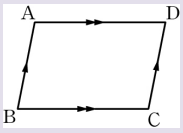
◇「콘텐츠산업 진흥법 시행령」제33조에 의한 표시
1) 제작연월일 : 2016-10-25
2) 제작자 : 교육지대㈜
3) 이 콘텐츠는 「콘텐츠산업 진흥법」에 따라 최초 제작일부터 5년간 보호됩니다.

◇「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

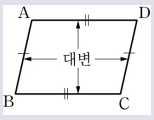
1. 평행사변형

1) 평행사변형: 두 쌍의 대변이 각각 평행한 사각형
⇨ □ABCD에서 $\overline{AB}//\overline{DC}$, $\overline{AD}//\overline{BC}$

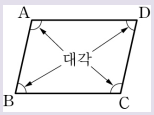


2. 평행사변형의 성질

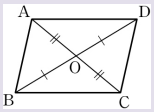
1) 두 쌍의 대변의 길이가 각각 같다.
⇨ $\overline{AB}=\overline{DC}$, $\overline{AD}=\overline{BC}$



2) 두 쌍의 대각의 크기가 각각 같다.
⇨ $\angle A=\angle C$, $\angle B=\angle D$



3) 두 대각선은 서로를 이등분한다.
⇨ $\overline{AO}=\overline{CO}$, $\overline{BO}=\overline{DO}$

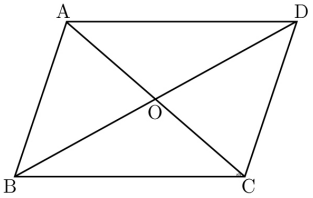


참고
◉ 평행사변형은 두 쌍의 대변이 각각 평행하므로 이웃하는 두 각의 크기의 합은 180° 이다.
즉, $\angle A+\angle B=\angle B+\angle C$
$=\angle C+\angle D$
$=\angle D+\angle A=180°$

참고
◉ 사각형에서 서로 마주 보는 변을 대변, 서로 마주 보는 각을 대각이라 한다.

평행사변형

◪ **다음 그림의 평행사변형 ABCD를 보고, 다음 ( )안에 알맞게 써넣어라.**



1. $\overline{AB}=$( ), $\overline{AD}=\overline{BC}$

2. $\overline{AO}=\overline{CO}$, $\overline{BO}=$( )

3. $\triangle ABO\equiv$( )

4. ( )$\equiv\triangle AOD$

5. $\overline{AD}//\overline{BC}$, $\overline{AB}//$( )

6. $\angle A=\angle C$, $\angle B=$( )

7. ( )$=\angle DOC$

8. $\angle DAO=$( )

9. $\angle A+\angle B=\angle C+\angle D=$( )

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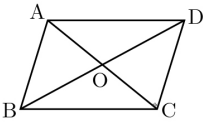
◪ 다음 평행사변형 ABCD에 대하여 다음 중 옳은 것에는 O표, 옳지 않은 것에는 X표를 하여라.



10. $\overline{AB}=\overline{DC}$ ( )

11. $\angle ABC=\angle BCD$ ( )

12. $\angle ABC+\angle BCD=180^\circ$ ( )

13. $\angle BAD+\angle BCD=180^\circ$ ( )

14. $\overline{OA}=\overline{OB}$ ( )

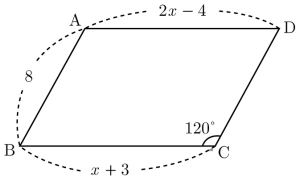
15. $\triangle ABO\equiv\triangle ADO$ ( )

16. $\triangle AOD\equiv\triangle COB$ ( )

평행사변형의 성질

◪ 다음 그림과 같은 평행사변형 ABCD에서 x의 값을 구하여라.

17.



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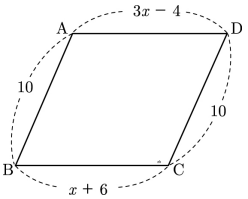
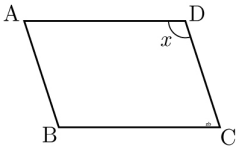
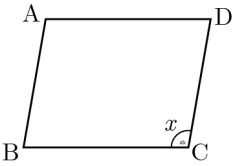


◪ 다음 평행사변형 ABCD에서 $\angle x$의 크기를 구하여라.

