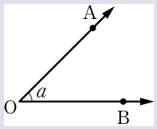
◇「콘텐츠산업 진흥법 시행령」제33조에 의한 표시
1) 제작연월일 : 2016-10-25
2) 제작자 : 교육지대㈜
3) 이 콘텐츠는 「콘텐츠산업 진흥법」에 따라 최초 제작일부터 5년간 보호됩니다.

◇「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. 각

1) 각 AOB ⇨ 기호 $\angle AOB$, $\angle BOA$
: 한 점 O에서 시작하는 두 반직선 OA, $\overline{OB}$로 이루어진 도형
2) 각 AOB의 크기 : 꼭짓점 O를 중심으로 $\overrightarrow{OA}$가 $\overrightarrow{OB}$까지 회전한 양

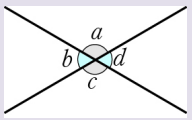


참고
◉ (두 점 A, B사이의 거리)
=(선분 AB의 길이)
=(선분 BA의 길이)

2. 각의 분류

1) 평각(180°): 각의 두 변이 꼭짓점을 중심으로 반대쪽에 있고, 한 직선을 이루는 각
2) 직각: 평각의 크기의 $\frac{1}{2}$인 각
3) 예각: 0°보다 크고 90°보다 작은 각
4) 둔각: 90°보다 크고 180°보다 작은 각

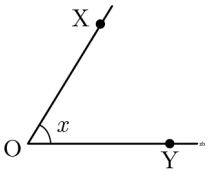
3. 맞꼭지각



1) 교각: 두 직선이 한 점에서 만날 때 생기는 네 개의 각
⇨ $\angle a$, $\angle b$, $\angle c$, $\angle d$
2) 맞꼭지각: 교각 중 서로 마주 보는 두각 ⇨ $\angle a$와 $\angle c$, $\angle b$와 $\angle d$
3) 맞꼭지각의 성질: 맞꼭지각의 크기는 서로 같다. ⇨ $\angle a=\angle c$, $\angle b=\angle d$

각의 분류

1. 다음 그림의 각을 기호로 나타낼 때, 다음 <보기> 중 옳은 것을 모두 찾아라.



<보기>

$\angle O$	$\angle XOY$	$\angle x$
$\angle XxY$	$\angle XY$	$\angle YOX$

◪ 다음 각을 예각, 직각, 둔각, 평각으로 구분하여라.

2. 30° ( )
3. 90° ( )
4. 150° ( )
5. 180° ( )

◪ 다음 설명 중 옳은 것에는 ○표, 옳지 않은 것에는 ×표 하고 잘못된 설명은 바르게 고쳐라.

6. $\angle AOB$는 $\angle BOA$와 다른 각을 나타낸다. ( )

7. 기호 $\angle AOB$는 도형으로서 각을 나타내기도 하지만 각의 크기도 나타낸다. ( )

8. 예각은 0°보다 크고 180°보다 작은 각이다. ( )

9. 평각은 직각의 크기의 $\frac{1}{2}$인 각을 말한다. ( )

10. 둔각은 90°와 180° 사이의 각이다. ( )

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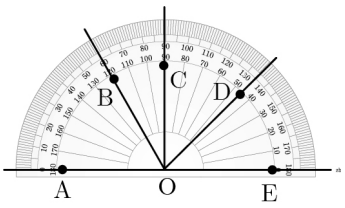
◪ 다음 그림을 보고, 다음 각을 평각, 직각, 예각, 둔각으로 구분하여라.



11. ∠AOB

12. ∠AOE

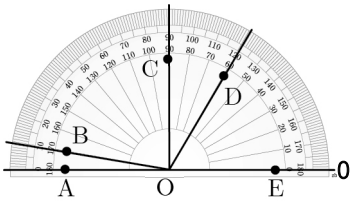
13. ∠AOC

14. ∠BOD

15. ∠BOE

16. ∠COE

◪ 다음 그림을 보고 각을 평각, 직각, 예각, 둔각으로 분류하여라.



17. ∠AOB

18. ∠BOE

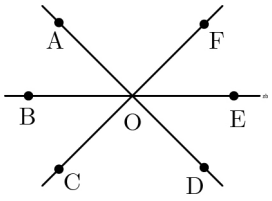
19. ∠COE

20. ∠DOC

21. ∠EOA

맞꼭지각

◪ 다음 그림과 같이 세 직선이 한 점 O에서 만날 때, 주어진 각의 맞꼭지각을 구하여라.



