◇「콘텐츠산업 진흥법 시행령」제33조에 의한 표시
1) 제작연월일 : 2016-08-25
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.

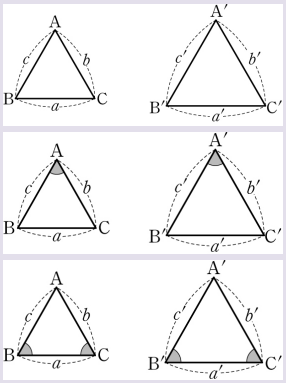
계산시 참고사항

1. 삼각형의 닮음조건

1) SSS 닮음: 세 쌍의 대응하는 변의 길이의 비가 같다.
⇨ $a:a'=b:b'=c:c'$

2) SAS 닮음: 두 쌍의 대응변의 길이의 비가 같고 그 끼인 각의 크기가 같다.
⇨ $a:a'=c:c'$, $\angle B=\angle B'$

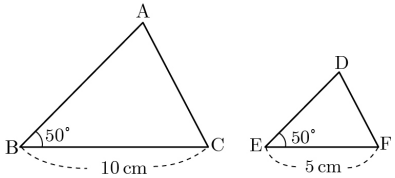
3) AA 닮음: 두 쌍의 대응하는 각의 크기가 같다.
⇨ $\angle A=\angle A'$, $\angle B=\angle B'$



참고
◉ 삼각형의 합동조건
- 세 쌍의 대응변의 길이가 각각 같을 때(SSS 합동)
- 두 쌍의 대응변의 길이가 각각 같고, 그 끼인각의 크기가 같을 때(SAS 합동)
- 한 쌍의 대응변의 길이가 같고, 그 양 끝 각의 크기가 각각 같을 때(ASA 합동)

삼각형의 닮음조건

◪ 다음 그림에서 △ABC∽△DEF가 되기 위해 추가 되야 할 조건으로 옳은 것에는 ○표, 옳지 않은 것에는 ×표를 하여라.



1. $\angle A=65^\circ$, $\angle D=65^\circ$ ( )

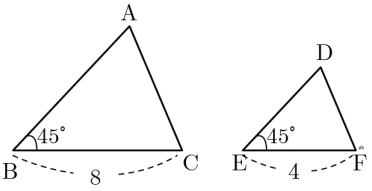
2. $\angle C=55^\circ$, $\angle D=65^\circ$ ( )

3. $\overline{AC}=8cm$, $\overline{DF}=4cm$ ( )

4. $\overline{AB}=10cm$, $\overline{DF}=5cm$ ( )

5. $\overline{AB}=12cm$, $\overline{DE}=6cm$ ( )

◪ 다음 그림에서 △ABC∽△DEF가 되기 위해 추가 되야 할 조건으로 옳은 것에는 ○표, 옳지 않은 것에는 ×표를 하여라.



6. $\overline{AC}=\overline{DE}$ ( )

7. $\angle A=65^\circ$, $\angle D=70^\circ$ ( )

8. $\overline{AC}=6$, $\overline{DF}=3$ ( )

9. $\overline{AB}=7$, $\overline{DF}=3.5$ ( )

10. $\angle A=70^\circ$, $\angle F=65^\circ$ ( )

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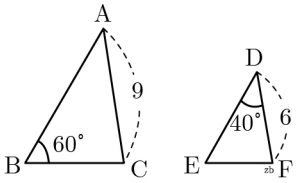
◪ **다음 조건이 주어질 때, 다음 그림에서 $\triangle ABC \backsim \triangle DEF$ 이면 O표, 아니면 X표를 하여라.**

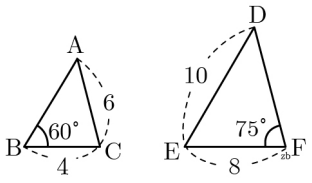


11. $\overline{AB}=12,\ \overline{DE}=8$ ( )

12. $\overline{AB}=15,\ \angle A=40^\circ$ ( )

13. $\angle C=80^\circ,\ \angle E=60^\circ$ ( )

◪ **다음 조건이 주어질 때, 다음 그림에서 $\triangle ABC \backsim \triangle DEF$ 이면 O표, 아니면 X표를 하여라.**



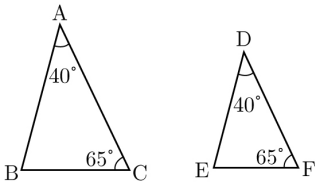
14. $\overline{AB}=5,\ \overline{DF}=12$ ( )

15. $\overline{AB}=5,\ \angle D=45^\circ$ ( )

16. $\angle A=30^\circ,\ \angle E=60^\circ$ ( )

◪ **다음 두 삼각형에 대하여 풀이의 □안에 알맞은 것을 써 넣어라.**

17.



