

**SOLVING GEOMETRY RYDERS**

**11 AUGUST 2014**



**Lesson Description**

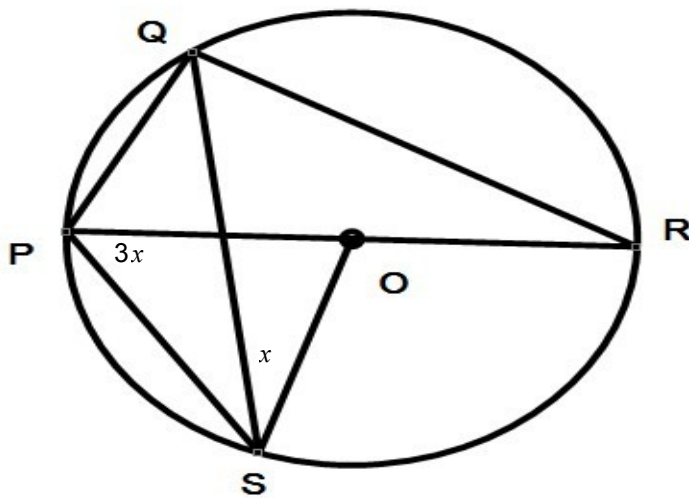
In this lesson we:

- Work through questions and key concepts relating to solving geometry ryders.



**Test yourself**

P, Q and R are points on the circumference of a circle, centre, O. PR is a diameter of the circle. Angle QSO =  $x^\circ$  and angle OPS =  $3x^\circ$ .



Express in terms of  $x$ , the size of angle:

**Question 1**

SQR

- A.  $3x$       B.  $2x$       C.  $x$       D.  $5x$       E.  $4x$

**Question 2**

PQS

- A.  $360-3x$       B.  $3x$       C.  $90+3x$       D.  $90-3x$       E.  $180-3x$

**Question 3**

PSQ

- A.  $4x$       B.  $3x$       C.  $2x$       D.  $x$       E.  $90-x$

**Question 4**

SOP

- A.  $6x$       B.  $180-6x$       C.  $3x$       D.  $180-3x$       E.  $90+3x$

notes for...

### Question 5

PRQ

- A.  $4x$       B.  $3x$       C.  $2x$       D.  $x$       E.  $90^\circ$

### Question 6

QPR

- A.  $2x$       B.  $90-2x$       C.  $3x$       D.  $90-3x$       E.  $4x$

### Question 7

SOR

- A.  $3x$       B.  $6x$       C.  $2x$       D.  $5x$       E.  $4x$

### Question 8

Find the value of  $x$  if angle  $SOR = 120^\circ$ .

- A.  $50^\circ$       B.  $40^\circ$       C.  $30^\circ$       D.  $20^\circ$       E.  $10^\circ$

### Question 9

With this value of  $x$ , what type of triangle will OPS be?

- A. right-angled      B. isosceles      C. equilateral      D. Scalene      E. rhombus

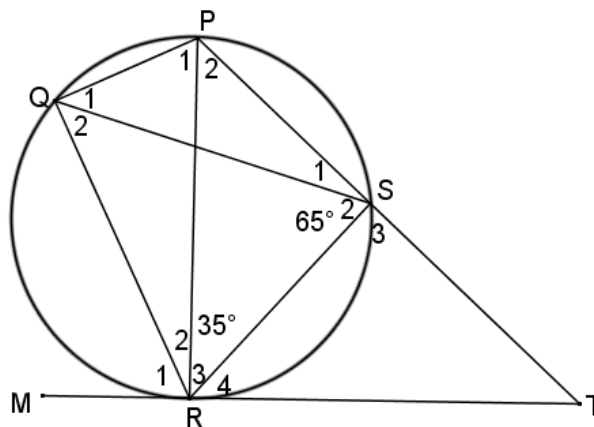


## Improve your Skills

### Question 1

In the sketch below P, Q, R and S are points on the circle. PR is the diameter of the circle and MRT is a tangent at R.

$$\hat{S}_2 = 65^\circ \text{ and } \hat{R}_3 = 35^\circ$$



Determine, with reasons, the sizes of:

1.1  $\hat{R}_1$  (1)

1.2  $\hat{R}_4$  (2)

1.3  $\hat{S}_3$  (2)

