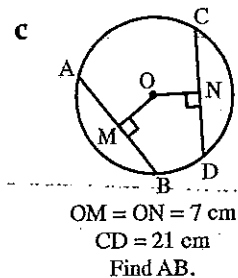
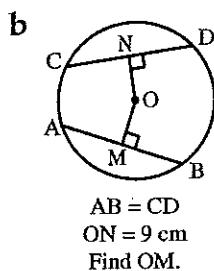
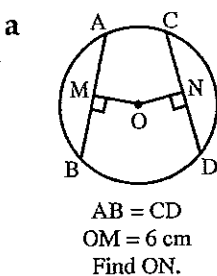
**QUESTION 3** Find the value of the pronumeral.



**QUESTION 4** Find the value of the pronumeral in the following.



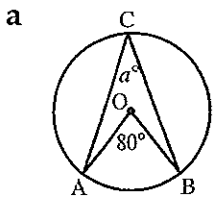
**QUESTION 5** Find the value of the required length.



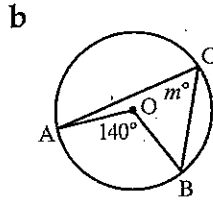
# Circle geometry (OPTION 5)

## UNIT 2: Angle properties of a circle

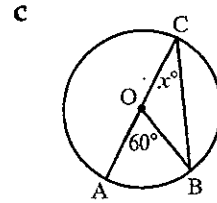
**QUESTION 1** Find the value of the pronumeral in each of the following.



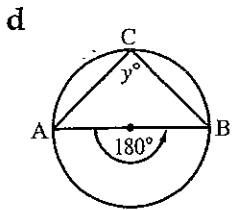
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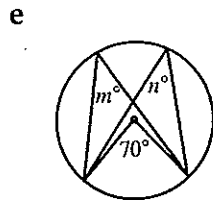
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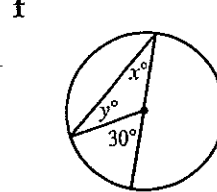
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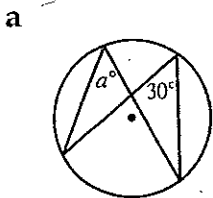


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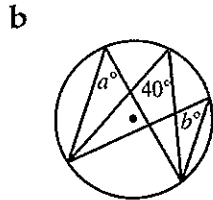


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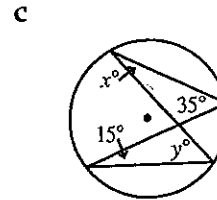
**QUESTION 2** Find the value of the pronumeral in the following.



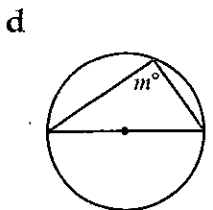
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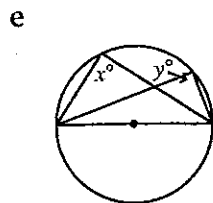
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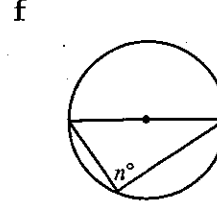
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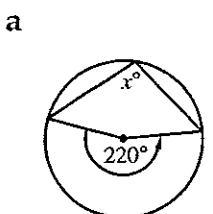


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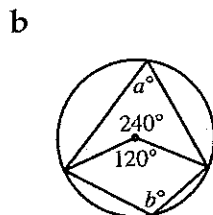


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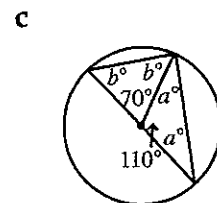
**QUESTION 3** Find the value of the pronumeral in the following.



