1) Find angle ABC in the diagram below, giving a reason for your answer. [1]

2) Find angle OBA in the following diagram, giving a reason for your answer. [1]
3) In the diagram below, angle AOC = 135°.
Find angle ABC, giving a reason for your answer.

4) In the diagram below, angle ADC = 88°.
Find angle ABC, giving a reason for your answer.
5) In the diagram below, angle OAB = 43°.
Find angle OBA, giving a reason for your answer.

6) Find angle $x$ in the following diagram, giving a reason for your answer.
7) In the diagram below, angle BAC = 65°.

Find the following angles, giving reasons for your answers:

a) angle ABC
b) angle ACB

8) Find angle AOC in the following diagram, giving reasons for your answer.
9) In the diagram below, angle $\angle ABO = 42^\circ$.
Find angle $\angle AOB$, giving reasons for your answer.

10) In the diagram below, angle $\angle ABC = 58^\circ$.
Find angle $\angle AOC$, giving a reason for your answer.
11) The diagram below shows a circle with points A, B, C and D on the circumference.

Find the following angles, giving reasons for your answers:

a) angle ABD

b) angle BAC

12) In the diagram below, angle AOB = 83°.

Find angle OAB, giving reasons for your answer.
13) In the diagram below, angle $DAB = 83^\circ$ and angle $ABC = 96^\circ$.

Find the following angles, giving reasons for your answers:

a) angle $BCD$

b) angle $CDA$

14) In the diagram below, angle $BOC = 97^\circ$.

Find the following angles, giving reasons for your answers:

a) angle $OCB$

b) angle $CBO$

c) angle $OAB$
15) In the diagram below, angle ABD = 37°.

Find the following angles, giving reasons for your answers:

a) angle BDC
b) angle CBD

16) Find angle AOB in the following diagram, giving reasons for your answer.
17) In the diagram below, angle AOC = 135°.
Find angle ABC, giving a reason for your answer.

18) In the diagram below, angle XAB = 46°.
Angle YAD = 50°. Find angle BCD, giving a reason for your answer.
19) In the diagram below, angle BAC = 48°.

Find the following angles, giving reasons for your answers:

a) angle ABD
b) angle COD
c) angle CDO

20) In the diagram below, angle ABE = 44°.

Find the following angles, giving reasons for your answers:

a) angle ACE
b) angle ADE
21) In the diagram below, angle ABC = 32°.

Find the following angles, giving reasons for your answers:

a) angle BAC
b) angle ADC

22) In the diagram below, angle ACB = 45°.

Find angle BDC, giving reasons for your answer.
23) In the diagram below, angle ADC = 50°.

Find the following angles, giving reasons for your answers:

a) angle $x$

b) angle $y$

24) In the diagram below, angle BOC = 54°.

Find angle BAE, giving reasons for your answer.
25) AB and BC are tangents to the circle shown below. Angle OAB = 44°.
Find angle ACB, giving reasons for your answer.

26) In the diagram below, angle ABD = 82°.

Find the following angles, giving reasons for your answers:

a) angle ACD  
b) angle AED
27) In the diagram below, angle ADC = 94° and angle ACD = 40°. Find angle DBC, giving reasons for your answer.
Solutions for the assessment Revision 5: Circle Theorems

1) angle ABC = 90°  
   Reason: Angle in a semicircle is 90°

2) angle OBA = 90°  
   Reason: Angle between tangent and radius is 90°

3) angle ABC = 67.5°  
   Reason: Angle at centre is twice angle at circumference

4) Angle ABC = 92°  
   Reason: Opposite angles in a cyclic quadrilateral sum to 180°

5) angle OBA = 43°  
   Reason: Isosceles triangle

6) $x = 39°$  
   Reason: Angles in the same segment are equal

7) a) angle ABC = 90°  
   b) angle ACB = 25°  
   Reasons: Angle in a semicircle is 90° and angle sum of a triangle is 180°

8) angle AOC = 119°  
   Reasons: Angle between tangent and radius is 90° and angle sum of a quadrilateral is 360°

9) angle AOB = 96°  
   Reason: Isosceles triangle and angle sum of a triangle

10) angle AOC = 116°  
    Reason: Angle at centre is twice angle at circumference

11) a) angle ABD = 32°  
    b) angle BAC = 30°  
    Reason: Angles in the same segment are equal

12) angle OAB = 48.5°  
    Reason: Angle sum of a triangle is 180° and isosceles triangle

13) a) angle BCD = 97°  
    b) angle CDA = 84°  
    Reason: Opposite angles in a cyclic quadrilateral sum to 180°

14) a) angle OCB = 41.5°  
    b) angle CBO = 41.5°  
    c) angle OAB = 48.5°  
    Reason: Angle sum of a triangle is 180° + isosceles triangle + angles on a straight line

15) a) angle BDC = 37°  
    b) angle CBD = 53°  
    Reasons: Alternate angles and angle in a semicircle is 90°

16) angle AOB = 69°  
    Reasons: Angle between tangent and radius is 90° and congruent triangles

17) angle ABC = 112.5°  
    Reason: Angle at centre is twice angle at circumference

18) angle BCD = 96°  
    Reason: Alternate Segment Theorem
19) a) \( \angle ABD = 48^\circ \)
b) \( \angle COD = 84^\circ \)
c) \( \angle CDO = 48^\circ \)
Reason: Isosceles triangle + angle sum of a triangle + vertically opposite angles 
\textit{or} isosceles triangle + angles in the same segment are equal + angle sum of a triangle

20) a) \( \angle ACE = 44^\circ \)
b) \( \angle ADE = 44^\circ \)
Reason: Angles in the same segment are equal

21) a) \( \angle BAC = 58^\circ \)
b) \( \angle ADC = 58^\circ \)
Reason: Angle in a semicircle + angle between tangent and radius + angle sum of triangle

22) \( \angle BDC = 45^\circ \)
Reason: Angle in a semicircle + angle sum of triangle + angles in same segment

23) a) \( \angle x = 100^\circ \)
b) \( \angle y = 130^\circ \)
Reason: Angle at centre and circumference + cyclic quadrilateral

24) \( \angle BAE = 63^\circ \)
Reason: Angle at centre and circumference + angle between tangent and radius 
\textit{or} angles on a straight line + isosceles triangle + angle sum of triangle + angle between tangent and radius

25) \( \angle ACB = 88^\circ \)
Reason: Angle between tangent and radius + isosceles triangle + angle sum of triangle

26) a) \( \angle ACD = 82^\circ \)
b) \( \angle AED = 98^\circ \)
Reason: Angles in the same segment + cyclic quadrilateral

27) \( \angle DBC = 46^\circ \)
Reason: Angles in the same segment + cyclic quadrilateral