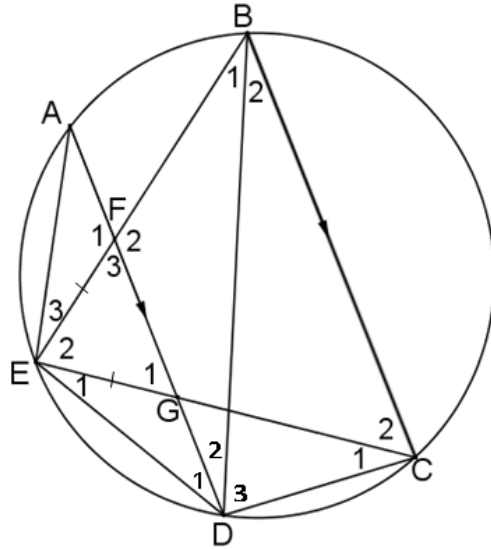
[5]

**Question 2**

2.1 Complete the theorem:

Angles subtended by a chord at a circle, on the same side of the chord, are ... (1)

2.2 In the sketch below  $AD \parallel BC$  with A, B, C, D and E points on the circumference of the circle. EB, EC and BD are straight lines and  $EF = EG$ .



2.2.1  $\hat{B}_2 = \hat{D}_2$  (1)

2.2.2  $\hat{E}_1 = \hat{E}_3$  (3)

2.2.3  $\triangle AEF \parallel \triangle CED$  (3)

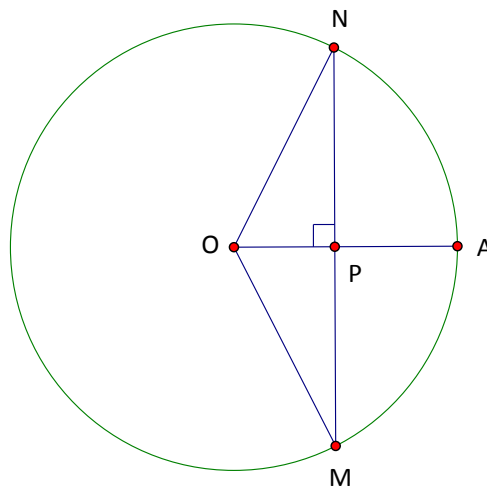
2.2.4 FBCG is a cyclic quadrilateral (3)

[11]

**Question 3**

The figure shows circle, centre O. Chord MN intersects radius OA at P.

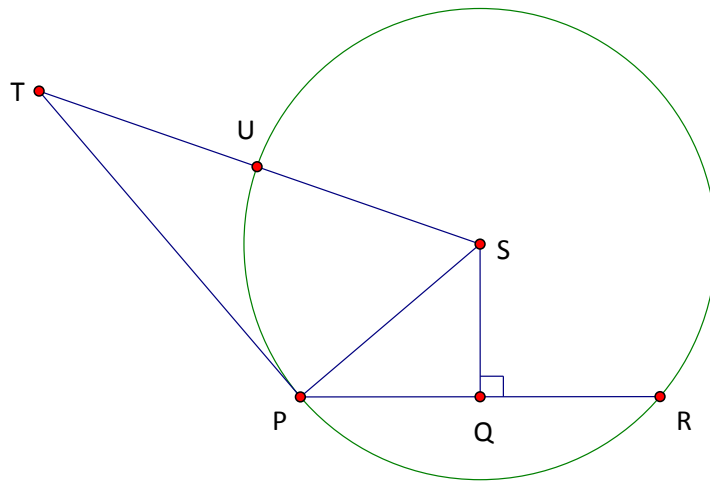
$OPA \perp MPN$



notes for...

- 3.1 It is given that  $MN = 48$  units and  $PO = 7$  units.  
Calculate the length of  $PA$ .

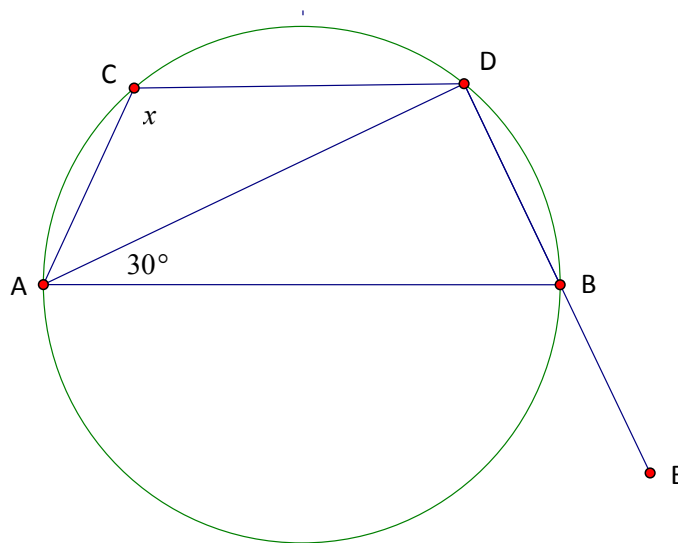
(3)



The figure shows a circle centre  $S$ .  $SQ \perp PR$ ,  $TP = 12$ ,  $PR = TU = 8$  and  $SQ = 3$  units.

