

GRAYS TUITION CENTRE – Online Tutoring

WEEK: 3

Week Beginning: (04/01/2021)

Subject: MATHS

Year: Year 9

Lesson Objective:

- Continuing with circle theorems
- Understanding theories based around cyclic quadrilaterals
- Understanding tangents and their relationship with radius
- Understanding alternate segment theorem
- Be able to apply all the learnt circle theorem rules to exam-style questions

Class Worksheets

- Circle properties 2, 3 and 4 GCSE Maths 4-9 Elmwood (Blue book)

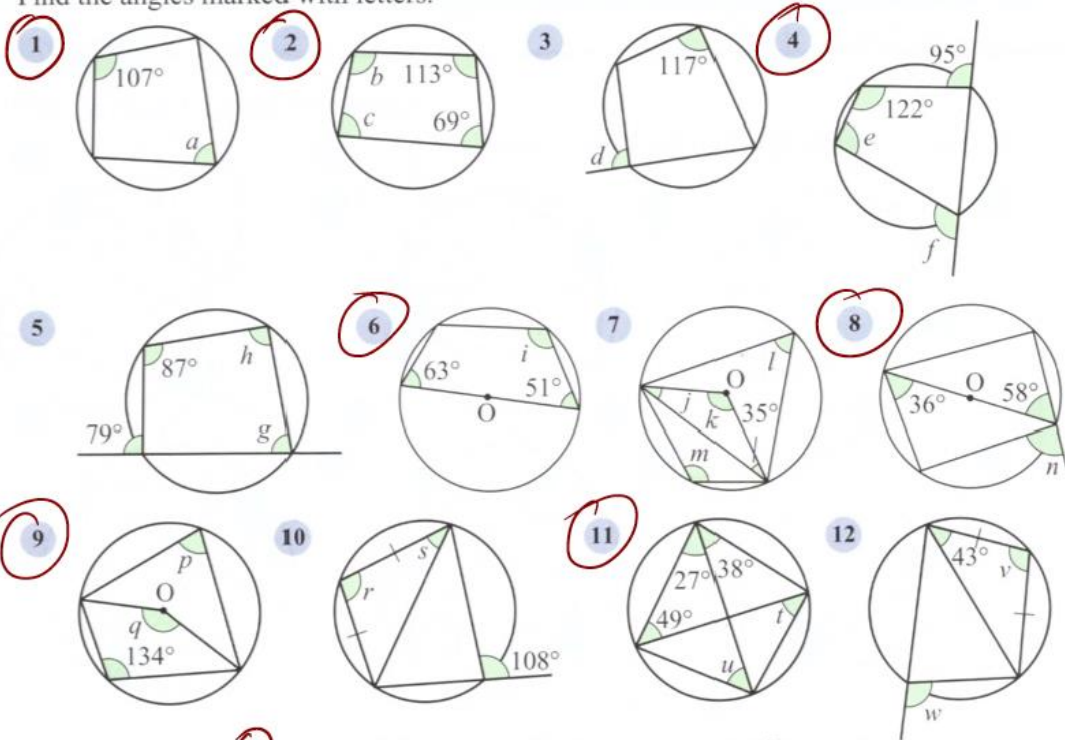
Homework

- Completing classwork for homework

Additional Notes

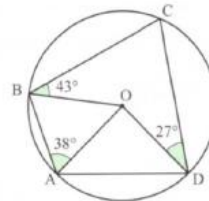
- At the beginning of the lesson we will spend some time discussing the homework to make sure the student know and are comfortable with the work they were set.
- All homework from last week will be marked at the beginning of the lesson. Make sure that you have your homework with you in the lesson and are ready to mark it.
- Also prepare any questions if you struggled with the homework so I can help you.
- All lesson worksheets and **homework for next week (due Week 4)** worksheets can be found below
- **All questions circled in red are the questions that you are supposed to do.**

Find the angles marked with letters.