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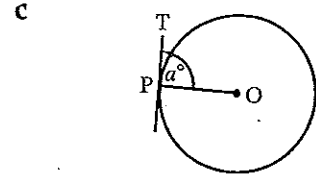
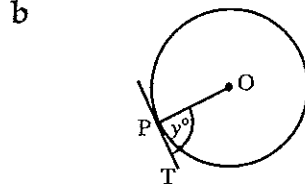
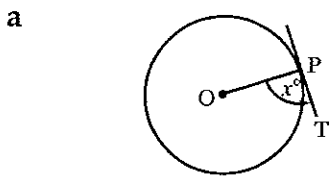


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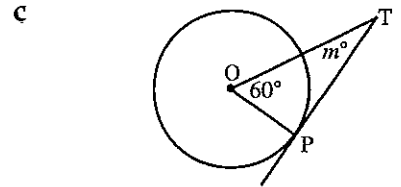
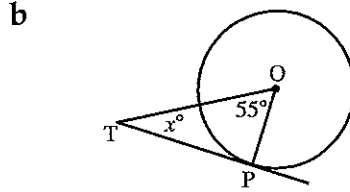
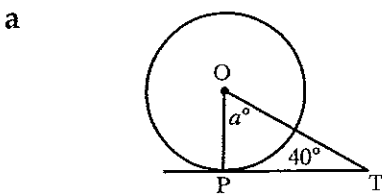
# Circle geometry (OPTION 5)

## UNIT 3: Tangent properties of a circle

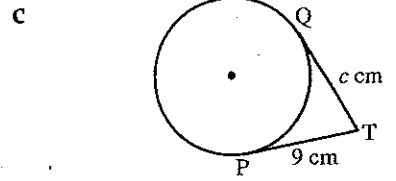
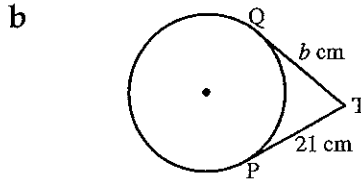
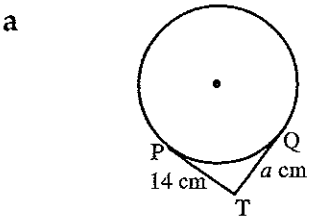
**QUESTION 1** Find the value of the pronumeral.



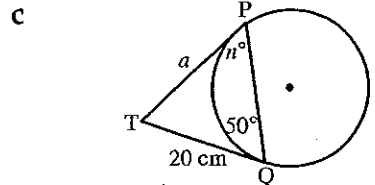
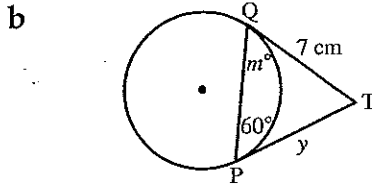
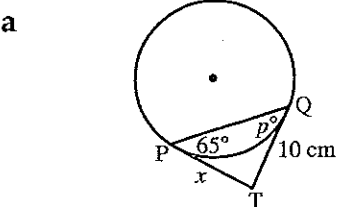
**QUESTION 2** Find the value of the pronumeral.



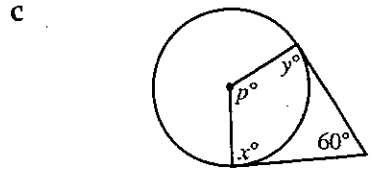
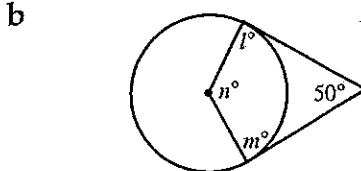
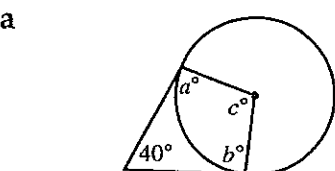
**QUESTION 3** Find the value of the pronumeral.



