Solutions by
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GCSE (9-1) Grade 6 Circle Theorems

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name.
- Answer **all** questions.
- Answer the questions in the spaces provided
  - there may be more space than you need.
- **Show all your working out**

Information

- The total mark for this paper is 40.
- The marks for **each** question are shown in brackets.
  - use this as a guide as to how much time to spend on each question.
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed

Advice

- Read each question carefully before you start to answer it
- Attempt every question
- Check your answers if you have time at the end

1.

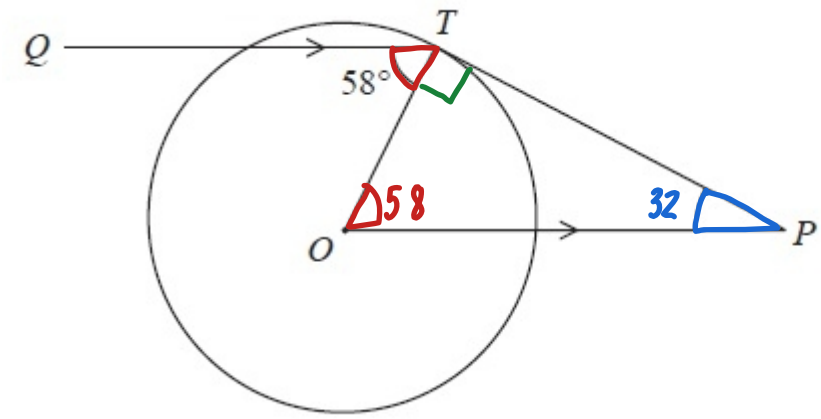


Diagram **NOT** accurately drawn

T is a point on a circle, centre *O*.
Q is a point such that angle *QTO* = 58°
P is the point such that *OP* is parallel to *QT* and *PT* is a tangent to the circle.

Work out the size of angle *OPT*.

32 .....°

(Total 3 marks)

2.

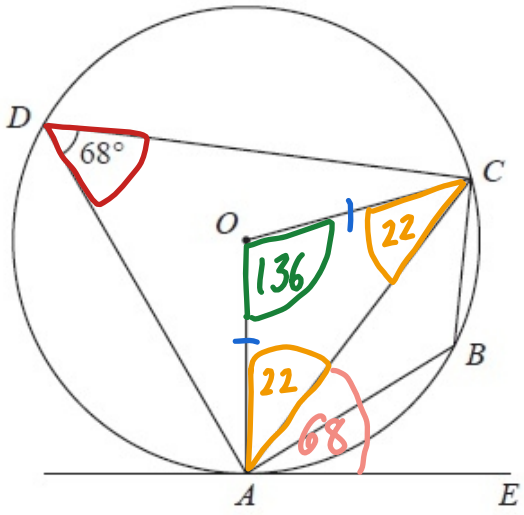


Diagram **NOT** accurately drawn

A, *B*, *C* and *D* are points on a circle, centre *O*.
AE is a tangent to the circle.
Angle *ADC* = 68°

(*a*) (i) Find the size of angle *ABC*.

180 - 68 = 112 .....°

(ii) Give a reason for your answer.

Opposite angles in a cyclic quadrilateral sum to 180°

(2)

(*b*) (i) Find the size of angle *AOC*.

136 .....°

(ii) Give a reason for your answer.

The angle at the centre is twice the angle at the circumference.

(2)

(*c*) Find the size of angle *CAE*.

68 .....°

(1)

(Total 5 marks)

3.

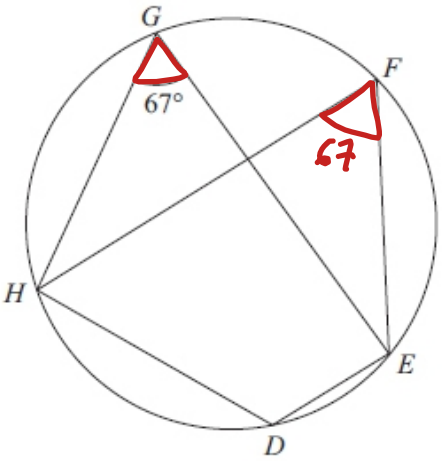


Diagram **NOT** accurately drawn

D, *E*, *F*, *G* and *H* are points on a circle.
Angle *EGH* = 67°

(*a*) Find the size of angle *EFH*.