13. In this question, write down *all the reasons* for your answers.

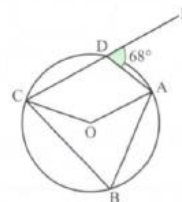
- Find
 (a) $\hat{A}BO$
 (b) $\hat{A}DO$
 (c) $\hat{A}OD$



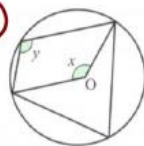
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14. In this question, write down *all the reasons* for your answers.

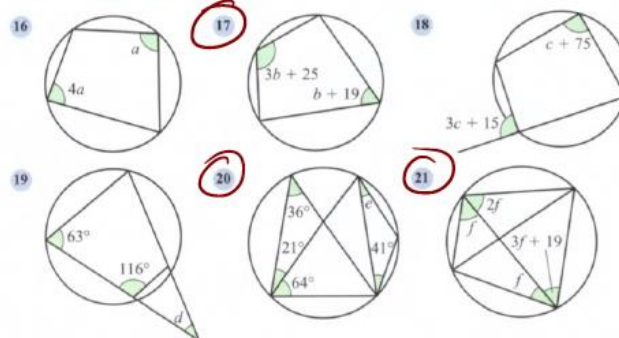
- Find
 (a) $\hat{A}BC$
 (b) $\hat{C}OA$



15. Express y in terms of x .



In questions 16 to 21, find the value of each letter.



78

Find the angles marked with letters.

1

2

3

4

5

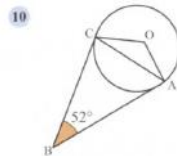
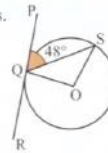
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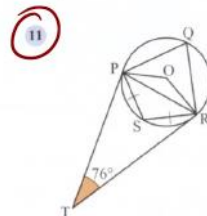
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9 In this question, write down *all the reasons* for your answers.

- Find
 (a) \widehat{OQS}
 (b) \widehat{OSQ}
 (c) \widehat{QOS}

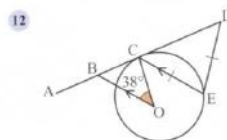


Find \widehat{BAC} and \widehat{CAO} .
 Write down *the reasons* for your answers.



In this question, write down *all the reasons* for your answers.

- Find
 (a) \widehat{POR} (b) \widehat{PQR} (c) \widehat{PSR}
 (d) \widehat{PRS} (e) \widehat{PRT} (f) \widehat{SRT}



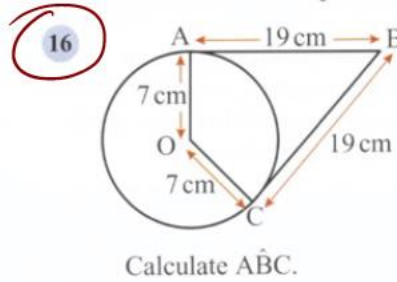
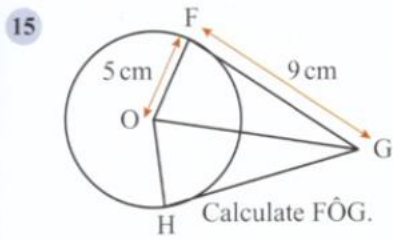
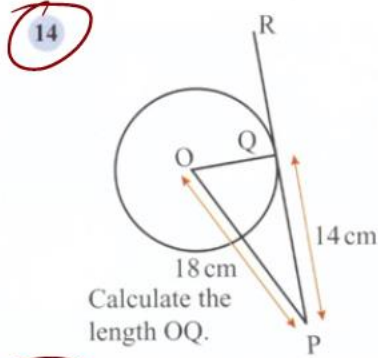
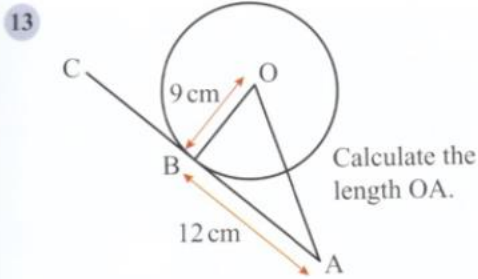
O is the centre of the circle.
 Angle $\widehat{CED} = 78^\circ$
 Angle $\widehat{BOC} = 38^\circ$
 Prove whether the line AD is a tangent to the circle at C or not.