22. ∠AOB

23. ∠AOC

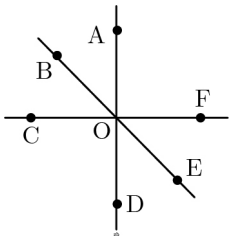
24. ∠BOD

25. ∠BOF

26. ∠COD

27. ∠FOE

◪ 다음 그림과 같이 세 직선이 한 점 O에서 만날 때, 주어진 각의 맞꼭지각을 찾아 써라.



28. ∠AOB

29. ∠COD

30. ∠BOC

31. ∠COE

32. ∠AOE

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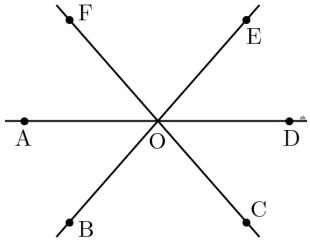
◪ 다음 그림과 같이 세 직선이 한 점 O에서 만날 때, 주어진 각의 맞꼭지각을 찾아 써라.



33. $\angle AOB$

34. $\angle AOF$

35. $\angle AOC$

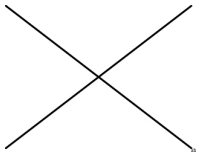
36. $\angle BOD$

37. $\angle BOF$

38. $\angle EOF$

◪ 다음 그림에서 맞꼭지각은 모두 몇 쌍인지 구하여라.

39.



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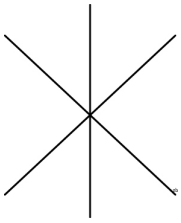
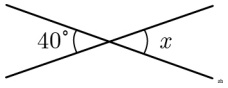


◪ 다음 그림에서 $\angle x$의 크기를 구하여라.

41.



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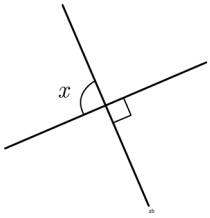

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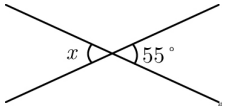

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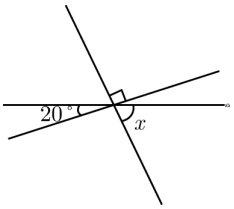

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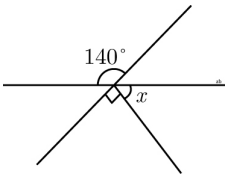

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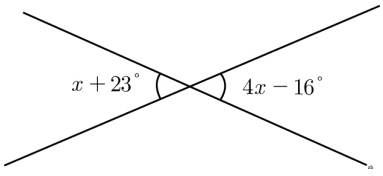

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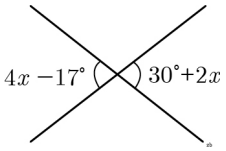
47.



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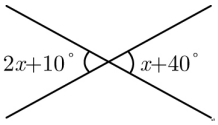

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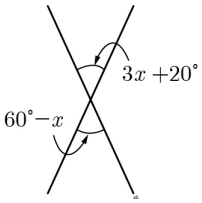

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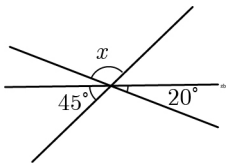

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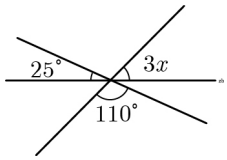

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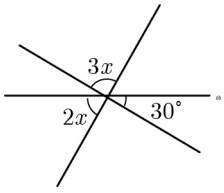

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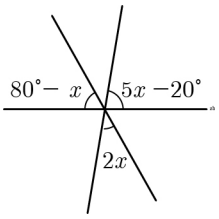

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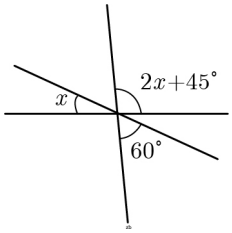

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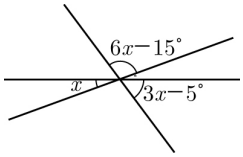

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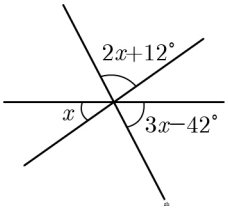

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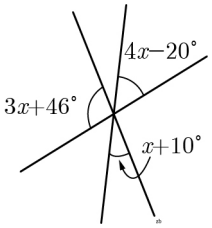

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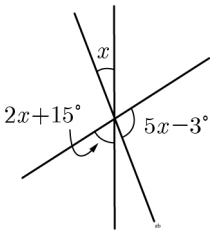
58.



