



◇ 「콘텐츠산업 진흥법 시행령」 제33조에 의한 표시
1) 제작연월일 : 2016-10-25
2) 제작자 : 교육지대㈜
3) 이 콘텐츠는 「콘텐츠산업 진흥법」에 따라 최초 제작일부터 5년간 보호됩니다.

◇ 「콘텐츠산업 진흥법」 외에도 「저작권법」에 의하여 보호되는 콘텐츠의 경우, 그 콘텐츠의 전부 또는 일부를 무단으로 복제하거나 전송하는 것은 콘텐츠산업 진흥법 외에도 저작권법에 의한 법적 책임을 질 수 있습니다.

계산시 참고사항

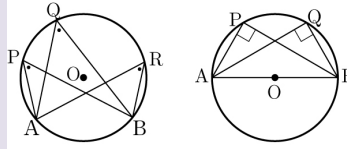
1. 원주각과 중심각의 크기

- 원주각: 원 O에서 호 AB를 제외한 원 위의 점 P에 대하여 $\angle APB$ 를 호 AB에 대한 원주각이라 한다.
- 원주각의 크기와 중심각의 크기의 관계: 한 원에서 한 호에 대한 원주각의 크기는 그 호에 대한 중심각의 크기의 $\frac{1}{2}$ 이다. $\Rightarrow \angle APB = \frac{1}{2} \angle AOB$



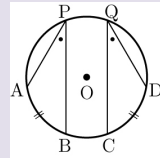
2. 원주각의 성질

- 한 원에서 한 호에 대한 원주각의 크기는 모두 같다.
 $\Rightarrow \angle APB = \angle AQB = \angle ARB$
- 반원에 대한 원주각의 크기는 90° 이다.
 $\Rightarrow \angle APB = 90^\circ$



3. 원주각의 크기와 호의 길이: 한 원 또는 합동인 두 원에서

- 길이가 같은 호에 대한 원주각의 크기는 서로 같다.
 $\Rightarrow \widehat{AB} = \widehat{CD}$ 이면 $\angle APB = \angle CQD$
- 크기가 같은 원주각에 대한 호의 길이는 서로 같다.
 $\Rightarrow \angle APB = \angle CQD$ 이면 $\widehat{AB} = \widehat{CD}$
- 호의 길이는 그 호에 대한 원주각의 크기에 정비례한다.

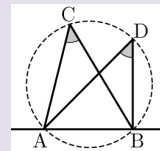


참고

- 한 원 또는 합동인 두 원에서 (호의 길이가 같다.)
⇒ (중심각의 크기가 같다.)
⇒ (원주각의 크기가 같다.)

4. 네 점이 한 원 위에 있을 조건①-원주각

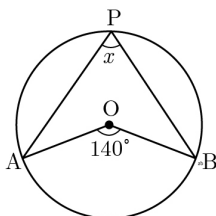
- 두 점 C, D가 직선 AB에 대하여 같은 쪽에 있을 때
- $\angle ACB = \angle ADB$ 이면 네 점 A, B, C, D는 한 원 위에 있다.
 - 네 점 A, B, C, D가 한 원위에 있으면 $\angle ACB = \angle ADB$ 이다.



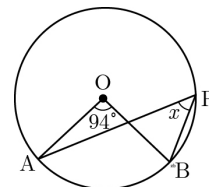
원주각과 중심각의 크기

▣ 다음 그림의 원 O에서 $\angle x$ 의 크기를 구하여라.

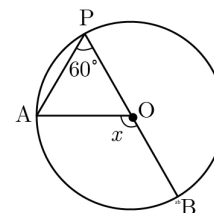
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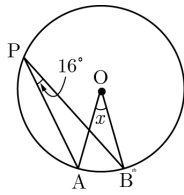
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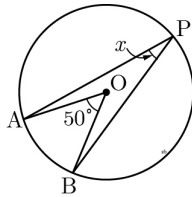
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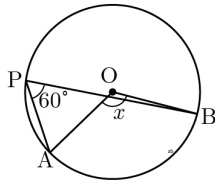
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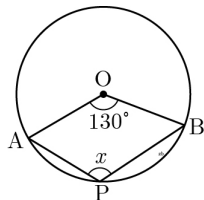
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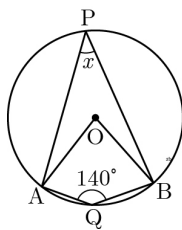
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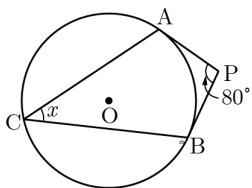
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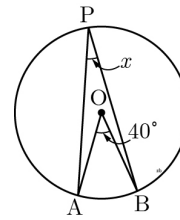
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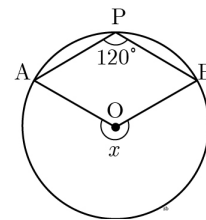
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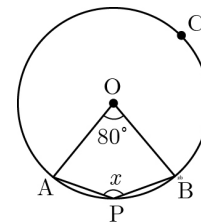
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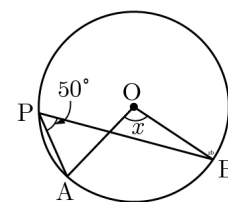
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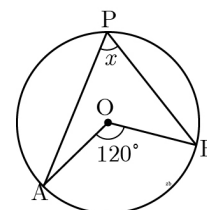
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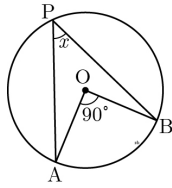
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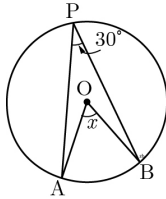
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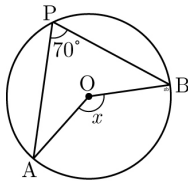
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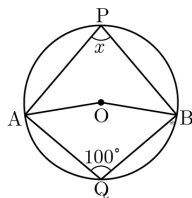
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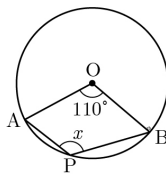
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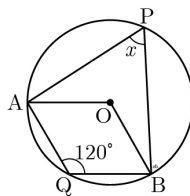
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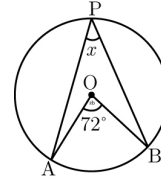
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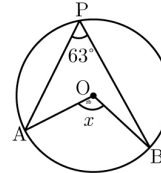
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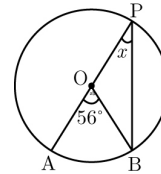
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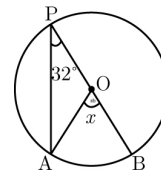
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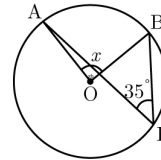
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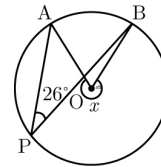
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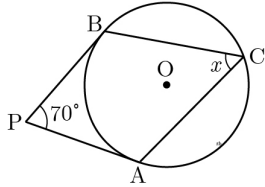