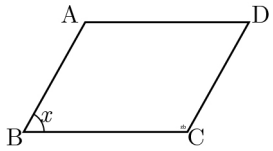
19. $\angle A:\angle B=2:3$



20. $\angle A:\angle B=5:4$

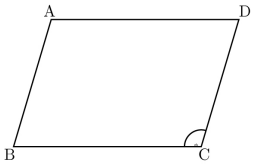


21. $\angle A:\angle D=2:1$

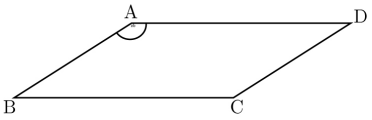


◪ 다음 그림을 보고 물음에 답하여라.

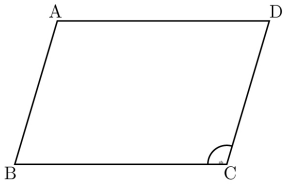
22. 평행사변형 ABCD에서 $\angle A:\angle B=5:4$일 때, $\angle C$의 크기를 구하여라.



23. 평행사변형 ABCD에서 $\angle A:\angle B=3:1$일 때, $\angle A$의 크기를 구하여라.



24. 평행사변형 ABCD에서 $\angle A$와 $\angle B$의 크기의 비가 $3:2$일 때, $\angle C$의 크기를 구하여라.



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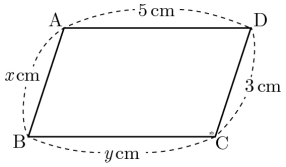
◪ 다음 그림과 같은 평행사변형 ABCD에서 x, y의 값을 각각 구하여라.

25.



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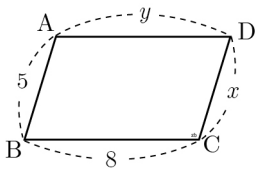

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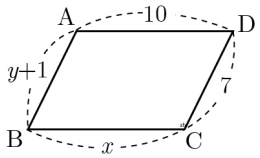

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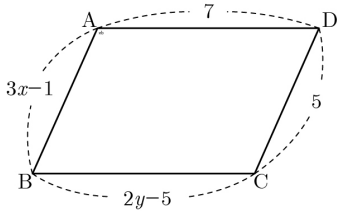

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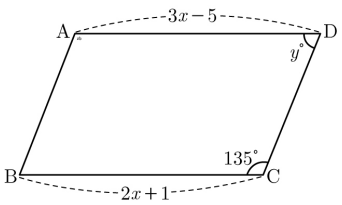

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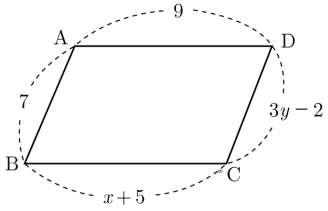

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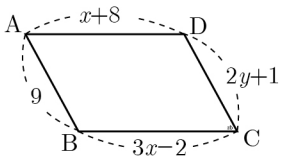

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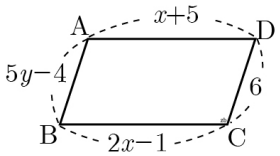

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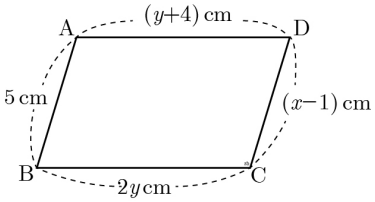

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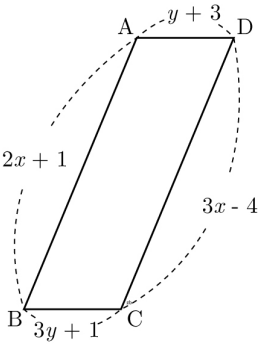

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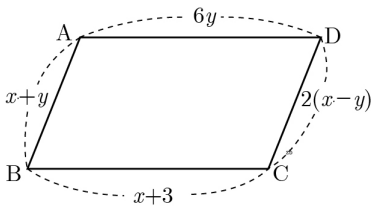

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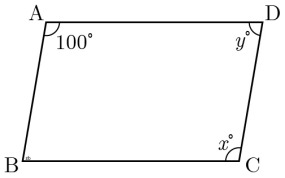

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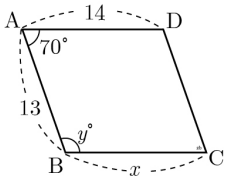