**QUESTION 4** Find the value of the pronumeral.



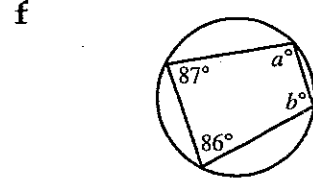
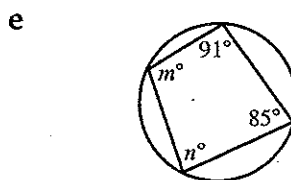
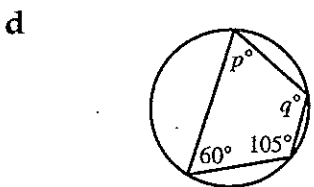
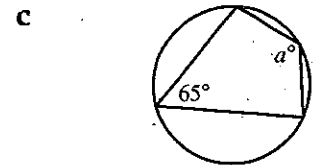
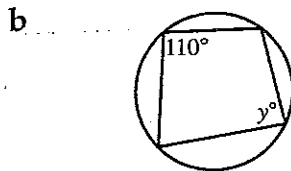
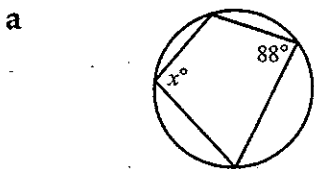
**QUESTION 5** Find the value of the pronumeral.



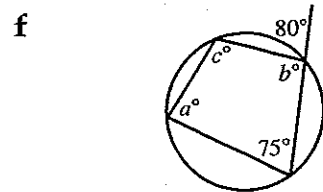
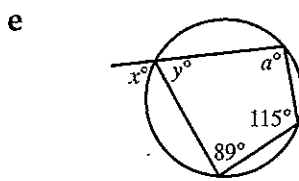
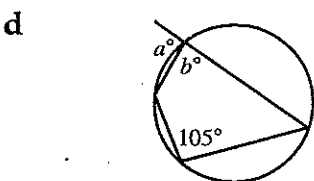
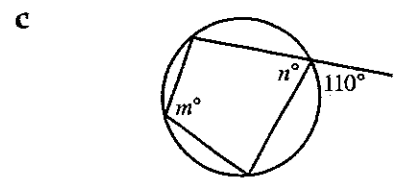
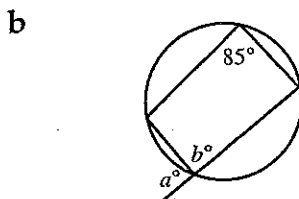
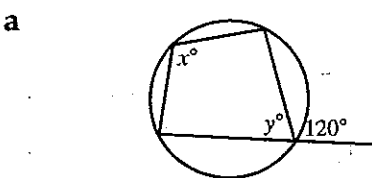
# Circle geometry (OPTION 5)

## UNIT 4: Cyclic quadrilaterals

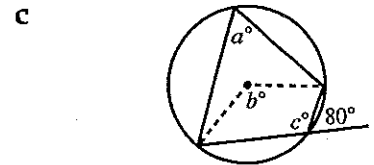
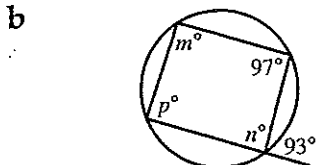
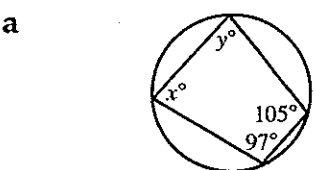
**QUESTION 1** Find the value of the pronumeral.