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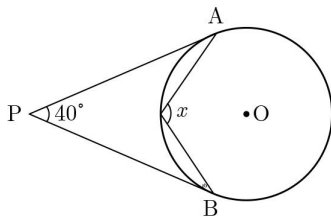


■ 다음 그림에서 직선 PA, PB가 원 O의 접선일 때, $\angle x$ 의 값을 구하여라.

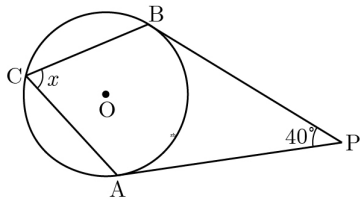
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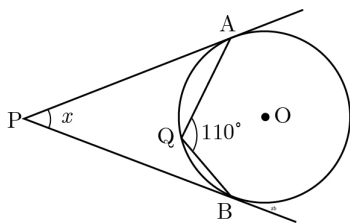
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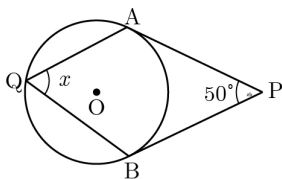
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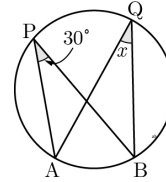
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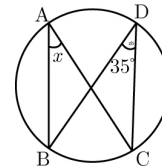
원주각의 성질

■ 다음 그림에서 $\angle x$ 의 값을 구하여라.

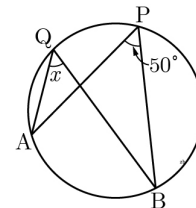
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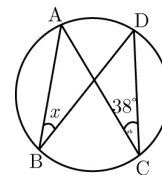
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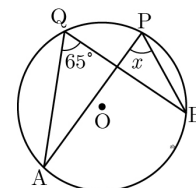
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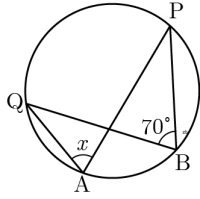
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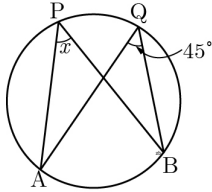
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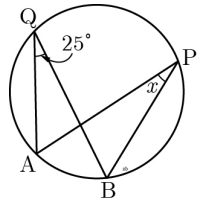
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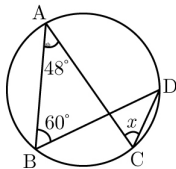
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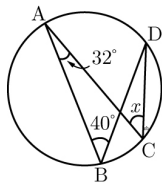
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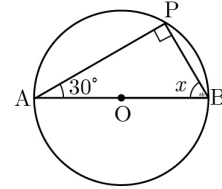


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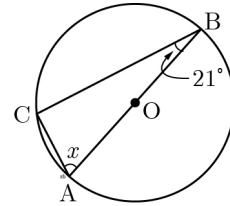


■ 다음 그림에서 \overline{AB} 가 원 O의 지름일 때, $\angle x$ 의 크기를 구 하여라.

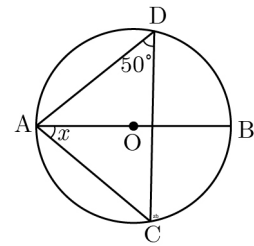
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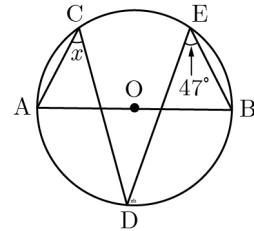
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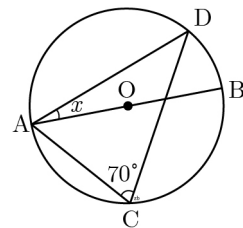
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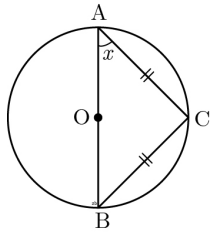
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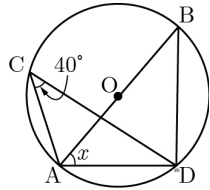
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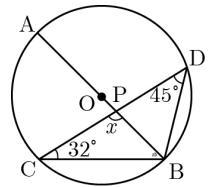
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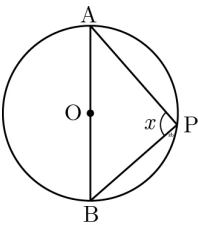
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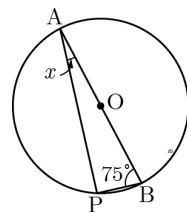
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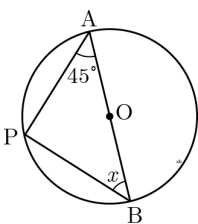
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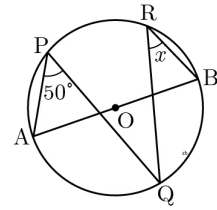
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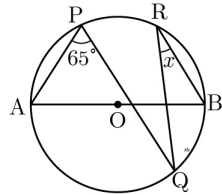
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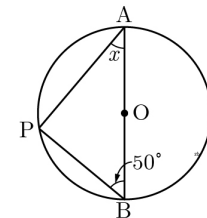
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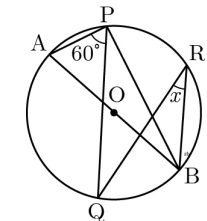
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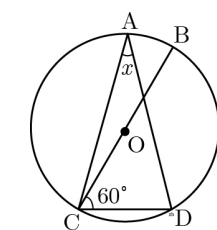


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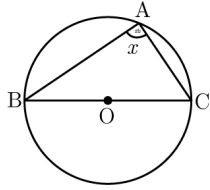


■ 다음 그림에서 \overline{BC} 가 원 O의 지름일 때, $\angle x$ 의 크기를 구 하여라.