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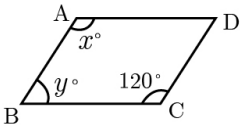

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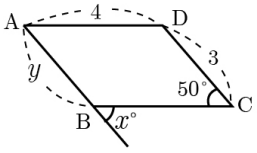

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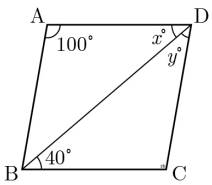

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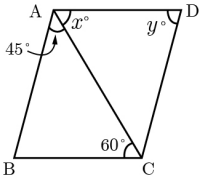

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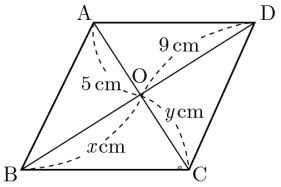

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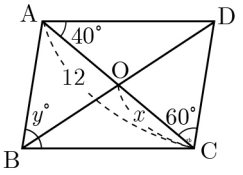

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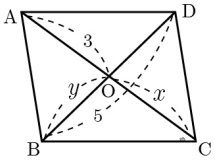

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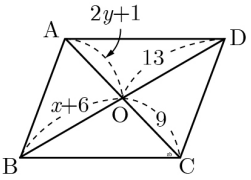

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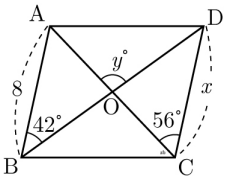

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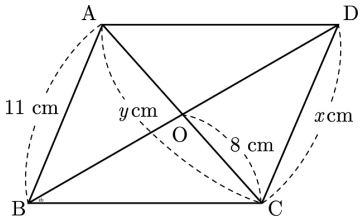

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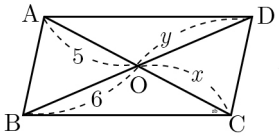

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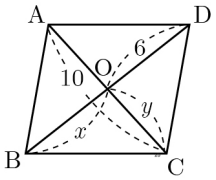

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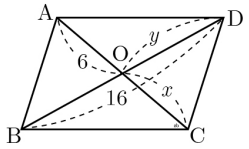

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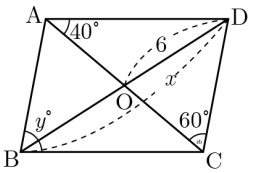

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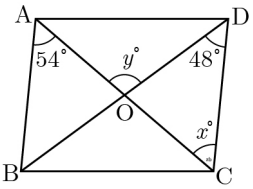

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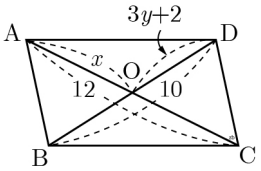

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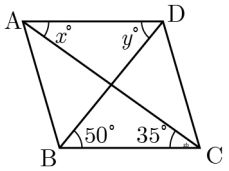

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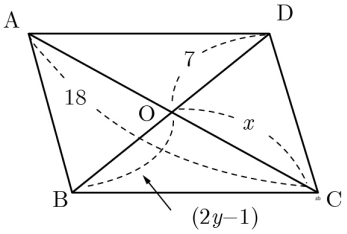

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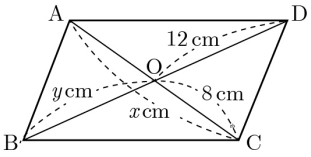

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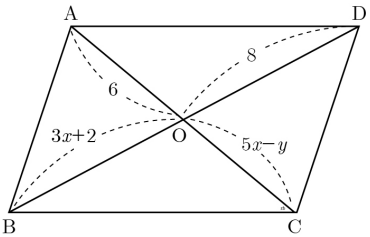

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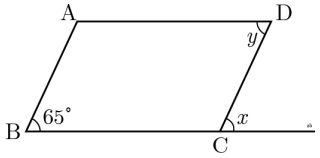
◪ 다음 그림과 같은 평행사변형 ABCD에서 $\angle x$, $\angle y$의 크기를 각각 구하여라.

58.