**QUESTION 2** Find the value of the pronumeral.



**QUESTION 3** Find the value of the pronumeral.



# Circle geometry (OPTION 5)

YEARS 9 & 10 ADVANCED MATHS

## UNIT 5: The angle in the alternate segment

**QUESTION 1** Find the value of the pronumeral.

**a**

\_\_\_\_\_

\_\_\_\_\_

**b**

\_\_\_\_\_

\_\_\_\_\_

**c**

\_\_\_\_\_

\_\_\_\_\_

**d**

\_\_\_\_\_

\_\_\_\_\_

**e**

\_\_\_\_\_

\_\_\_\_\_

**f**

\_\_\_\_\_

\_\_\_\_\_

**QUESTION 2** Find the value of the pronumeral.

**a**

\_\_\_\_\_

\_\_\_\_\_

**b**

\_\_\_\_\_

\_\_\_\_\_

**c**

\_\_\_\_\_

\_\_\_\_\_

**d**

\_\_\_\_\_

\_\_\_\_\_

**e**

\_\_\_\_\_

\_\_\_\_\_

**f**

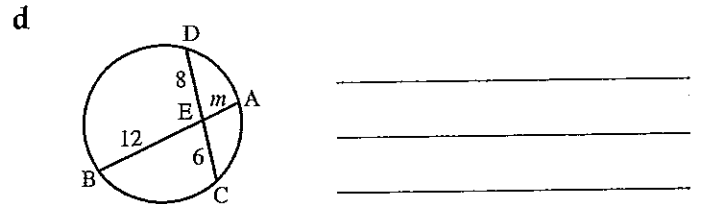
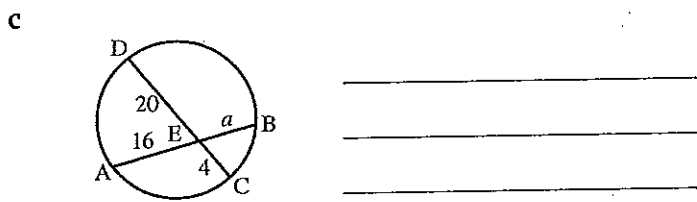
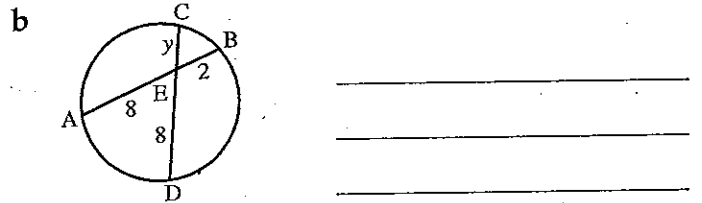
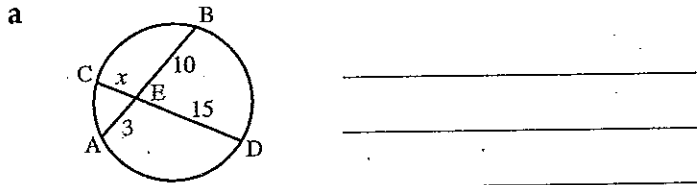
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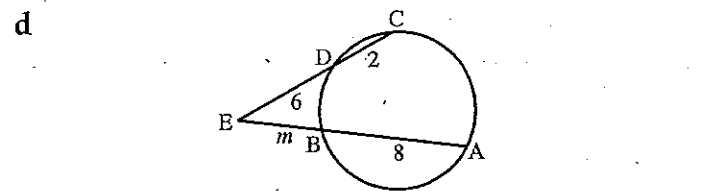
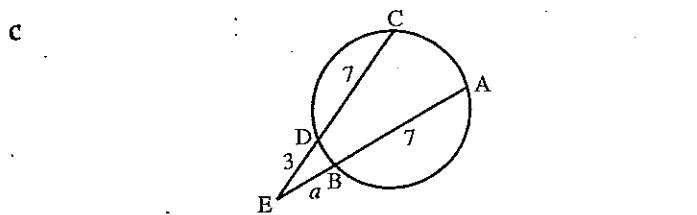
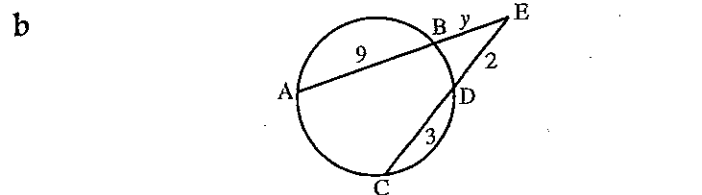
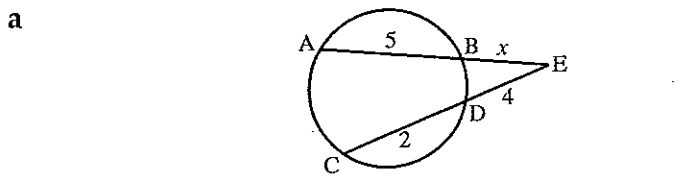
# Circle geometry (OPTION 5)