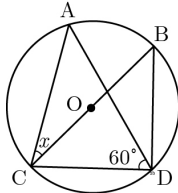
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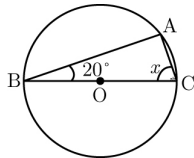
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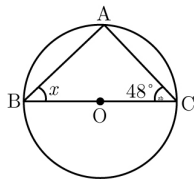
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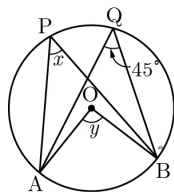


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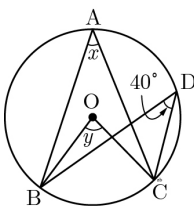


■ 다음 그림의 원에서 $\angle x$, $\angle y$ 의 크기를 각각 구하여라.

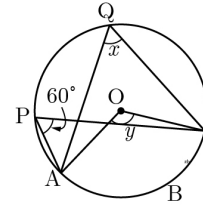
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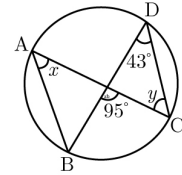
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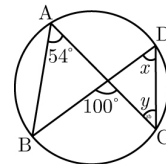
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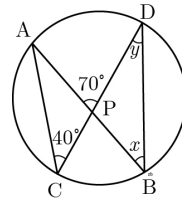
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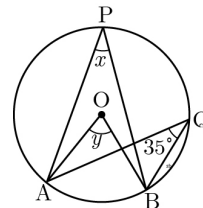
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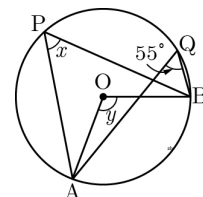
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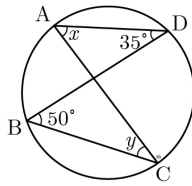
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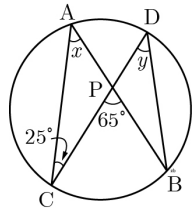
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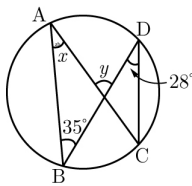
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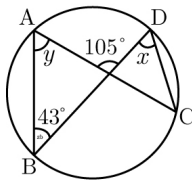
71.



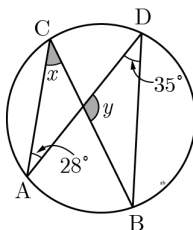
72.



73.



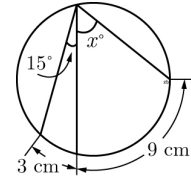
74.



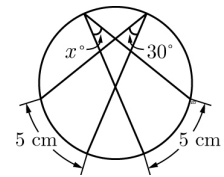
원주각의 크기와 호의 길이

■ 다음 그림에서 x 의 값을 구하여라.

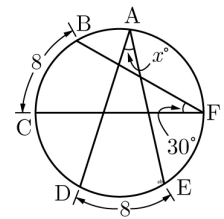
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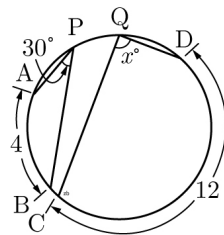
76.



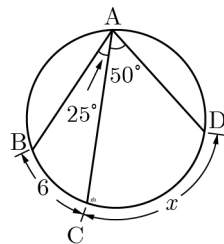
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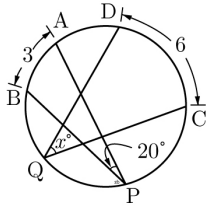
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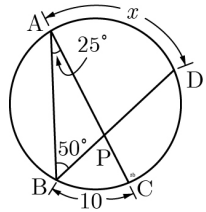
79.



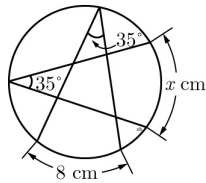
80.



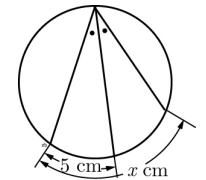
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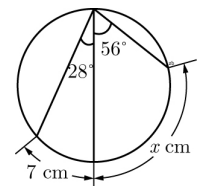
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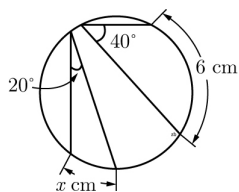
83.



84.

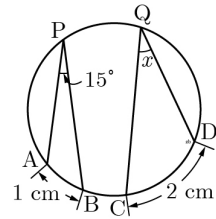


85.

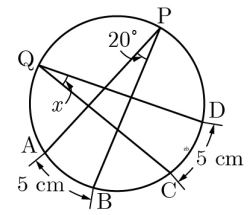


■ 다음 그림에서 $\angle x$ 의 크기를 구하여라.

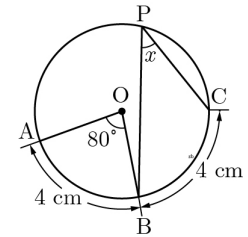
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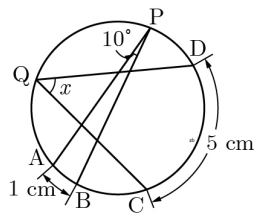
87.