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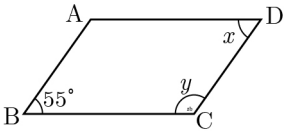

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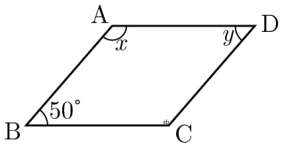

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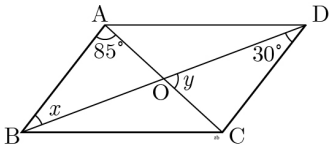

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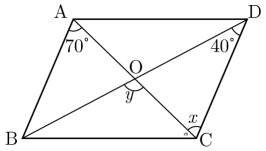

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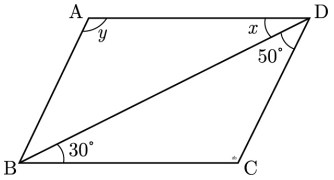

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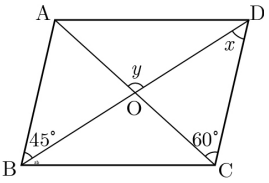

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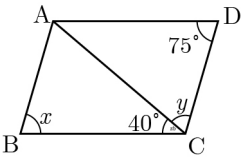

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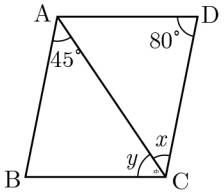

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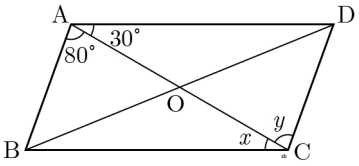

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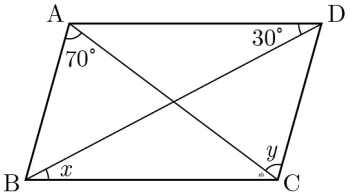

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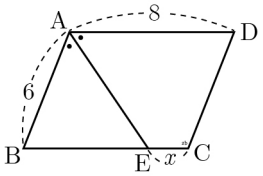
평행사변형의 성질의 응용

◪ 다음 평행사변형 ABCD에서 x의 값을 구하여라.

69.



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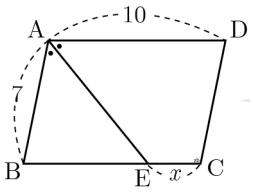

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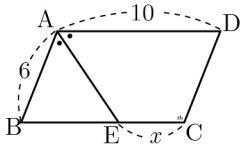

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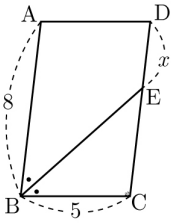

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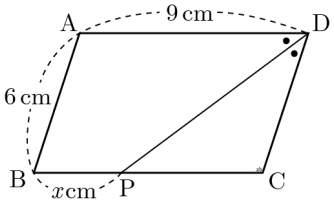

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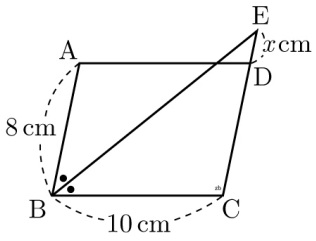

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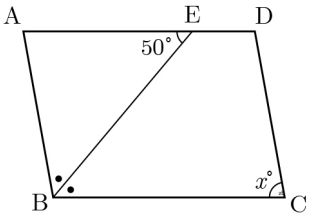

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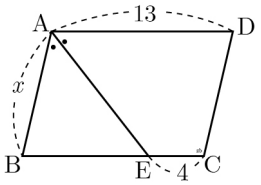

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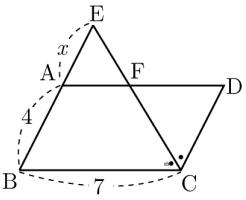

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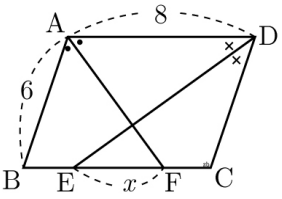

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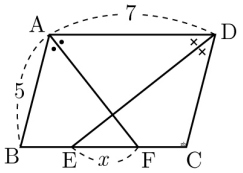
79.