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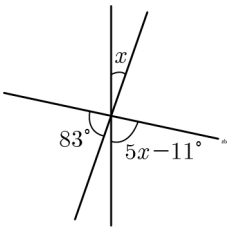

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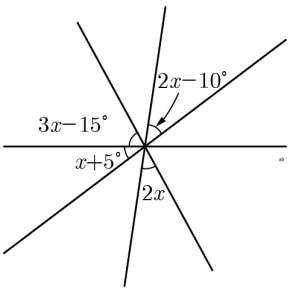
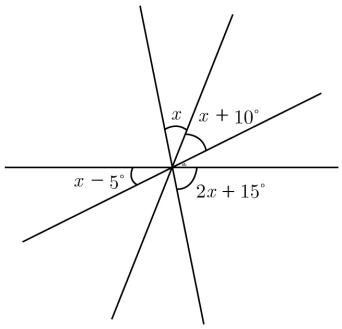
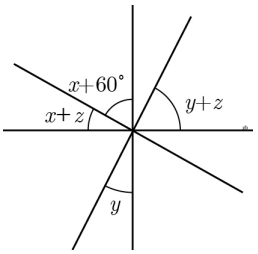


61.

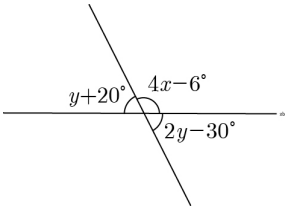


◪ 다음 물음에 답하여라.

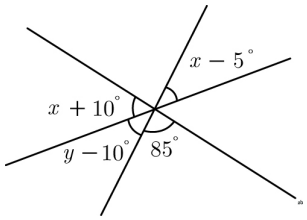
62. 다음 그림과 같이 네 직선이 한 점에서 만날 때, $\angle x+\angle y+\angle z$의 크기를 구하여라.



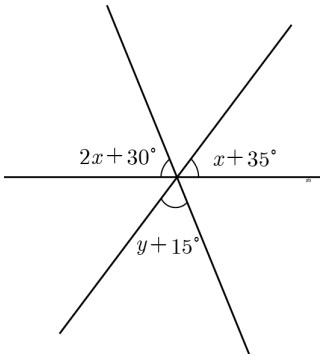
63. 다음 그림에서 $\angle y-\angle x$의 값을 구하여라.



64. 다음 그림에서 $\angle y$의 값을 구하여라.



65. 다음 그림과 같이 세 직선이 한 점에서 만나서 생기는 교각이 다음과 같다. 이때 $x:y=1:2$이면 $y-x$의 값을 구하여라.



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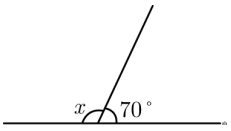
여러가지 각의 크기

◪ 다음 그림에서 $\angle x$의 크기를 구하여라.

66.



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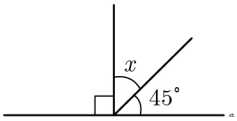
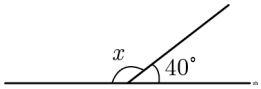


68.



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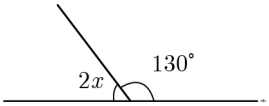

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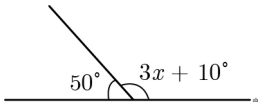

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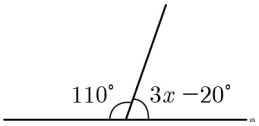

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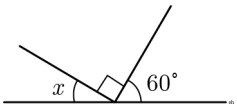

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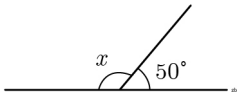

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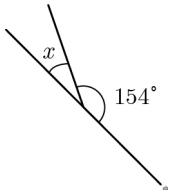

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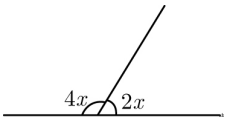

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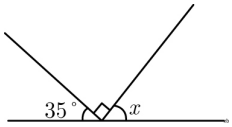

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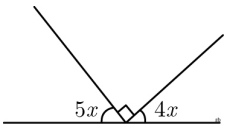

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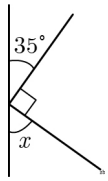

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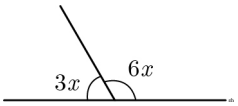