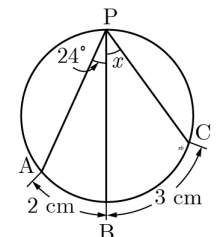
88.



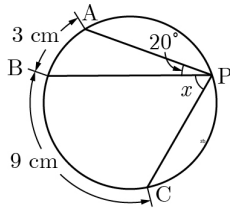
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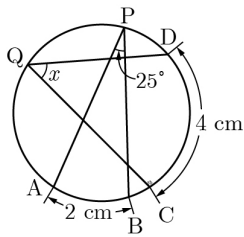
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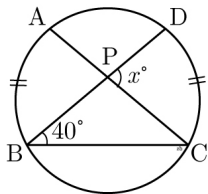
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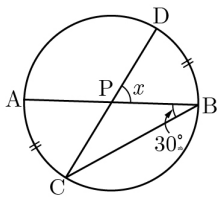
92.



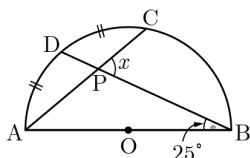
93.



94.



95.

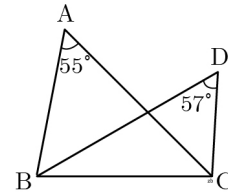


네 점이 한 원 위에 있을 조건①

■ 다음 그림에서 네 점 A,B,C,D가 한 원 위에 있으면 ○표, 한 원 위에 있지 않으면 ×표를 하여라.

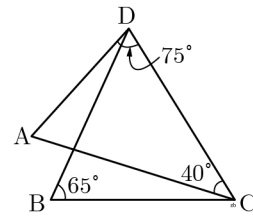
96.

()



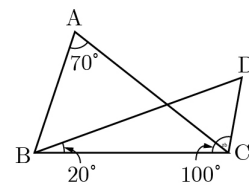
97.

()



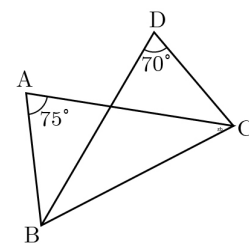
98.

()



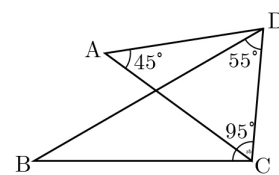
99.

()

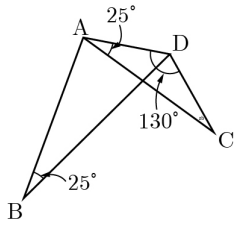


100.

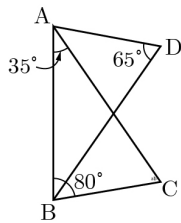
()



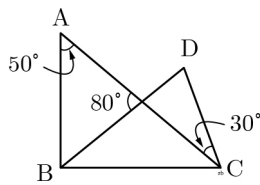
101. ()



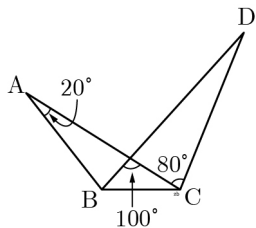
102. ()



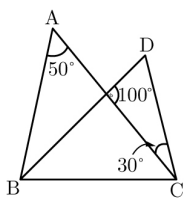
103. ()



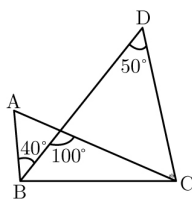
104. ()



105. ()

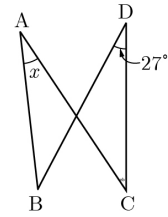


106. ()

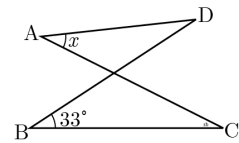


■ 다음 그림에서 네 점 A, B, C, D가 한 원 위에 있도록 하는 $\angle x$ 의 크기를 구하여라.

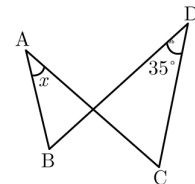
107.



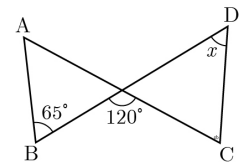
108.



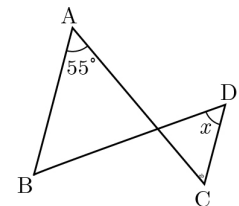
109.



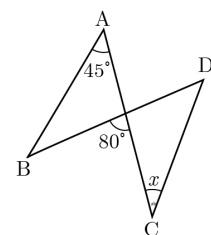
110.



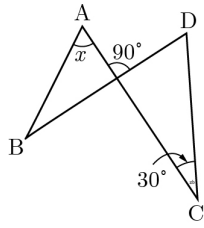
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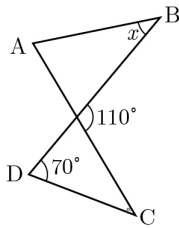
112.



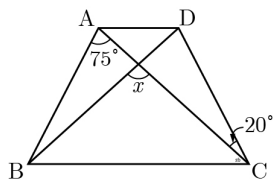
113.



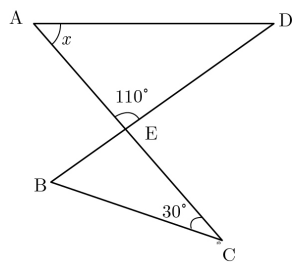
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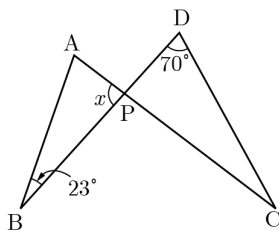
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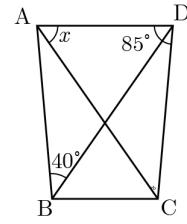
116.



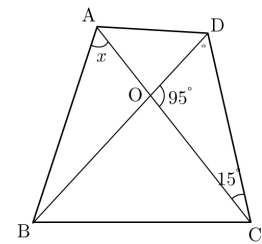
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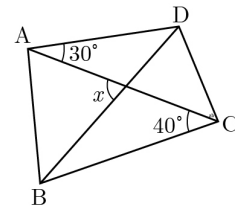
118.