Can you still?

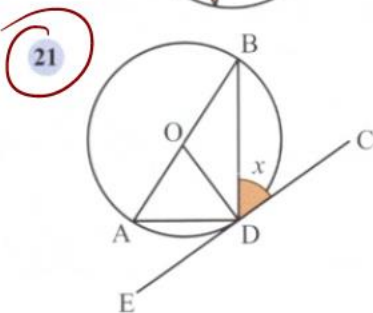
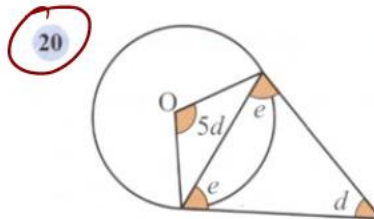
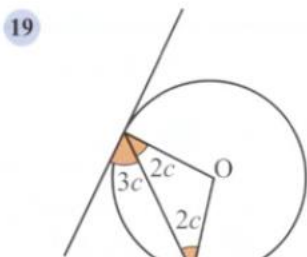
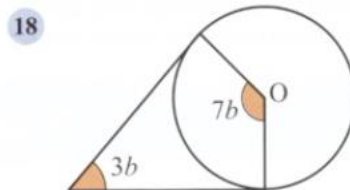
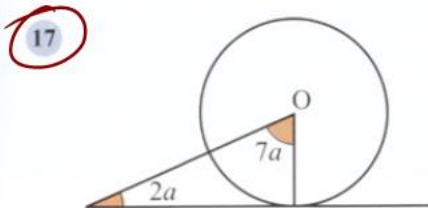
Percentages

- The price of a camera fell from £150 to £112.50. Find the percentage decrease.
- The price of a new car fell by 5% of its value at the start of each month for the first three months of the year 2015. The car cost £16 800 at the start of the year. What did the car cost after three months?
- Lucy buys a computer for £1524 including VAT (20%). What was the actual VAT payable on this computer?
- Simon invests £5000 at 4% per annum compound interest. Claire invests the same amount of money at 4% simple interest each year. Who will have more money after 8 years and by how much?

In questions 13 to 16, you will have to use Pythagoras or trigonometry (this work is reviewed/tackled in Unit 10). Give your answers to one decimal place.



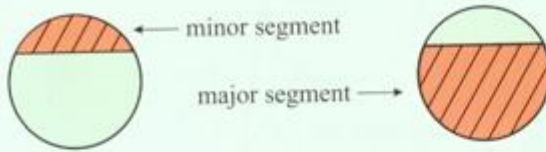
In questions 17 to 20, find the value of each letter.



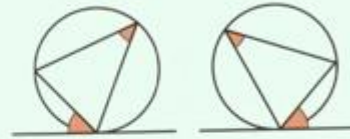
O is the centre of the circle.
EC is the tangent to the circle at D.
Prove that angle BAD is equal to x .



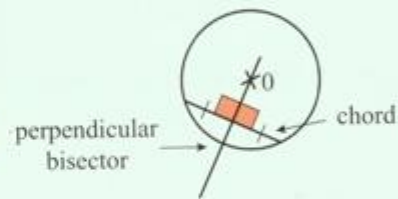
Key Facts



8. The angle between a tangent and a chord is equal to the angle at the circumference in the alternate segment (known as the alternate segment theorem).