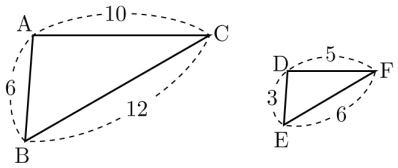
△ABC와 △DEF에서

$\angle A=$ □ $=$ □, □ $=\angle F=65^\circ$

따라서 두 쌍의 대응하는 각의 크기가 각각 같으므로

$\triangle ABC \backsim \triangle DEF$ (□ 닮음)

18.



△ABC와 △DEF에서

$\overline{AB}:\overline{DE}=6:3=$ □ : □

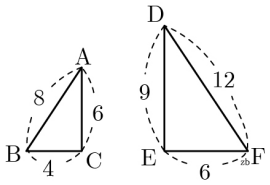
$\overline{BC}:$ □ $=12:$ □ $=$ □ : □

□ $:\overline{DF}=$ □ $:5=$ □ : □

따라서 대응하는 세 쌍의 변의 길이의 비가 같으므로

$\triangle ABC \backsim \triangle DEF$ (□ 닮음)

19.



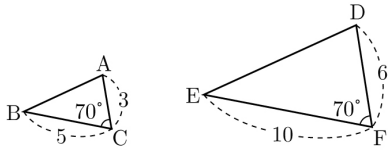
$\overline{AB}:\overline{DF}=8:12=2:3$

$\overline{BC}:\overline{FE}=4:$ □ $=$ □ : □

$\overline{AC}:\overline{DE}=$ □ $:9=$ □ : □

$\therefore \triangle ABC \backsim$ □ (□닮음)

20.



△ABC와 △DEF에서

□ $:\overline{EF}=5:10=$ □ : □

$\overline{AC}:$ □ $=3:6=$ □ : □

$\angle C=$ □ $=70^\circ$

따라서 두 쌍의 대응하는 변의 길이의 비가 같고, 그 끼인 각의 크기가 같으므로 $\triangle ABC \backsim \triangle DEF$ (□ 닮음)

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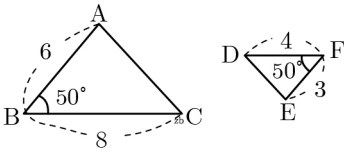
21.



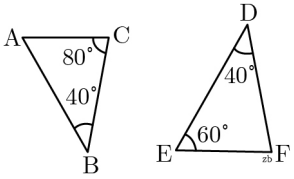
$\overline{AB} : \overline{EF} = 6 : 3 = 2 : 1$

$\overline{BC} : \overline{FD} = \square : 4 = \square : \square$

$\angle B = \square = 50^\circ$

$\therefore \triangle ABC \backsim \square$ (□닮음)

22.



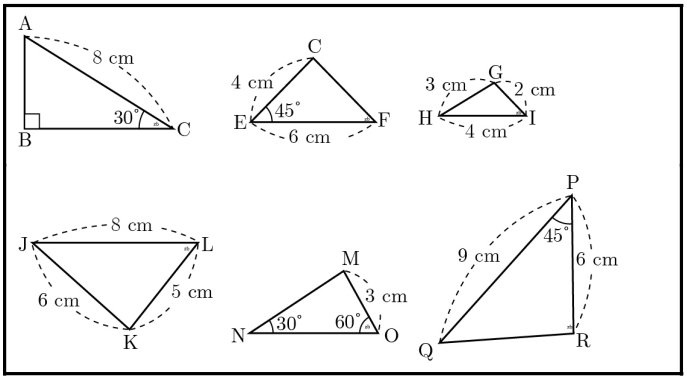
$\triangle DEF$에서

$\angle F = 180^\circ - (\square + \square) = \square$

$\angle B = \square = 40^\circ$, $\angle C = \square = 80^\circ$

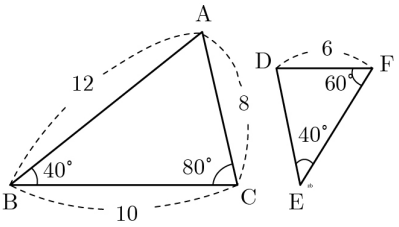
$\therefore \triangle ABC \backsim \square$ (□닮음)

23. 다음 삼각형에서 닮은 도형을 있는 대로 찾아 기호를 사용하여 나타내고, 닮음조건을 쓰시오.