67 .....°

(1)

(*b*) Give a reason for your answer.

Angles in the same segment are equal.

.....

.....

(2)

(Total 3 marks)

4.

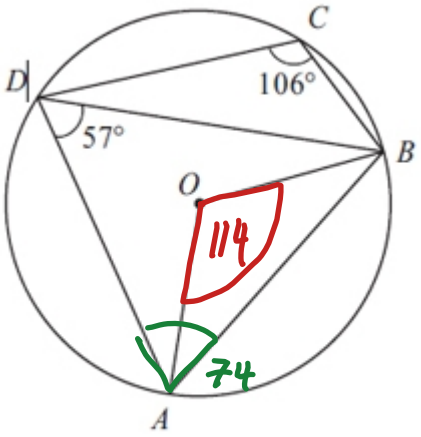


Diagram **NOT** accurately drawn

A, *B*, *C* and *D* are points on a circle, centre *O*.
Angle *ADB* = 57°.
Angle *BCD* = 106°.

(*a*) (i) Calculate the size of angle *AOB*.

57 x 2 = 114 .....°

(ii) Give a reason for your answer.

Angles at the centre are twice the angle at the circumference.

.....

(2)

(*b*) Calculate the size of angle *BAD*.

180 - 106 = 74 .....°

(1)

(Total 3 marks)

5.

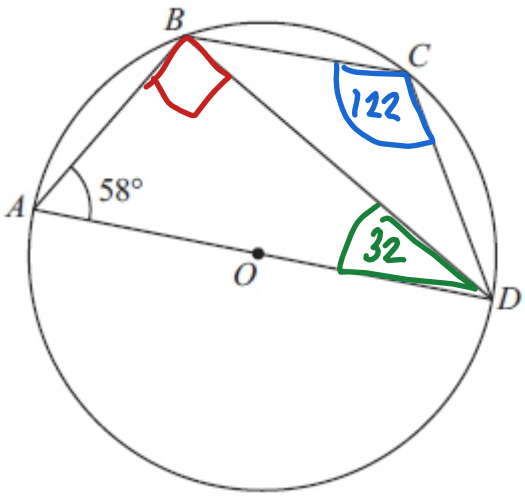


Diagram **NOT** accurately drawn

A, B, C and D are four points on a circle, centre O.
AD is a diameter of the circle.
Angle $BAD = 58°$

(a) Calculate the size of angle ADB.

90-58 = 32 .....°

(2)

(b) (i) Calculate the size of angle BCD.

180-58 = 122 .....°

(ii) Give a reason for your answer.

Opposite angles in a cyclic quadrilateral sum to 180°

(2)

(Total 4 marks)

***6.**

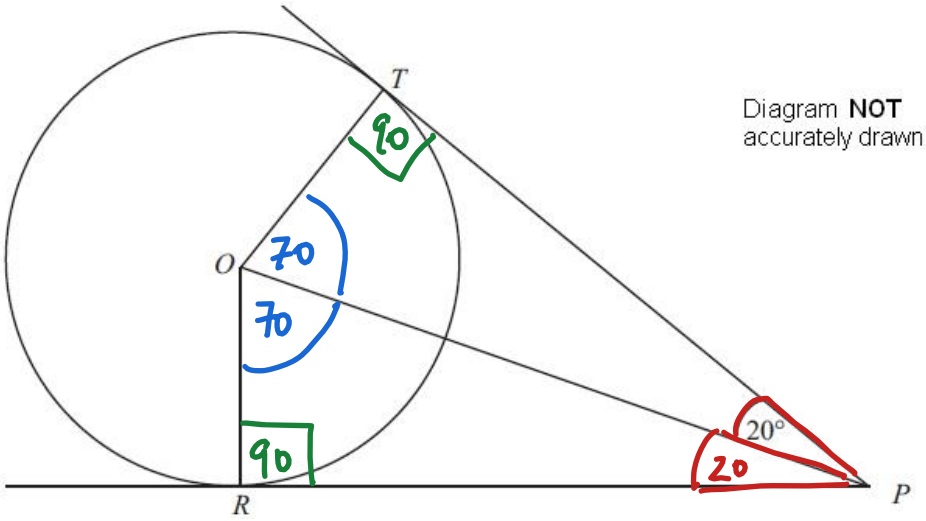


Diagram **NOT** accurately drawn

T and *R* are two points on a circle centre *O*.
PT and *PR* are the tangents to the circle from *P*.