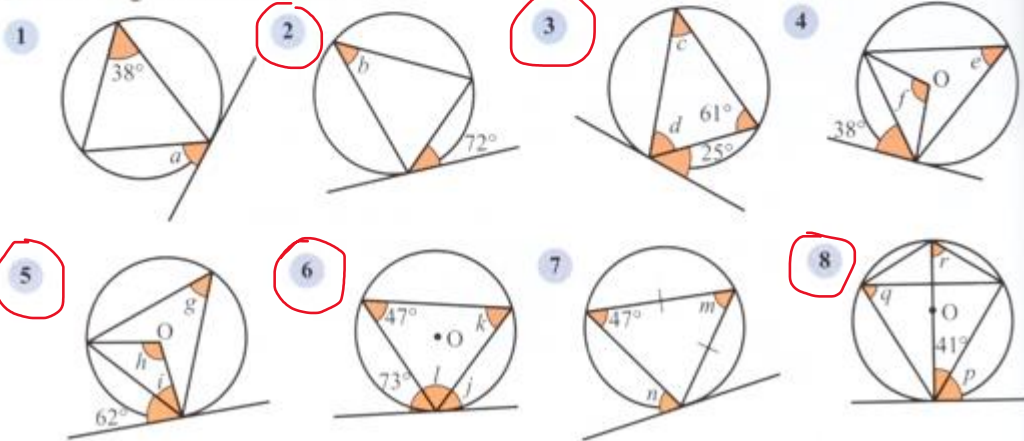
9. The perpendicular bisector of a chord passes through the centre of the circle.



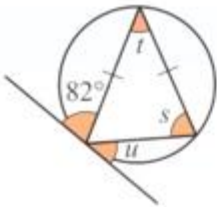
We will prove these rules later in this unit.

E3.4

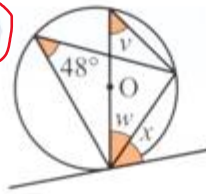
Find the angles marked with letters.



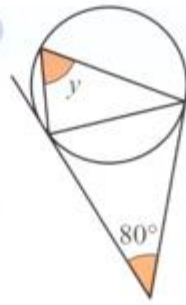
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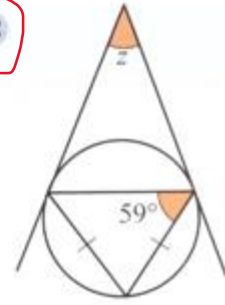
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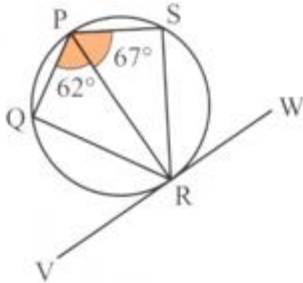
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12



13



In this question, write down *all the reasons* for your answers.

Find

- (a) \hat{SRW} (b) \hat{QRV} (c) \hat{QRS}

Can you still?

Surds

1. Simplify

- (a) $\sqrt{18}$ (b) $\sqrt{45}$ (c) $\sqrt{160}$

2. Simplify

- (a) $\sqrt{80} - \sqrt{20}$ (b) $(\sqrt{2} + \sqrt{3})^2$

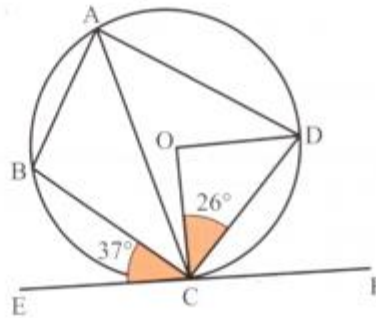
3. Prove that $\frac{3}{\sqrt{7}} - \frac{2}{\sqrt{10}} = \frac{15\sqrt{7} - 7\sqrt{10}}{35}$

14

In this question, write down *all the reasons* for your answers.