- 3.2 Prove that  $TP$  is a tangent to the circle at  $P$ .

(6)



$AB$  is the diameter of the circle.

- 3.3 If  $\angle DAB = 30^\circ$ , then  $x = \dots\dots$

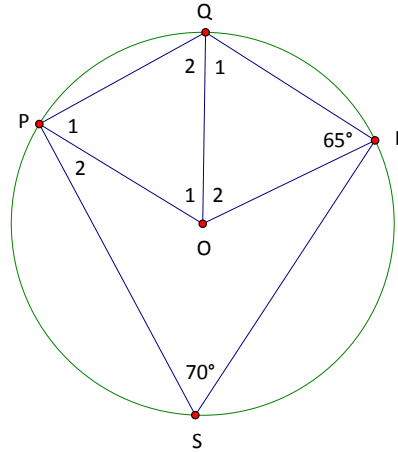
(6)

**Question 4**

In the figure O is the centre of the circle.

P, Q, R and S are concyclic.

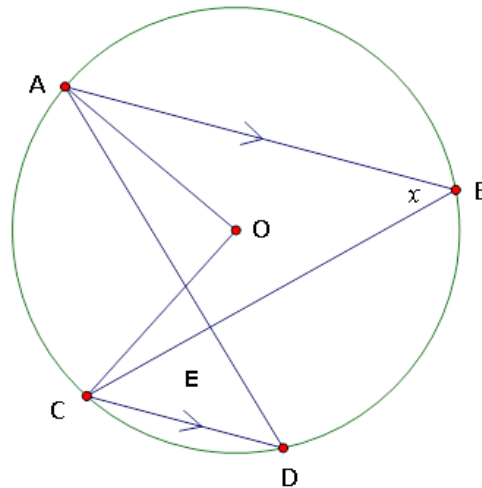
$\angle QRO = 65^\circ$  and  $\angle PSR = 70^\circ$



Find, with reasons, the sizes of the following angles:

- (a)  $\angle Q_1$  (2)
  - (b)  $\angle Q_2$  (2)
  - (c)  $\angle O_1$  (2)
- [6]**

**Question 5**



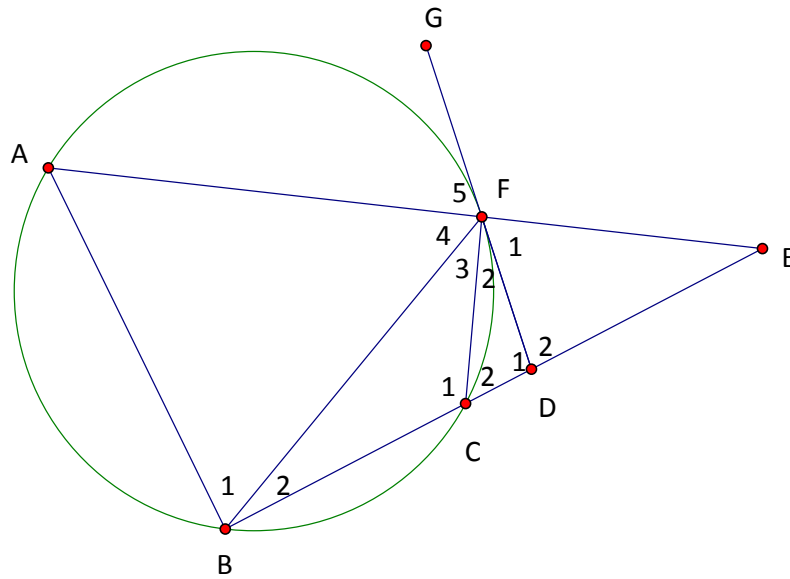
In the figure O is the centre of the circle. A, B, C and D are points on the circumference.

$AB \parallel CD$  and  $\angle B = x$ .

- (a) Find, with reasons, 3 other angles each equal to  $x$ . (6)
- (b) Calculate  $\angle AEC$  in terms of  $x$ . (2)
- (c) Hence prove that points A, O, E and C are concyclic. (3)

**[11]**

Question 6



In the figure ABCF is a cyclic quadrilateral with  $BA = BF$ .

AF and BC produced meet at E.

DF is a tangent at F.

$\hat{A} = x$ .

- (a) Prove that  $\angle C_2 = x$ . (2)
- (b) Prove that  $\angle F_1 = 180^\circ - 2x$ . (5)
- (c) Prove that FB is a tangent at F to circle FCE. (4)
- (d) If  $\angle E = 30^\circ$  and  $\angle F_1 = 40^\circ$ , calculate  $\angle F_2$ . (3)

[14]