## UNIT 6: Further properties of a circle

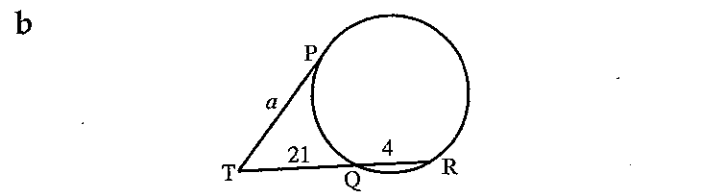
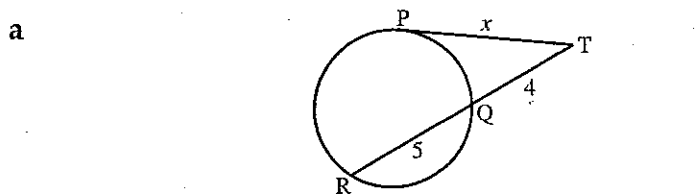
**QUESTION 1** Find the value of the pronumeral. All measurements are in centimetres.



**QUESTION 2** Find the value of the pronumeral. All measurements are in centimetres.



**QUESTION 3** Find the value of the pronumeral. All measurements are in centimetres.



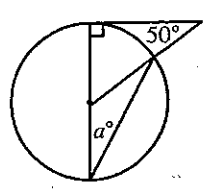
# Circle geometry (OPTION 5)

YEARS 9 & 10 ADVANCED MATHS

## UNIT 7: Deductive exercises related to the circle

**QUESTION 1** Find the value of the pronumeral.

a




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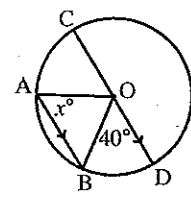


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b




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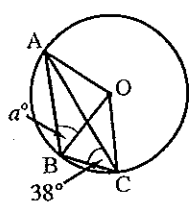


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c




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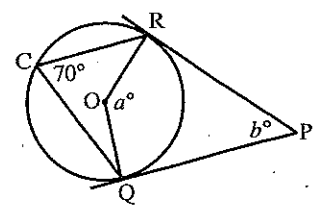


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d




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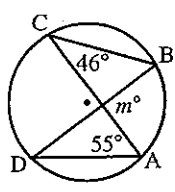
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**QUESTION 2** Find the value of the pronumeral.

a




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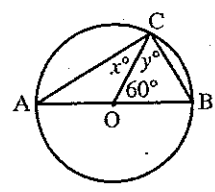


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b




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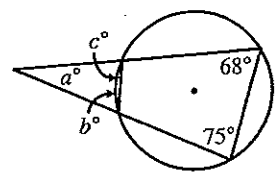


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c




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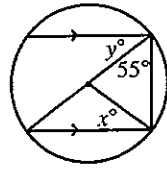


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d




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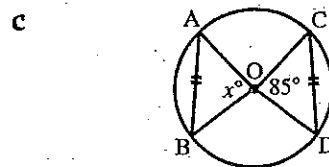
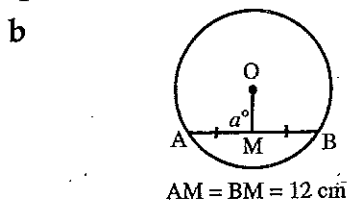
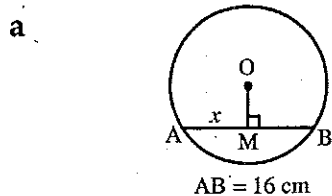