Find

- (a) \hat{BAC}
 (b) \hat{COD}
 (c) \hat{BAD}

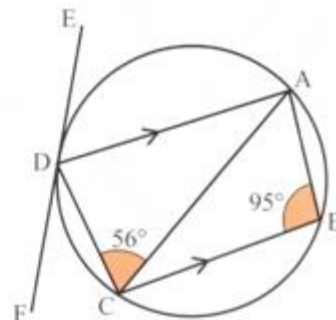


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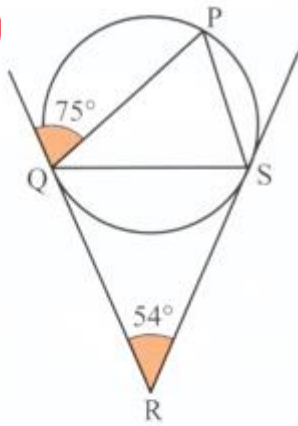
In this question, write down *all the reasons* for your answers.

Find

- (a) \hat{EDA}
 (b) \hat{ADC}
 (c) \hat{ACB}



16

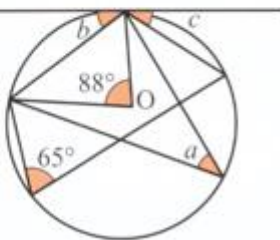


In this question, write down *all the reasons* for your answers.

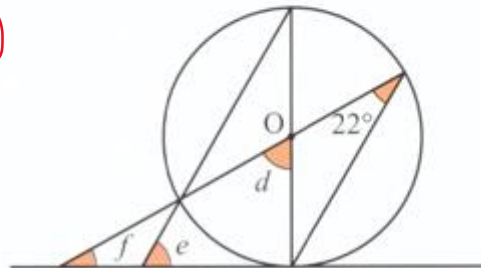
- Find
- (a) \hat{QSR}
 - (b) \hat{QPS}
 - (c) \hat{PSQ}
 - (d) \hat{PQS}

In questions 17 to 21, find the angles marked with letters.

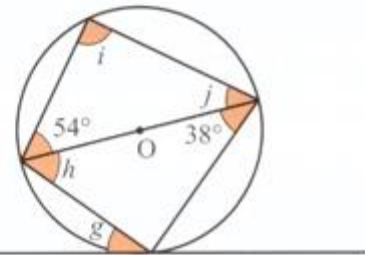
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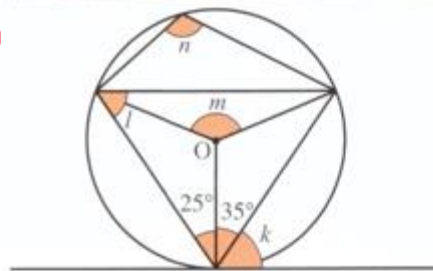
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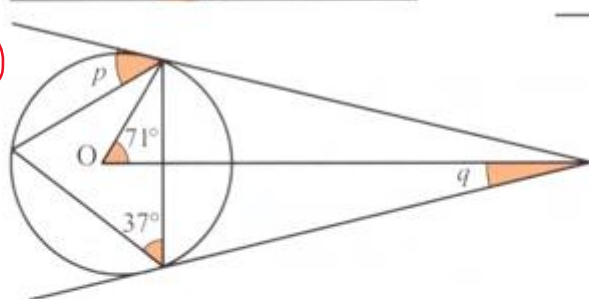
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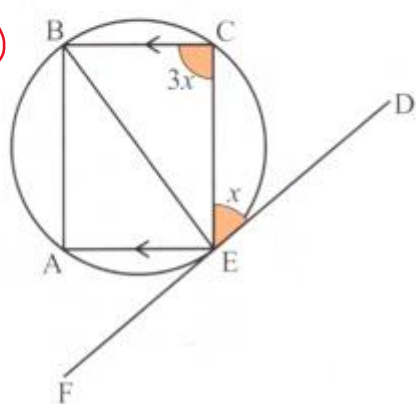
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21



22



DF is a tangent to the circle at E.
Express angle AEF in terms of x .