Angle *TPO* = 20°.

Work out the size of angle *TOR*.
You must give reasons for each stage of your working.

ORP = 90° Angle between a tangent and a radius are 90°

OPR = OPT = 20° Triangles OPR and OPT are congruent.

ROP = TOP = 70° Angles in a triangle sum to 180°

TOR = 70° + 70° = 140°

(Total 4 marks)

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*7.

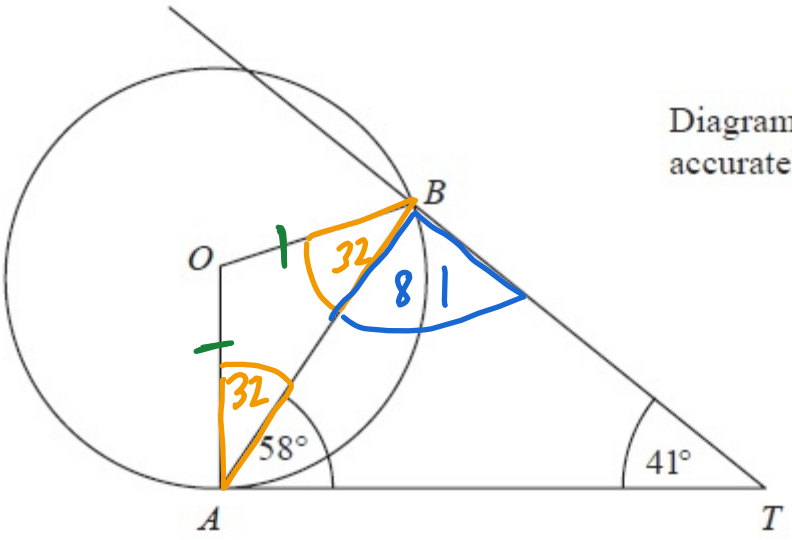


Diagram **NOT** accurately drawn

A and *B* are points on the circumference of a circle, centre *O*.

AT is a tangent to the circle.
Angle *TAB* = 58°.
Angle *BTA* = 41°.

Calculate the size of angle *OBT*.
You must give reasons at each stage of your working.

OAT = 90° Angle between a radius and a tangent is 90°

OAB = 32 (90-58)

OAB = OBA = 32° Base angles in an isosceles are equal.

ABT = 81 Angles in a triangle sum to 180°

OBT = 32 + 81 = 113°

(Total 5 marks)

8.

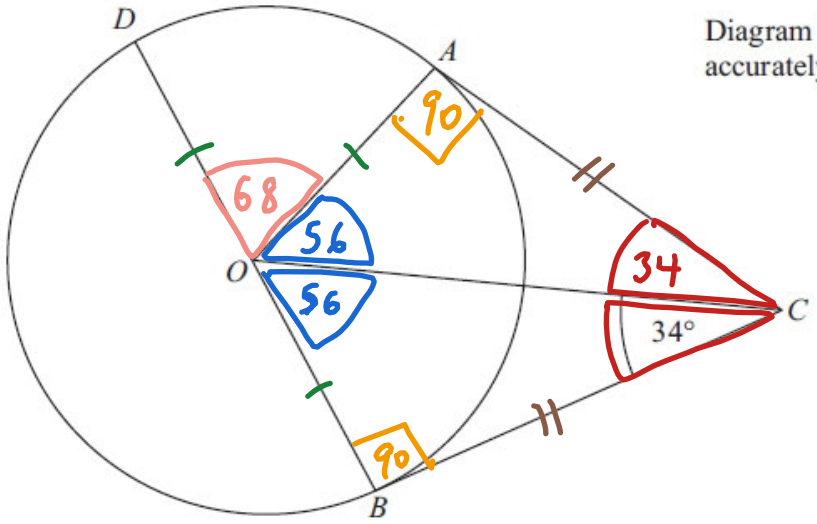


Diagram **NOT** accurately drawn

A, *B* and *D* are points on the circumference of a circle, centre *O*.
BOD is a diameter of the circle.
BC and *AC* are tangents to the circle.
Angle *OCB* = 34°.

Work out the size of angle *DOA*.

68°

…. .....
.

(Total 3 marks)

9.