# Circle geometry (OPTION 5)

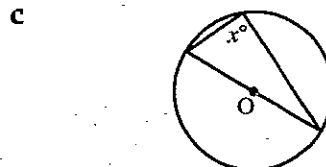
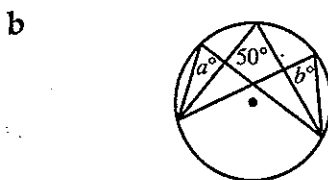
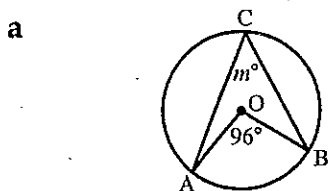
YEARS 9 & 10, ADVANCED MATHS

## UNIT 8: Miscellaneous questions

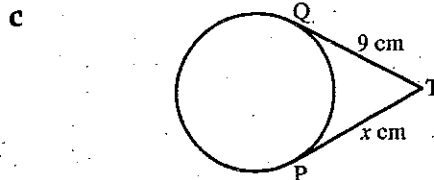
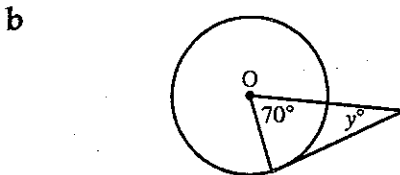
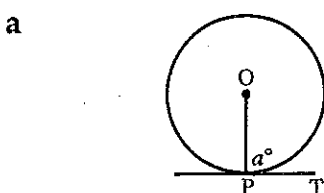
**QUESTION 1** Find the value of the pronumeral.



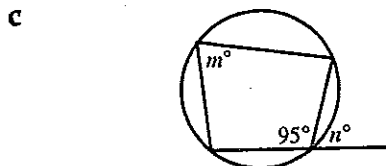
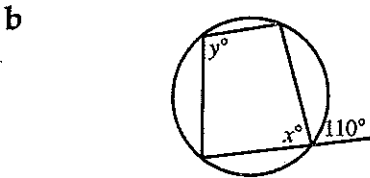
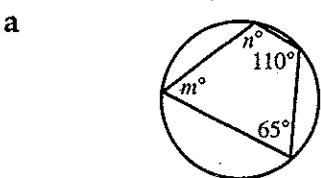
**QUESTION 2** Find the value of the pronumeral.



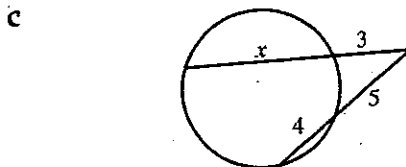
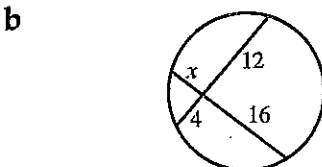
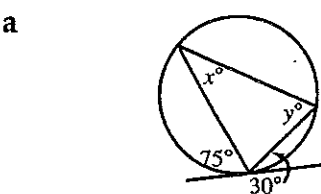
**QUESTION 3** Find the value of the pronumeral.



**QUESTION 4** Find the value of the pronumeral.



**QUESTION 5** Find the value of the pronumeral.



Circle geometry (OPTION 5)

Instructions for SECTION 1

- You have 15 minutes to answer Section 1
- Each question is worth 2 marks
- Attempt ALL questions
- Calculators are NOT to be used
- Fill in only ONE CIRCLE for each question