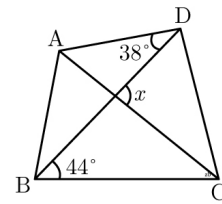
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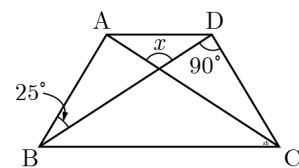
120.



121.



122.



정답 및 해설



1) 70°

$$\Rightarrow \angle x = \frac{1}{2} \angle AOB = \frac{1}{2} \times 140^\circ = 70^\circ$$

2) 47°

$$\Rightarrow \angle x = \frac{1}{2} \angle AOB = \frac{1}{2} \times 94^\circ = 47^\circ$$

3) 120°

$$\Rightarrow \angle x = 2 \angle APB = 2 \times 60^\circ = 120^\circ$$

4) 32°

$$\Rightarrow \angle x = 2 \angle APB = 2 \times 16^\circ = 32^\circ$$

5) 25°

$$\Rightarrow \angle x = \frac{1}{2} \times 50^\circ = 25^\circ$$

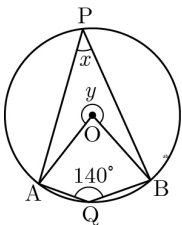
6) 120°

$$\Rightarrow \angle x = 2 \times 60^\circ = 120^\circ$$

7) 115°

$$\Rightarrow \angle x = 180^\circ - \frac{1}{2} \times 130^\circ = 115^\circ$$

8) 40°

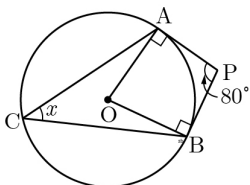


\Rightarrow

$$\angle y = 2 \angle AQB = 280^\circ, \angle AOB = 360^\circ - 280^\circ = 80^\circ$$

$$\therefore \angle x = \frac{1}{2} \times 80^\circ = 40^\circ$$

9) 50°



\Rightarrow

$$\angle AOB = 360^\circ - (80^\circ + 90^\circ + 90^\circ) = 100^\circ$$

$$\therefore \angle x = \frac{1}{2} \times 100^\circ = 50^\circ$$

10) 20°

$$\Rightarrow \angle APB = \frac{1}{2} \angle AOB \text{ 이므로 } \angle x = \frac{1}{2} \times 40^\circ = 20^\circ$$

11) 240°

$$\Rightarrow \angle x = 2 \angle APB = 2 \times 120^\circ = 240^\circ$$

12) 140°

$$\Rightarrow \angle AOB = 80^\circ \text{ 이므로}$$

$$(\widehat{ACB} \text{에 대한 중심각의 크기}) = 360^\circ - 80^\circ = 280^\circ$$

$$\therefore \angle x = \frac{1}{2} \times 280^\circ = 140^\circ$$

13) 100°

$$\Rightarrow \angle x = 2 \times 50^\circ = 100^\circ$$

14) 60°

$$\Rightarrow \angle x = \frac{1}{2} \times 120^\circ = 60^\circ$$

15) 45°

$$\Rightarrow \angle x = \frac{1}{2} \times 90^\circ = 45^\circ$$

16) 60°

$$\Rightarrow \angle AOB = 2 \angle APB \text{ 이므로 } \angle x = 2 \times 30^\circ = 60^\circ$$

17) 140°

$$\Rightarrow \angle x = 2 \times 70^\circ = 140^\circ$$

18) 80°

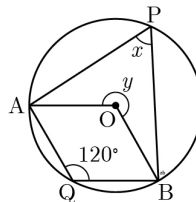
$$\Rightarrow 180^\circ \text{ 보다 큰 부분의 } \angle AOB = 2 \angle AQB = 200^\circ \text{ 이고, } 180^\circ \text{ 보다 작은 부분의 } \angle AOB = 160^\circ \text{ 이다.}$$

$$\angle x = \frac{1}{2} \times 160^\circ = 80^\circ$$

19) 125°

$$\Rightarrow \angle x = 180^\circ - \frac{1}{2} \times 110^\circ = 125^\circ$$

20) 60°



\Rightarrow

$$\angle y = 2 \angle AQB = 240^\circ, \angle AOB = 360^\circ - 240^\circ = 120^\circ$$

$$\therefore \angle x = \frac{1}{2} \times 120^\circ = 60^\circ$$

21) 36°

22) 126°

23) 28°

24) 64°

25) 70°

26) 308°

27) 55°

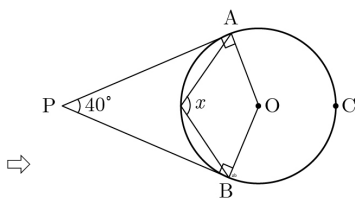
⇒ 원의 접선은 그 접점을 지나는 원의 반지름과 서로 수직이므로 $\angle PAO = \angle PBO = 90^\circ$ 이다.

사각형의 내각의 크기의 합은 360° 이므로

$$\angle AOB = 360^\circ - (70^\circ + 90^\circ + 90^\circ) = 110^\circ$$

$$\angle x = \frac{1}{2} \angle AOB = \frac{1}{2} \times 110^\circ = 55^\circ$$

28) 110°



⇒

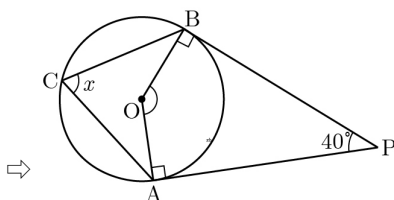
$$\angle OAP = \angle OBP = 90^\circ \text{ 이므로}$$

$$\angle AOB = 180^\circ - 40^\circ = 140^\circ$$

이때 \widehat{ACB} 의 중심각은 $360^\circ - 140^\circ = 220^\circ$ 이므로

$$\widehat{ACB} \text{의 원주각인 } \angle x = \frac{1}{2} \times 220^\circ = 110^\circ$$