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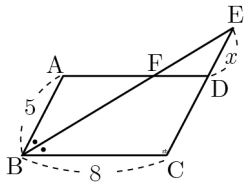

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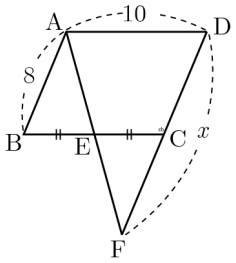

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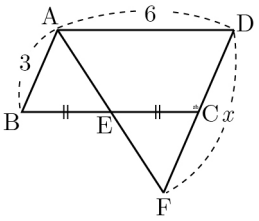

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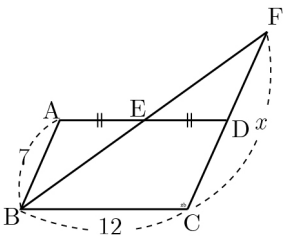

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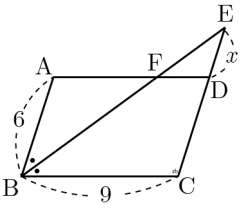

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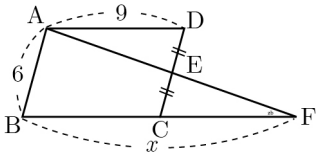

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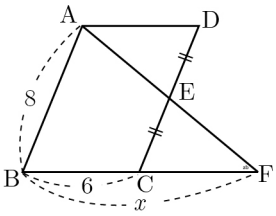

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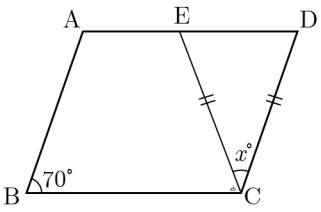

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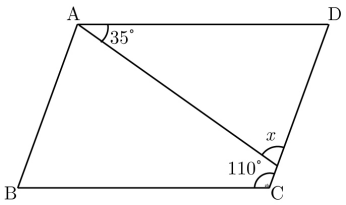
◪ 다음 평행사변형 ABCD에서 $\angle x$의 크기를 구하여라.

88.



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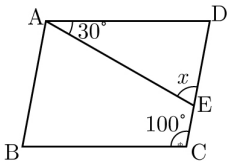

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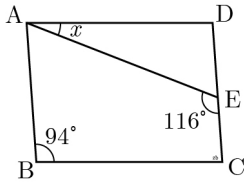

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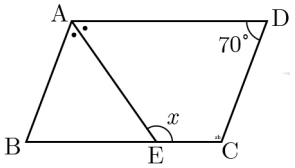

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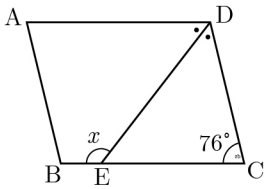

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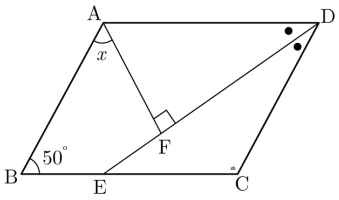

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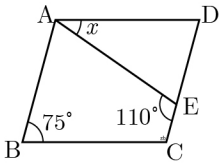

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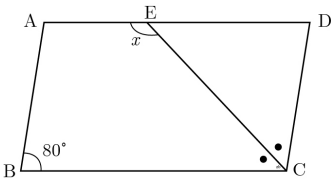

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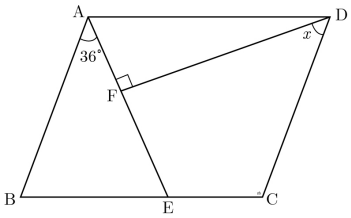

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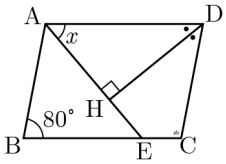