				Marks		
<b>1</b>	The distance around a circle is called the	(A) diameter	(B) circumference	(C) radius	(D) secant	2
<b>2</b>	The angle in a semicircle is equal to	(A) 45°	(B) 90°	(C) 180°	(D) 270°	2
<b>3</b>	The opposite angles of a cyclic quadrilateral add up to	(A) 90°	(B) 180°	(C) 270°	(D) 360°	2
<b>4</b>	The angle between the tangent and the radius through the point of contact is	(A) 45°	(B) 90°	(C) 135°	(D) 170°	2
<b>5</b>	The number of diameters a circle has, equals	(A) 1	(B) 2	(C) 3	(D) infinite	2
<b>6</b>	The axis of symmetry of a circle is called a	(A) chord	(B) radius	(C) diameter	(D) tangent	2
<b>7</b>	The maximum number of points in which a straight line can cut a circle are	(A) 1	(B) 2	(C) 3	(D) 4	2
<b>8</b>	Circles of different radii which have a common centre are called	(A) semicircles	(B) cyclics	(C) concentric	(D) none of these	2
<b>9</b>	A straight line that touches a circle at one point only is called the	(A) radius	(B) diameter	(C) tangent	(D) secant	2
<b>10</b>	The tangents at the ends of any diameter are	(A) perpendicular	(B) parallel	(C) bisect	(D) none of these	2

Total marks achieved for SECTION 1

20

Circle geometry (OPTION 5)

- Instructions for SECTION 2**
- You have 20 minutes to answer ALL of Section 2
  - Each question is worth 2 marks
  - Attempt ALL questions
  - Calculators may be used

Questions	Answers	Marks
<p>A circle has centre <math>O</math> and <math>COD</math> is a straight line.</p>		
<p><b>1</b> Find the size of the obtuse angle <math>AOB</math>.</p>	_____	2
<p><b>2</b> What is the size of <math>\angle DAC</math>?</p>	_____	2
<p>Complete the following sentences.</p>		
<p><b>3</b> Equal chords are ..... from the centre.</p>	_____	2
<p><b>4</b> Equal chords make ..... angles at the centre.</p>	_____	2
<p><b>5</b> A line from the centre of a circle, perpendicular to a chord, ..... the chord.</p>	_____	2
<p><b>6</b> The right bisector of any chord of a circle passes through the .....</p>	_____	2
<p><b>7</b> The angle at the centre of a circle is ..... the angle at the circumference standing on the same arc.</p>	_____	2
<p><b>8</b> The angle in a semicircle is a .....</p>	_____	2
<p><b>9</b> Angles in the same segment of a circle are .....</p>	_____	2
<p><b>10</b> The opposite angles of a cyclic quadrilateral are .....</p>	_____	2
<p><b>11</b> The angle between a tangent and the radius through its point of contact is always equal to .....</p>	_____	2
<p><b>12</b> The tangents drawn to a circle from an external point are ..... in length.</p>	_____	2
<p><b>13</b> The tangents at the end of any diameter are .....</p>	_____	2
<p><b>14</b> The line from the centre of a circle to the midpoint of a chord meets the chord at ..... angles.</p>	_____	2
<p><b>15</b> When two circles intersect, the line joining their centres bisects the common chord at ..... angles.</p>	_____	2

Total marks achieved for SECTION 2

30

# Answers

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**PAGE 2** 1 a 9 cm b 18 cm c 6.3 cm 2 a  $90^\circ$  b  $90^\circ$  c  $90^\circ$  3 a  $85^\circ$  b  $50^\circ$  c  $120^\circ$  4 a  $x=5$  cm b  $y=7$  cm c  $a=12$  cm  
5 a  $ON=6$  cm b  $OM=9$  cm c  $AB=21$  cm

**PAGE 3** 1 a  $a=40^\circ$  b  $m=70^\circ$  c  $x=30^\circ$  d  $y=90^\circ$  e  $m=n=35^\circ$  f  $x=y=15^\circ$  2 a  $a=30^\circ$  b  $a=b=40^\circ$  c  $x=15^\circ, y=35^\circ$   
d  $m=90^\circ$  e  $x=y=90^\circ$  f  $n=90^\circ$  3 a  $x=110^\circ$  b  $a=60^\circ, b=120^\circ$  c  $a=35^\circ, b=55^\circ$