29) 70°



⇒

$$\angle AOB = 360^\circ - (40^\circ + 90^\circ + 90^\circ) = 140^\circ$$

$$\therefore \angle x = \frac{1}{2} \times 140^\circ = 70^\circ$$

30) 40°

⇒ $\angle OAP = \angle OBP = 90^\circ$ 이므로 사각형 APBO 에서

$$x + \angle AOB = 180^\circ \rightarrow \angle AOB = 180^\circ - x$$

$\angle AOB$ 의 반대쪽 각의 크기는

$$360^\circ - (180^\circ - x) = 180^\circ + x$$

이각은 길이가 긴 부분인 호 \widehat{AB} 의 중심각이므로

$$110^\circ = \frac{1}{2}(180^\circ + x), \quad 220^\circ = 180^\circ + x \quad \therefore x = 40^\circ$$

31) 65°

32) 30°

⇒ 한 호에 대한 원주각의 크기는 같으므로

$$\angle x = \angle APB = 30^\circ$$

33) 35°

34) 50°

$$\Rightarrow \angle x = \angle APB = 50^\circ$$

35) 38°

36) 65°

$$\Rightarrow \angle x = \angle AQB = 65^\circ$$

37) 70°

$$\Rightarrow \angle x = \angle PBQ = 70^\circ$$

38) 45°

$$\Rightarrow \angle x = \angle AQB = 45^\circ$$

39) 25°

$$\Rightarrow \angle x = \angle AQB = 25^\circ$$

40) 60°

41) 40°

42) 60°

$$\Rightarrow \angle APB = 90^\circ \text{ 이므로}$$

$$\angle x = 180^\circ - (30^\circ + 90^\circ) = 60^\circ$$

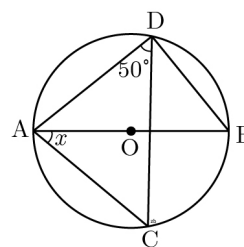
43) 69°

$$\Rightarrow \overline{AB} \text{는 원 O의 지름이므로 } \angle ACB = 90^\circ$$

$$\triangle ABC \text{에서 } \angle x = 180^\circ - (90^\circ + 21^\circ) = 69^\circ$$

44) 40°

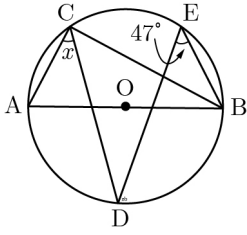
⇒ 다음 그림과 같이 \overline{BD} 를 그으면 \overline{AB} 는 원 O의 지름이므로 $\angle ADB = 90^\circ$



$$\angle BDC = 90^\circ - 50^\circ = 40^\circ \text{ 이므로 } \angle x = \angle BDC = 40^\circ$$

45) 43°

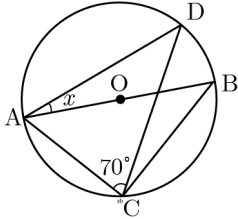
⇒ 다음 그림과 같이 \overline{BC} 를 그으면 \overline{AB} 는 원 O의 지름이므로 $\angle ACB = 90^\circ$



$\angle BCD = \angle BED = 47^\circ$ 이므로 $\angle x = 90^\circ - 47^\circ = 43^\circ$

46) 20°

\Rightarrow 다음 그림과 같이 \overline{BC} 를 그으면 \overline{AB} 는 원 O의 지름이므로 $\angle ACB = 90^\circ$



$\angle BCD = 90^\circ - 70^\circ = 20^\circ$ 이므로 $\angle x = \angle BCD = 20^\circ$

47) 45°

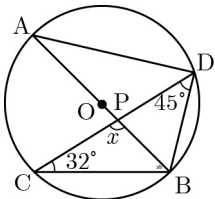
$\Rightarrow \overline{AB}$ 는 원 O의 지름이므로 $\angle ACB = 90^\circ$
 $\triangle ABC$ 에서 $\overline{AC} = \overline{BC}$ 이므로
 $\angle x = \frac{1}{2} \times (180^\circ - 90^\circ) = 45^\circ$

48) 50°

$\Rightarrow \angle ABD = \angle ACD = 40^\circ$ 이고, \overline{AB} 는 지름이므로
 $\angle ADB = 90^\circ$
 $\triangle ABD$ 에서 $\angle x = 180^\circ - (40^\circ + 90^\circ) = 50^\circ$

49) 103°

\Rightarrow 다음 그림과 같이 \overline{AD} 를 그으면 \overline{AB} 는 원 O의 지름이므로 $\angle ADB = 90^\circ$



$\angle ADC = 90^\circ - 45^\circ = 45^\circ$ 이므로

$\angle ABC = \angle ADC = 45^\circ$

$\triangle BCP$ 에서 $\angle x = 180^\circ - (32^\circ + 45^\circ) = 103^\circ$

50) 90°

51) 15°

$\Rightarrow \angle APB = 90^\circ$ 이므로
 $\angle x = 180^\circ - (75^\circ + 90^\circ) = 15^\circ$

52) 45°

$\Rightarrow \angle APB = 90^\circ$ 이므로

$\angle x = 180^\circ - (45^\circ + 90^\circ) = 45^\circ$

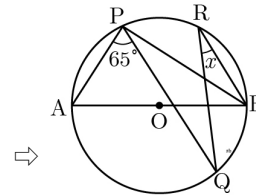
53) 40°

$\Rightarrow \overline{PB}$ 를 그으면 $\angle APB = 90^\circ$

$\angle QPB = 90^\circ - 50^\circ = 40^\circ$

한 원에서 한 호에 대한 원주각의 크기는 모두 같으므로 $\angle x = \angle QPB = 40^\circ$

54) 25°



$\angle x = \angle QPB = 90^\circ - 65^\circ = 25^\circ$

55) 40°

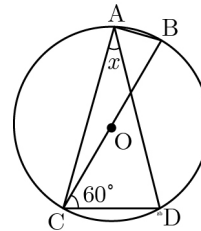
$\Rightarrow \angle x = 180^\circ - (50^\circ + 90^\circ) = 40^\circ$

56) 30°

$\Rightarrow \angle x = \angle QPB = 90^\circ - 60^\circ = 30^\circ$

57) 30°

\Rightarrow 다음 그림과 같이 \overline{AB} 를 그으면 \overline{BC} 는 원 O의 지름이므로 $\angle CAB = 90^\circ$



$\angle BAD = \angle BCD = 60^\circ$ 이므로 $\angle x = 90^\circ - 60^\circ = 30^\circ$

58) 90°

\Rightarrow 반원에 대한 원주각의 크기는 90° 이다.