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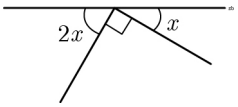

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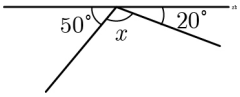

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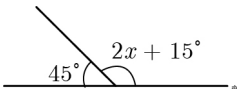

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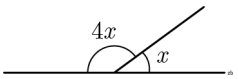

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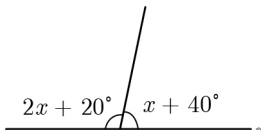

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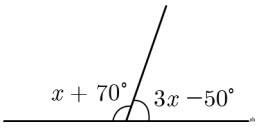

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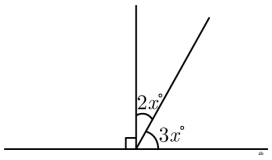

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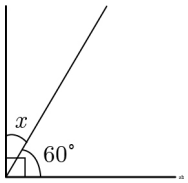

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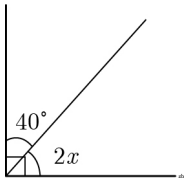

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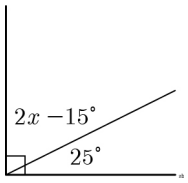

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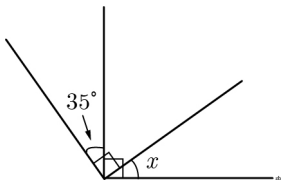

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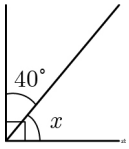

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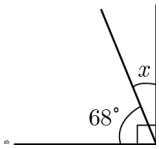

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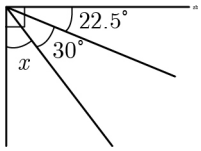

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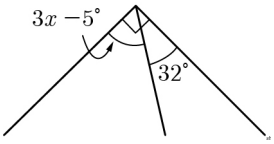

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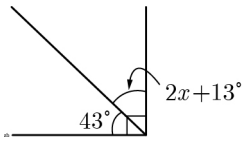

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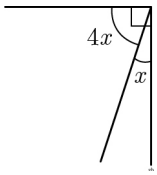

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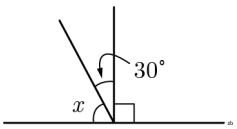

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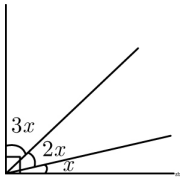

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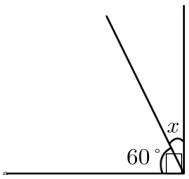

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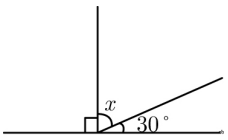

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정답 및 해설

1) $\angle O$, $\angle XOY$, $\angle x$, $\angle YOX$

2) 예각

3) 직각

4) 둔각

5) 평각

6) ×, $\angle AOB$는 $\angle BOA$와 같은 각을 나타낸다.

7) ○

8) ×, 예각은 0°보다 크고 90°보다 작은 각이다.

9) ×, 평각은 직각의 크기의 2배인 각을 말한다.

10) ○

11) 예각

12) 평각

13) 직각

14) 예각

15) 둔각

16) 직각

17) 예각

18) 둔각

19) 직각

20) 예각

21) 평각

22) $\angle DOE$

23) $\angle DOF$

24) $\angle AOE$

25) $\angle COE$

26) $\angle AOF$

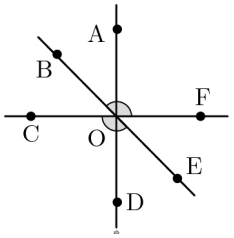
27) $\angle BOC$

28) $\angle DOE$

29) $\angle FOA$

30) $\angle EOF$

31) $\angle FOB$



32) $\angle DOB$

33) $\angle DOE$

34) $\angle DOC$

35) $\angle DOF$

36) $\angle EOA$

37) $\angle EOC$

38) $\angle BOC$

39) 2쌍

40) 6쌍
⇨ $3\times(3-1)=6$(쌍)

41) 40°

42) 90°

43) 55°

44) 70°

45) 50°

46) 13°

47) 23.5°
⇨ $4\angle x-17^\circ=30^\circ+2\angle x$, $2\angle x=47^\circ$
$\therefore\ \angle x=23.5^\circ$

48) 30°

49) 10°
⇨ $3\angle x+20^\circ=60^\circ-\angle x$, $4\angle x=40^\circ$ $\therefore\ \angle x=10^\circ$