**PAGE 4** 1 a  $x=90^\circ$  b  $y=90^\circ$  c  $a=90^\circ$  2 a  $a=50^\circ$  b  $x=35^\circ$  c  $m=30^\circ$  3 a  $a=14$  cm b  $b=21$  cm c 9 cm 4 a  $x=10$  cm,  
 $p=65^\circ$  b  $y=7$  cm,  $m=60^\circ$  c  $a=20$  cm,  $n=50^\circ$  5 a  $a=b=90^\circ, c=140^\circ$  b  $m=l=90^\circ, n=130^\circ$  c  $x=y=90^\circ, p=120^\circ$

**PAGE 5** 1 a  $a=92^\circ$  b  $y=70^\circ$  c  $a=115^\circ$  d  $p=75^\circ, q=120^\circ$  e  $m=95^\circ, n=89^\circ$  f  $a=94^\circ, b=93^\circ$  2 a  $x=120^\circ, y=60^\circ$  b  $a=85^\circ,$   
 $b=95^\circ$  c  $m=110^\circ, n=70^\circ$  d  $a=105^\circ, b=75^\circ$  e  $x=115^\circ, y=65^\circ, a=91^\circ$  f  $a=80^\circ, b=100^\circ, c=105^\circ$  3 a  $x=75^\circ, y=83^\circ$  b  $m=93^\circ,$   
 $n=87^\circ, p=83^\circ$  c  $a=80^\circ, c=100^\circ, b=160^\circ$

**PAGE 6** 1 a  $m=50^\circ$  b  $a=45^\circ$  c  $x=30^\circ$  d  $x=48^\circ, y=60^\circ$  e  $m=35^\circ, n=70^\circ, p=75^\circ$  f  $x=50^\circ, y=70^\circ$  2 a  $x=135^\circ, y=25^\circ$   
b  $a=65^\circ, b=65^\circ, c=65^\circ$  c  $x=70^\circ, y=80^\circ$  d  $a=25^\circ, b=75^\circ$  e  $a=55^\circ, b=110^\circ$  f  $m=n=40^\circ$

**PAGE 7** 1 a  $x=2$  b  $y=2$  c  $a=5$  d  $m=4$  2 a  $x=3$  b  $y=1$  c  $a=3$  d  $m=4$  3 a  $x=6$  cm b  $a=22.9$  cm

**PAGE 8** 1 a  $a=20^\circ$  b  $x=40^\circ$  c  $a=52^\circ$  d  $a=140^\circ, b=40^\circ$  2 a  $m=101^\circ$  b  $x=30^\circ, y=60^\circ$  c  $a=37^\circ, b=68^\circ, c=75^\circ$  d  $x=35^\circ, y=35^\circ$

**PAGE 9** 1 a  $x=8$  cm b  $a=90^\circ$  c  $x=85^\circ$  2 a  $m=48^\circ$  b  $a=b=50^\circ$  c  $x=90^\circ$  3 a  $a=90^\circ$  b  $y=20^\circ$  c  $x=9$  cm 4 a  $m=70^\circ,$   
 $n=115^\circ$  b  $x=70^\circ, y=110^\circ$  c  $m=85^\circ, n=85^\circ$  5 a  $x=30^\circ, y=75^\circ$  b  $x=3$  c  $x=12$

**PAGE 10** 1 B 2 B 3 B 4 B 5 D 6 C 7 B 8 C 9 C 10 B

**PAGE 11** 1  $120^\circ$  2  $90^\circ$  3 equidistant 4 equal 5 bisects 6 centre 7 double 8 right angle 9 equal 10 supplementary 11  $90^\circ$  12 equal  
13 parallel 14 right 15 right