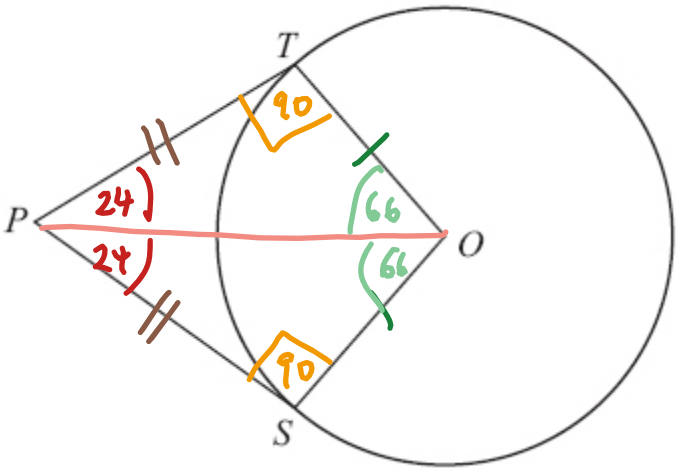


Diagram **NOT** accurately drawn

S and *T* are points on the circumference of a circle, centre *O*.
PT and *PS* are tangents.
Angle *TPO* = 24°

Work out the size of angle *SOT*.

66 + 66 = 132°

(Total 3 marks)

10.

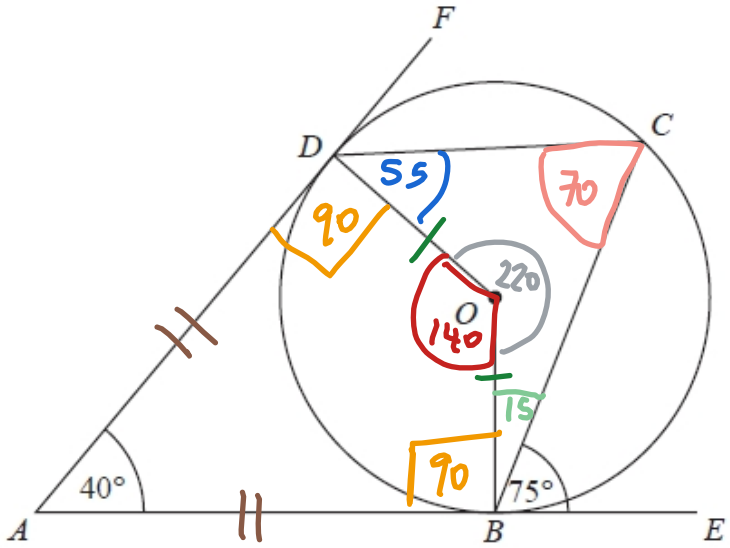


Diagram **NOT** accurately drawn

B, *C* and *D* are points on the circumference of a circle, centre *O*.
ABE and *ADF* are tangents to the circle.

Angle *DAB* = 40°
Angle *CBE* = 75°

Work out the size of angle *ODC*.

55 .....°

(Total 3 marks)

11.

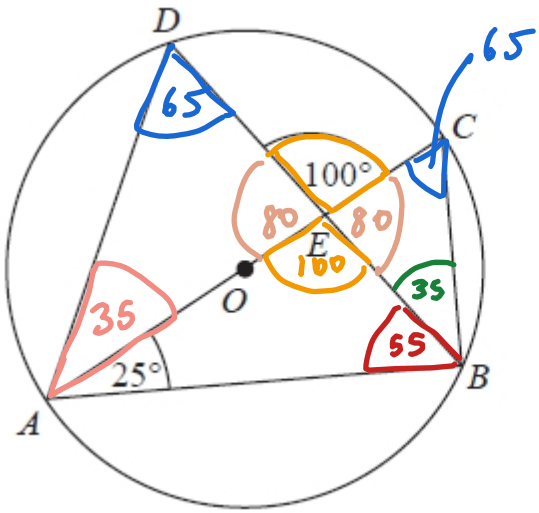


Diagram **NOT** accurately drawn

A, B, C and D are points on the circumference of a circle, centre O.
AC is a diameter of the circle.
AC and BD intersect at E.

Angle $CAB = 25°$
Angle $DEC = 100°$

Work out the size of angle DAC.
You must show all your working.

35 .....°

(Total 4 marks)

TOTAL FOR PAPER: 40 MARKS