59) 30°

$\Rightarrow \overline{CB}$ 는 원 O의 지름이므로 $\angle BDC = 90^\circ$

$\therefore \angle ADB = 90^\circ - 60^\circ = 30^\circ$

$\therefore \angle x = \angle ADB = 30^\circ$

60) 70°

$\Rightarrow \angle x = 180^\circ - (20^\circ + 90^\circ) = 70^\circ$

61) 42°

$\Rightarrow \angle x = 180^\circ - (90^\circ + 48^\circ) = 42^\circ$

62) $\angle x = 45^\circ, \angle y = 90^\circ$

$\Rightarrow \angle x = 45^\circ, \angle y = 2 \times 45^\circ$

63) $\angle x = 40^\circ, \angle y = 80^\circ$
 $\Rightarrow \angle x = \angle BDC = 40^\circ, \angle y = 2\angle x = 2 \times 40^\circ = 80^\circ$

64) $\angle x = 60^\circ, \angle y = 120^\circ$
 $\Rightarrow \angle y = 2 \times 60^\circ = 120^\circ$

65) $\angle x = 43^\circ, \angle y = 52^\circ$

66) $\angle x = 54^\circ, \angle y = 46^\circ$

67) $\angle x = 40^\circ, \angle y = 30^\circ$
 $\Rightarrow \angle x = \angle ACD = 40^\circ$
 $\angle CAB = \angle APD - \angle ACD = 70^\circ - 40^\circ = 30^\circ$ 이므로
 $\angle y = \angle CAB = 30^\circ$

68) $\angle x = 35^\circ, \angle y = 70^\circ$
 $\Rightarrow \angle y = 2 \times 35^\circ = 70^\circ$

69) $\angle x = 55^\circ, \angle y = 110^\circ$
 $\Rightarrow \angle y = 2 \times 55^\circ = 110^\circ$

70) $\angle x = 50^\circ, \angle y = 35^\circ$
 $\Rightarrow \angle x = \angle CBD = 50^\circ, \angle y = \angle ADB = 35^\circ$

71) $\angle x = 40^\circ, \angle y = 40^\circ$
 $\Rightarrow \angle x = \angle CPB - \angle ACD = 65^\circ - 25^\circ = 40^\circ$
 $\angle y = \angle x = 40^\circ$

72) $\angle x = 28^\circ, \angle y = 63^\circ$

73) $\angle x = 62^\circ, \angle y = 62^\circ$

74) $\angle x = 35^\circ, \angle y = 117^\circ$

75) 45
 $\Rightarrow 15 : x = 3 : 9 \quad \therefore x = 45$

76) 30

77) 30
 $\Rightarrow \widehat{BC} = \widehat{DE}$ 이므로 $\angle DAE = \angle BFC = 30^\circ$
 $\therefore x = 30$

78) 90
 $\Rightarrow 30^\circ : x^\circ = 4 : 12 \quad \therefore x = 90$

79) 12
 $\Rightarrow 25^\circ : 50^\circ = 6 : x \quad \therefore x = 12$

80) 40
 $\Rightarrow 20^\circ : x^\circ = 3 : 6 \quad \therefore x = 40$

81) 20
 $\Rightarrow 25^\circ : 50^\circ = 10 : x \quad \therefore x = 20$

82) 8

83) 10

84) 14
 $\Rightarrow 7 : x = 28^\circ : 56^\circ \quad \therefore x = 14$

85) 3
 $\Rightarrow x : 6 = 20^\circ : 40^\circ \quad \therefore x = 3$

86) 30°
 $\Rightarrow 1 : 2 = 15^\circ : \angle x \quad \therefore \angle x = 30^\circ$

87) 20°
 $\Rightarrow \widehat{AB} = \widehat{CD}$ 이므로 $\angle x = \angle APB = 20^\circ$

88) 40°
 $\Rightarrow \overline{PA}$ 를 그으면 $\angle APB = \frac{1}{2} \times 80^\circ = 40^\circ$
 $\widehat{AB} = \widehat{BC}$ 이므로 $\angle x = \angle APB = 40^\circ$

89) 50°
 $\Rightarrow 1 : 5 = 10^\circ : \angle x \quad \therefore \angle x = 50^\circ$

90) 36°
 $\Rightarrow 2 : 3 = 24^\circ : \angle x \quad \therefore \angle x = 36^\circ$

91) 60°
 $\Rightarrow 3 : 9 = 20^\circ : \angle x \quad \therefore \angle x = 60^\circ$

92) 50°
 $\Rightarrow 2 : 4 = 25^\circ : \angle x \quad \therefore \angle x = 50^\circ$

93) 80
 $\Rightarrow \widehat{AB} = \widehat{CD}$ 이므로 $\angle ACB = \angle CBD = 40^\circ$
따라서 $\angle CPD = 40^\circ + 40^\circ = 80^\circ$ 이므로 $x = 80$

94) 60°
 $\Rightarrow \widehat{AC} = \widehat{BD}$ 이므로 $\angle BCD = \angle ABC = 30^\circ$
 $\triangle PCB$ 에서 $\angle x = \angle PCB + \angle PBC = 30^\circ + 30^\circ = 60^\circ$

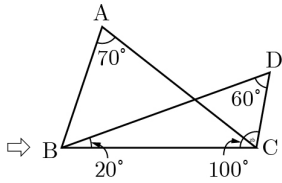
95) 65°
 $\Rightarrow \overline{BC}$ 를 그으면 \overline{AB} 는 반원 O의 지름이므로
 $\angle ACB = 90^\circ$
 $\widehat{AD} = \widehat{CD}$ 이므로 $\angle DBC = \angle DBA = 25^\circ$
 $\triangle CPB$ 에서 $\angle x = 180^\circ - (90^\circ + 25^\circ) = 65^\circ$

96) \times
 $\Rightarrow \angle BAC \neq \angle BDC$ 이므로 네 점 A, B, C, D는 한 원 위에 있지 않다.