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정답 및 해설

1) $\overline{CD}$

2) $\overline{DO}$

3) $\triangle CDO$

4) $\triangle COB$

5) $\overline{DC}$

6) $\angle D$

7) $\angle BOA$

8) $\angle BCO$

9) 180°

10) O

11) X

12) O

13) X

14) X

15) X

16) O

17) 7

18) 5

19) 108°

⇨ $\angle x = \angle B = 180^\circ \times \frac{3}{5} = 108^\circ$

20) 100°

⇨ $\angle x = \angle A = 180^\circ \times \frac{5}{9} = 100^\circ$

21) 60°

⇨ $\angle x = \angle D = 180^\circ \times \frac{1}{3} = 60^\circ$

22) 100°

⇨ $\angle C = \angle A = 180^\circ \times \frac{5}{9} = 100^\circ$

23) 135°

⇨ $\angle A = 180^\circ \times \frac{3}{4} = 135^\circ$

24) 108°

⇨ $\angle C = \angle A = 180^\circ \times \frac{3}{5} = 108^\circ$

25) $x=3,\ y=5$

26) $x=5, y=8$

27) $x=10, y=6$

28) $x=2,\ y=6$

29) $x=6,\ y=45$

⇨ 평행사변형은 두 쌍의 대변의 길이가 같으므로

$2x+1=3x-5 \quad \therefore x=6$

평행사변형은 두 쌍의 대각의 크기가 같으므로

$y^\circ + 135^\circ = 180^\circ \quad \therefore\ y=45$

30) $x=4,\ y=3$

31) $x=5, y=4$

⇨ $x+8=3x-2$에서 $x=5$

$9=2y+1$에서 $y=4$

32) $x=6,\ y=2$

⇨ $x+5=2x-1$에서 $x=6$

$5y-4=6$에서 $y=2$

33) $x=6,\ y=4$

34) $x=5,\ y=1$

⇨ $2x+1=3x-4,\ x=5$

$y+3=3y+1,\ y=1$

35) $x=3,\ y=1$

⇨ $x+y=2(x-y),\ x+y=2x-2y \quad \therefore\ x=3y$

$x+3=6y,\ 3y+3=6y,\ 3y=3$

$\therefore\ y=1,\ x=3$

36) $x=100,\ y=80$

37) $x=14,\ y=110$

38) $x=120,\ y=60$

39) $x=50,\ y=3$

40) $x=40,\ y=40$

41) $x=60,\ y=75$

42) $x=9,\ y=5$

43) $x=6,\ y=80$

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⇨ $x=\frac{1}{2}\times 12=6$
$\angle ABC=\angle D=180^\circ-(40^\circ+60^\circ)=80^\circ$
$\therefore\ y=80$

44) $x=3\ ,\ y=\frac{5}{2}$

45) $x=7,\ y=4$
⇨ $x+6=13$에서 $x=7$
$2y+1=9$에서 $y=4$

46) $x=8,\ y=98$
⇨ $x=\overline{AB}=8$
$\angle ODC=\angle OBA=42^\circ$(엇각)이므로
$\angle AOD=42^\circ+56^\circ=98^\circ\quad\therefore\ y=98$

47) $x=11,\ y=16$

48) $x=5,\ y=6$

49) $x=6,\ y=5$

50) $x=6,\ y=8$

51) $x=12,\ y=80$
⇨ $x=2\times 6=12$
$\angle ABC=\angle ADC=180^\circ-(40^\circ+60^\circ)=80^\circ$
$\therefore\ y=80$

52) $x=54,\ y=102$
⇨ $\angle OCD=\angle OAB=54^\circ$(엇각) $\therefore\ x=54$
$\triangle OCD$에서 $\angle AOD=48^\circ+54^\circ=102^\circ\quad\therefore\ y=102$

53) $x=6,\ y=1$
⇨ $x=\frac{1}{2}\times 12=6,\ 3y+2=5$에서 $y=1$

54) $x=35,\ y=50$

55) $x=9,\ y=4$

56) $x=16,\ y=12$

57) $x=2,\ y=4$
⇨ 평행사변형의 두 대각선은 서로를 이등분하므로
$3x+2=8,\ 5x-y=6$이다.
$\therefore\ x=2,\ y=4$

58) $\angle x=65^\circ,\ \angle y=65^\circ$

59) $\angle x=55^\circ,\angle y=125^\circ$

60) $\angle x=130^\circ,\angle y=50^\circ$

61) $\angle x=30^\circ,\ \angle y=65^\circ$
⇨ $\overline{AB}//\overline{DC}$이므로 $\angle x=\angle BDC=30^\circ$(엇각)
$\triangle OAB$에서 $\angle AOB=180^\circ-(85^\circ+30^\circ)=65^\circ$이므로
$\angle y=\angle AOB=65^\circ$(맞꼭지각)

62) $\angle x=70^\circ,\ \angle y=110^\circ$
⇨ $\overline{AB}//\overline{DC}$이므로 $\angle x=\angle BAC=70^\circ$(엇각)
$\triangle OCD$에서 $\angle y=70^\circ+40^\circ=110^\circ$

63) $\angle x=30^\circ,\ \angle y=100^\circ$

64) $\angle x=45^\circ,\ \angle y=105^\circ$
⇨ $\overline{AB}//\overline{DC}$이므로 $\angle x=\angle ABD=45^\circ$(엇각)
$\triangle OCD$에서 $\angle y=60^\circ+45^\circ=105^\circ$