50) 115°
⇨ $\angle x+45^\circ+20^\circ=180^\circ$ $\therefore \angle x=115^\circ$

51) 15°

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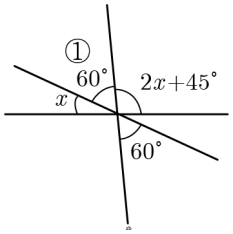
⇨ $25^\circ+3\angle x+110^\circ=180^\circ$ 에서
$3\angle x=45^\circ$ $\therefore\ \angle x=15^\circ$

52) 30°
⇨ $3\angle x+2\angle x+30^\circ=180^\circ$ 에서
$5\angle x=150^\circ$ $\therefore\ \angle x=30^\circ$

53) 20°
⇨ $(80^\circ-\angle x)+(5\angle x-20^\circ)+2\angle x=180^\circ$ 에서
$6\angle x=120^\circ$ $\therefore\ \angle x=20^\circ$

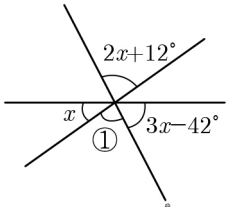
54) 25°



⇨
② $\angle x+60^\circ+2\angle x+45^\circ=180^\circ$, $3\angle x=75^\circ$
$\therefore\ \angle x=25^\circ$

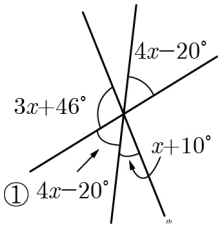
55) 20°

56) 35°



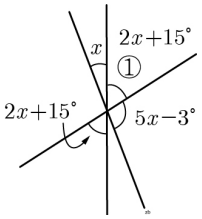
⇨
① $2\angle x+12^\circ$
② $\angle x+2\angle x+12^\circ+3\angle x-42^\circ=180^\circ$, $6\angle x=210^\circ$
$\therefore\ \angle x=35^\circ$

57) 18°



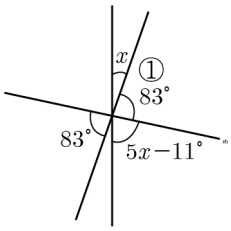
⇨
② $3\angle x+46^\circ+4\angle x-20^\circ+\angle x+10^\circ=180^\circ$
$8\angle x=144^\circ$ $\therefore\ \angle x=18^\circ$

58) 21°



⇨
② $\angle x+2\angle x+15^\circ+5\angle x-3^\circ=180^\circ$, $8\angle x=168^\circ$
$\therefore\ \angle x=21^\circ$

59) 18°



⇨
② $\angle x+83^\circ+5\angle x-11^\circ=180^\circ$, $6\angle x=108^\circ$
$\therefore\ \angle x=18^\circ$

60) 25°
⇨ 맞꼭지각의 크기가 같으므로
$(\angle x+5^\circ)+(3\angle x-15^\circ)+2\angle x+(2\angle x-10^\circ)=180^\circ$
$8\angle x-20^\circ=180^\circ$
$8\angle x=200^\circ$
$\therefore\ \angle x=25^\circ$

61) 32°

62) 60°
⇨ $(x+z)+(x+60^\circ)+y+(y+z)=180^\circ$
$2(x+y+z)=120^\circ$
$\therefore\ \angle x+\angle y+\angle z=60^\circ$

63) 21°
⇨ 맞꼭지각에서 $y+20^\circ=2y-30^\circ\ \rightarrow\ y=50^\circ$
평각에서 $(4x-6^\circ)+(2y-30^\circ)=180^\circ\ \rightarrow\ x=29^\circ$
$\therefore\ \angle y-\angle x=50^\circ-29^\circ=21^\circ$

64) 50°
⇨ 맞꼭지각의 크기가 같으므로
$(x+10^\circ)+85^\circ+(x-5^\circ)=180^\circ$
$2x=90^\circ\ \rightarrow\ \angle x=45^\circ$
$y-10^\circ=x-5^\circ$ 에서 $y-10^\circ=40^\circ\ \rightarrow\ \angle y=50^\circ$

65) 20°
⇨ $x:y=1:2$이므로 $y=2x$라고 하자.
맞꼭지각의 크기가 같고 평각에서
$(2x+30^\circ)+(y+15^\circ)+(x+35^\circ)=180^\circ$
이때 $y=2x$ 이므로
$5x+80^\circ=180^\circ$, $5x=100^\circ$
$\therefore\ x=20^\circ$, $y=40^\circ$
$\therefore\ y-x=40^\circ-20^\circ=20^\circ$