97) \bigcirc
 $\Rightarrow \angle CAD = 180^\circ - (75^\circ + 40^\circ) = 65^\circ$
따라서 $\angle CAD = \angle CBD = 65^\circ$ 이므로 네 점 A, B, C, D

는 한 원 위에 있다.

98) ×

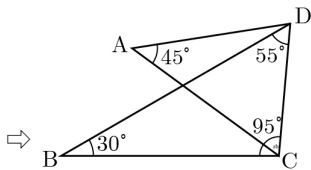


$\angle BAC \neq \angle BDC$ 이므로 네 점 A, B, C, D는 한 원 위에 있지 않다.

99) ×

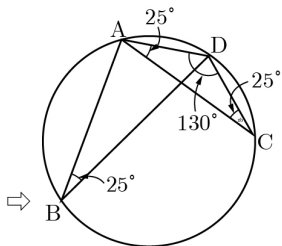
$\Rightarrow \angle BAC \neq \angle BDC$ 이므로 네 점 A, B, C, D는 한 원 위에 있지 않다.

100) ×



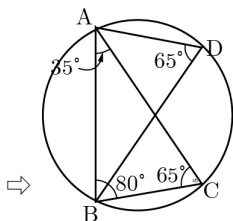
$\angle CAD \neq \angle CBD$ 이므로 네 점 A, B, C, D는 한 원 위에 있지 않다.

101) ○



$\angle ABD = \angle ACD$ 이므로 네 점 A, B, C, D는 한 원 위에 있다.

102) ○



$\angle ACB = \angle ADB$ 이므로 네 점 A, B, C, D는 한 원 위에 있다.

103) ×

$$\Rightarrow \angle BDC = 180^\circ - (80^\circ + 30^\circ) = 70^\circ$$

따라서 $\angle BAC \neq \angle BDC$ 이므로 네 점 A, B, C, D는 한 원 위에 있지 않다.

104) ○

$$\Rightarrow \angle BDC = 100^\circ - 80^\circ = 20^\circ$$

따라서 $\angle BAC = \angle BDC = 20^\circ$ 이므로 네 점 A, B, C, D는 한 원 위에 있다.

105) ○

106) ×

107) 27°

$$\Rightarrow \angle x = \angle BDC = 27^\circ$$

108) 33°

$$\Rightarrow \angle x = \angle CBD = 33^\circ$$

109) 35°

$$\Rightarrow \angle x = \angle D = 35^\circ$$

110) 55°

$$\Rightarrow \angle ACD = \angle ABD = 65^\circ \text{ 이고, } \angle ACD + \angle x = 120^\circ \\ \angle x = 120^\circ - 65^\circ = 55^\circ$$

111) 55°

$$\Rightarrow \angle x = \angle BAC = 55^\circ$$

112) 35°

$$\Rightarrow \angle BDC = \angle BAC = 45^\circ \text{ 이고 } \angle BDC + \angle x = 80^\circ \\ \angle x = 80^\circ - 45^\circ = 35^\circ$$

113) 60°

$$\Rightarrow \angle ABD = \angle ACD = 30^\circ \text{ 이고, } \angle ABD + \angle x = 90^\circ \\ \angle x = 90^\circ - 30^\circ = 60^\circ$$

114) 40°

$$\Rightarrow \angle BAC = \angle BDC = 70^\circ \text{ 이고, } \angle BAC + \angle x = 110^\circ \\ \angle x = 110^\circ - 70^\circ = 40^\circ$$

115) 95°

$$\Rightarrow \angle BDC = \angle BAC = 75^\circ \text{ 이므로 } \\ \angle x = 75^\circ + 20^\circ = 95^\circ$$

116) 40°

$$\Rightarrow \text{네 점 A, B, C, D가 한 원 위에 있으므로 } \angle EBC = \angle x \\ \triangle EBC \text{에서 } \angle BEC = 110^\circ \text{ 이므로 } \\ \angle x = 180^\circ - (110^\circ + 30^\circ) = 40^\circ$$

117) 87°

$$\Rightarrow \text{네 점 A, B, C, D가 한 원 위에 있으므로 } \angle BAC = \angle BDC = 70^\circ \\ \text{따라서 } \triangle ABP \text{에서 } \\ \angle x = 180^\circ - (70^\circ + 23^\circ) = 87^\circ$$

118) 55°

$$\Rightarrow \angle ACD = \angle ABD = 40^\circ \text{ 이므로 } \triangle ACD \text{에서}$$

$$\angle x = 180^\circ - (85^\circ + 40^\circ) = 55^\circ$$

119) 70°

120) 70°

⇒ \overline{AC} 와 \overline{BD} 의 교점을 P라 하면

$$\angle ADB = \angle ACB = 40^\circ \text{ 이므로}$$

$$\triangle APD \text{에서 } \angle x = \angle ADP + \angle DAP = 40^\circ + 30^\circ = 70^\circ$$

$$\angle DAC = \angle DBC = 30^\circ \text{ 이므로}$$

$$\triangle PBC \text{에서 } \angle x = \angle PCB + \angle PBC = 40^\circ + 30^\circ = 70^\circ$$

121) 82°

⇒ $\angle DAC = \angle DBC = 44^\circ$ 이어야 하므로

$$\angle x = 38^\circ + 44^\circ = 82^\circ$$

122) 115°

⇒ $\angle ACD = \angle ABC = 25^\circ$ 이므로

$$\angle x = 90^\circ + 25^\circ = 115^\circ$$