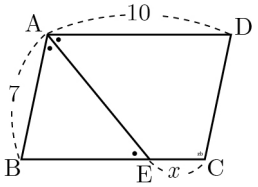
65) $\angle x=75^\circ,\angle y=65^\circ$
⇨ $\angle x=\angle D=75^\circ$
$\angle DAC=\angle ACB=40^\circ$(엇각)이므로
$\angle y=180^\circ-(40^\circ+75^\circ)=65^\circ$

66) $\angle x=45^\circ,\angle y=55^\circ$
⇨ $\angle x=\angle BAC=75^\circ$(엇각)
$\angle B=\angle D=80^\circ$이므로
$\angle y=180^\circ-(45^\circ+80^\circ)=55^\circ$

67) $\angle x=30^\circ,\ \angle y=80^\circ$

68) $\angle x=30^\circ,\ \angle y=70^\circ$

69) 2
⇨ $\angle DAE=\angle AEB$ (엇각)이므로 $\angle BAE=\angle BEA$
$\triangle ABE$는 이등변삼각형이므로 $\overline{AB}=\overline{BE}$
$\therefore x=\overline{BC}-\overline{BE}=8-6=2$

70) 3
⇨ 

$x=\overline{BC}-\overline{BE}=10-7=3$

71) 4
⇨ $\angle AEB=\angle DAE$(엇각)이므로 $\angle BAE=\angle BEA$
$\therefore\ \overline{BE}=\overline{AB}=6$
$\therefore x=\overline{BC}-\overline{BE}=10-6=4$

72) 3
⇨ $\angle ABE=\angle CEB$(엇각)이므로 $\overline{BC}=\overline{CE}$
$x=\overline{CD}-\overline{CE}=8-5=3$

73) 3
⇨ $\overline{AD}//\overline{BC}$이므로 $\angle DPC=\angle ADP$(엇각)
이때 $\angle ADP=\angle CDP$이므로 $\angle CDP=\angle DPC$
따라서 $\triangle PCD$는 이등변삼각형이므로

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$\overline{PC}=\overline{DC}=6(cm)$, $\overline{BP}=\overline{BC}-\overline{PC}$ 이므로 $x=9-6=3$

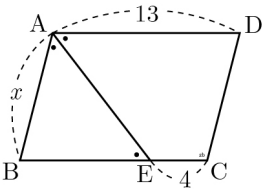
74) 2

⇨ $\overline{AB}//\overline{CE}$이므로 $\angle ABE=\angle CEB$(엇각)
이때 $\angle ABE=\angle CBE$이므로 $\angle CBE=\angle CEB$
따라서 $\triangle BCE$는 이등변삼각형이므로
$\overline{CE}=\overline{BC}=10(cm)$, $\overline{DE}=\overline{CE}-\overline{CD}$이므로
$x=10-8=2$

75) 80

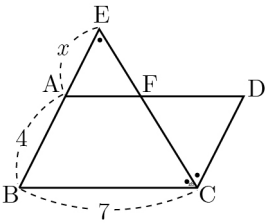
⇨ $\overline{AD}//\overline{BC}$이므로 $\angle EBC=\angle AEB=50^\circ$(엇각)
$\therefore \angle B=2\angle EBC=2\times 50^\circ=100^\circ$
따라서 $\angle B+\angle C=180^\circ$이므로
$\angle C=180^\circ-100^\circ=80^\circ$ $\therefore x=80$

76) 9

⇨ 

$x=\overline{BE}=\overline{BC}-\overline{EC}=13-4=9$

77) 3

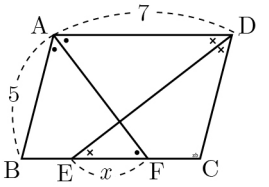
⇨ 

$x=\overline{EB}-\overline{AB}=7-4=3$

78) 4

⇨ $\angle DAF=\angle AFB$ (엇각), $\angle ADE=\angle DEC$ (엇각)이므로
$\triangle ABF$와 $\triangle DEC$는 각각 이등변삼각형이다.
$\therefore \overline{BF}=\overline{AB}$, $\overline{CE}=\overline{CD}$
$\therefore x=\overline{BF}+\overline{CE}-\overline{BC}=6+6-8=4$