66) 110°

67) 45°
⇨ $90^\circ+\angle x+45^\circ=180^\circ$ $\therefore\ \angle x=45^\circ$

68) 140°
⇨ $\angle x+40^\circ=180^\circ$ $\therefore\angle x=140^\circ$

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69) 25°
⇨ $2\angle x+130^\circ=180^\circ \quad \angle x=25^\circ$

70) 40°
⇨ $50^\circ+(3\angle x+10^\circ)=180^\circ \quad \therefore \angle x=40^\circ$

71) 30°
⇨ $110^\circ+(3\angle x-20^\circ)=180^\circ \quad \therefore \angle x=30^\circ$

72) 30°
⇨ $\angle x+90^\circ+60^\circ=180^\circ \quad \therefore \angle x=30^\circ$

73) 130°
⇨ $\angle x+50^\circ=180^\circ \quad \therefore \angle x=130^\circ$

74) 26°
⇨ $\angle x+154^\circ=180^\circ \quad \therefore \angle x=26^\circ$

75) 30°

76) 55°

77) 10°

78) 55°
⇨ $35^\circ+90^\circ+\angle x=180^\circ \quad \therefore \angle x=55^\circ$

79) 20°
⇨ $3\angle x+6\angle x=180^\circ,\ 9\angle x=180^\circ \quad \therefore \angle x=20^\circ$

80) 30°
⇨ $2\angle x+90^\circ+\angle x=180^\circ,\ 3\angle x=90^\circ \quad \therefore \angle x=30^\circ$

81) 110°
⇨ $50^\circ+\angle x+20^\circ=180^\circ \quad \therefore \angle x=110^\circ$

82) 60°
⇨ $45^\circ+2\angle x+15^\circ=180^\circ,\ 2\angle x=120^\circ$
$\therefore \angle x=60^\circ$

83) 36°
⇨ $4\angle x+\angle x=180^\circ,\ 5\angle x=180^\circ \quad \therefore \angle x=36^\circ$

84) 40°
⇨ $(2\angle x+20^\circ)+(\angle x+40^\circ)=180^\circ$ 이므로
$3\angle x=120^\circ \quad \therefore \angle x=40^\circ$

85) 40°
⇨ $(\angle x+70^\circ)+(3\angle x-50^\circ)=180^\circ$ 이므로
$4\angle x=160^\circ \quad \therefore \angle x=40^\circ$

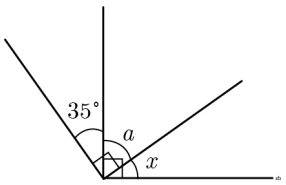
86) 18°

87) 30°
⇨ $\angle x+60^\circ=90^\circ \quad \therefore \angle x=30^\circ$

88) 25°
⇨ $40^\circ+2\angle x=90^\circ \quad \therefore \angle x=25^\circ$

89) 40°
⇨ $(2\angle x-15^\circ)+25^\circ=90^\circ \quad \therefore \angle x=40^\circ$

90) 35°
⇨ 다음 그림에서 $35^\circ+\angle a=90^\circ$, $\angle a+\angle x=90^\circ$ 이므로
$35^\circ+\angle a=\angle a+\angle x \quad \therefore \angle x=35^\circ$



91) 50°
⇨ $\angle x+40^\circ=90^\circ \quad \therefore \angle x=50^\circ$

92) 22°
⇨ $\angle x+68^\circ=90^\circ \quad \therefore \angle x=22^\circ$

93) 37.5°
⇨ $\angle x+30^\circ+22.5^\circ=90^\circ \quad \therefore \angle x=37.5^\circ$

94) 21°
⇨ $3\angle x-5^\circ+32^\circ=90^\circ,\ 3\angle x=63^\circ \quad \therefore \angle x=21^\circ$

95) 17°
⇨ $43^\circ+2\angle x+13^\circ=90^\circ,\ 2\angle x=34^\circ \quad \therefore \angle x=17^\circ$

96) 18°
⇨ $4\angle x+\angle x=90^\circ,\ 5\angle x=90^\circ \quad \therefore \angle x=18^\circ$

97) 60°
⇨ $\angle x+30^\circ=90^\circ \quad \therefore \angle x=60^\circ$

98) 15°

99) 30°

100) 60°

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교육지대(주) 서울특별시 강남구 논현동 학동로 130 한주빌딩 7층 대표전화 : 1544-5633 FAX : 02-521-0331