79) 3

⇨ 

$x=\overline{BF}+\overline{CE}-\overline{BC}=5+5-7=3$

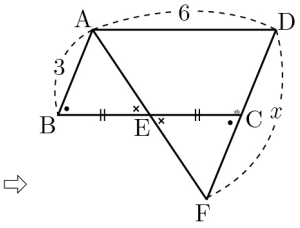
80) 3

⇨ $\angle ABE=\angle BEC$(엇각)이므로 $\angle EBC=\angle BEC$
$\therefore \overline{EC}=\overline{BC}=8$
$\therefore x=\overline{EC}-\overline{DC}=8-5=3$

81) 16

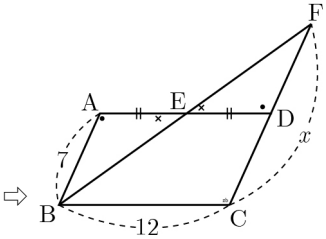
⇨ $\triangle ABE$와 $\triangle FCE$에서 $\angle ABE=\angle FCE$ (엇각),
$\overline{BE}=\overline{CE}$, $\angle AEB=\angle FEC$ (맞꼭지각)이므로
$\triangle ABE\equiv\triangle FCE$ (ASA 합동)
$\therefore \overline{CF}=\overline{BA}$
평행사변형에서 대변의 길이는 같으므로 $\overline{AB}=\overline{DC}$
$\therefore x=\overline{DC}+\overline{CF}=8+8=16$

82) 6

⇨ 

$\triangle ABE\equiv\triangle FCE$(ASA 합동)
$\therefore x=\overline{DC}+\overline{CF}=3+3=6$

83) 14

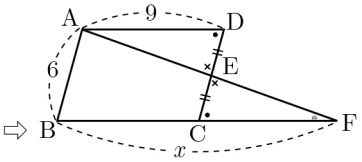
⇨ 

$\triangle ABE\equiv\triangle DFE$(ASA 합동)
$\therefore x=\overline{CD}+\overline{DF}=7+7=14$

84) 3

⇨ $\angle ABE=\angle BEC$(엇각)이므로 $\triangle BCE$는 이등변 삼각형이다.
$\therefore \overline{EC}=\overline{BC}$
$\therefore x=\overline{EC}-\overline{DC}=9-6=3$

85) 18

⇨ 

$\triangle AED\equiv\triangle FEC$(ASA 합동)
$\therefore x=\overline{BC}+\overline{CF}=9+9=18$

86) 12

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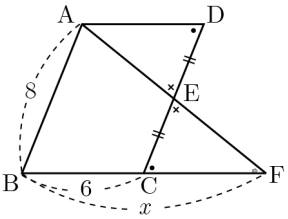

$\triangle AED \equiv \triangle FEC$ (ASA 합동)

$\therefore\ x = \overline{BC} + \overline{CF} = 6 + 6 = 12$

87) 40

⇨ $\angle D = \angle B = 70^\circ$

$\triangle ECD$에서 $\overline{CD} = \overline{CE}$이므로 $\angle DEC = \angle D = 70^\circ$

$\therefore x = 40$

88) 75°

⇨ $\angle x = 180^\circ - 35^\circ - 70^\circ = 75^\circ$

89) 70°

⇨ $\angle D = 180^\circ - 100^\circ = 80^\circ$ 이므로

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

90) 22°

⇨ $\angle D = 94^\circ$ 이므로 $\angle x = 116^\circ - 94^\circ = 22^\circ$

91) 125°

⇨ $\angle BAD = 180^\circ - 70^\circ = 110^\circ$ 이므로

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

따라서 $\angle B = 70^\circ$ 이므로 $\angle x = 55^\circ + 70^\circ = 125^\circ$

92) 128°

⇨ $\angle ADC = 180^\circ - 76^\circ = 104^\circ$ 이므로

$\angle EDC = 104^\circ \times \frac{1}{2} = 52^\circ$

$\therefore\ \angle x = 52^\circ + 76^\circ = 128^\circ$

93) 65°

94) 35°

⇨ $\angle D = \angle B = 75^\circ$ 이므로

$\triangle AED$에서 $\angle x = 110^\circ - 75^\circ = 35^\circ$

95) 130°

96) 54°

97) 50°

⇨ $\angle ADC = \angle ABC = 80^\circ$ 이므로

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

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

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