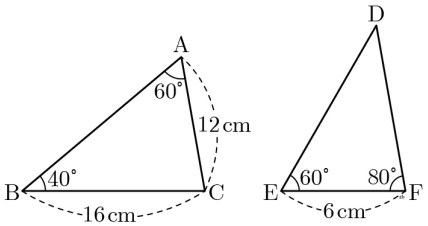


◪ 다음 물음에 답하여라.

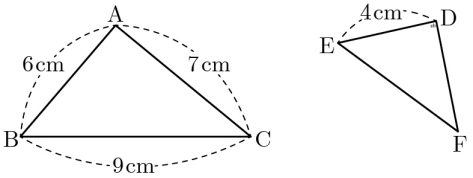
24. 다음 그림과 같은 두 삼각형에서 $\overline{EF}$의 길이를 구하여라.



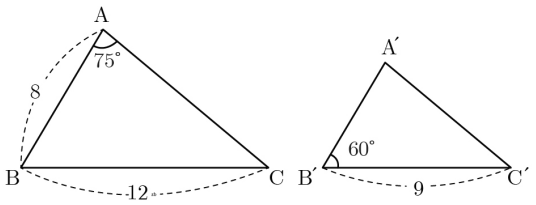
25. 다음 그림과 같은 두 삼각형에서 $\overline{DF}$의 길이를 구하여라.



26. 다음 그림에서 $\triangle ABC \backsim \triangle DEF$일 때, $\overline{EF}$의 길이를 구하여라.



27. 다음 그림에서 $\triangle ABC \backsim \triangle A'B'C'$일 때, $\overline{A'B'}$의 길이를 구하여라.



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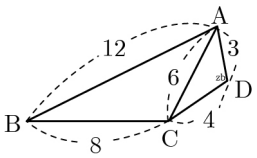
삼각형의 닮음조건의 활용

◪ 다음 그림에 대하여 □안에 알맞은 것을 써넣어라.

28.



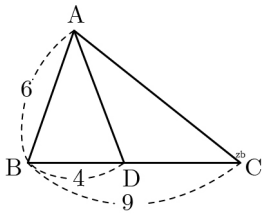
$\overline{AB} : \overline{AC} = 12 : 6 = 2 : 1$

$\overline{BC} : \overline{CD} = \square : 4 = \square : \square$

$\overline{AC} : \overline{AD} = 6 : \square = \square : \square$

$\therefore \triangle ABC \backsim \square$ (□닮음)

29.



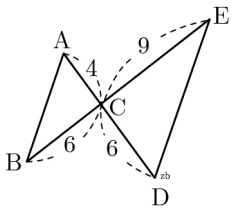
$\overline{AB} : \overline{DB} = 6 : 4 = 3 : 2$

$\overline{BC} : \overline{BA} = 9 : \square = \square : \square$

□는 공통

$\therefore \triangle ABC \backsim \square$ (□닮음)

30.



[풀이] $\overline{AC} : \overline{DC} = 4 : 6 = 2 : 3$

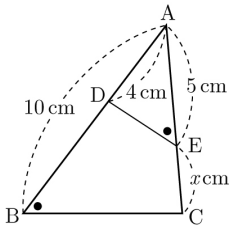
$\overline{BC} : \overline{EC} = \square : 9 = \square : \square$

$\angle ACB = \square$ (맞꼭지각)

$\therefore \triangle ABC \backsim \square$ (□닮음)

◪ 다음 그림에서 x의 값을 구하여라.

31.



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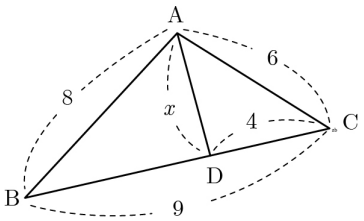

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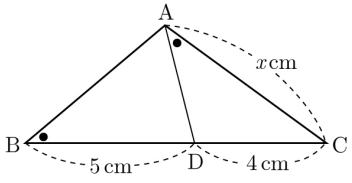

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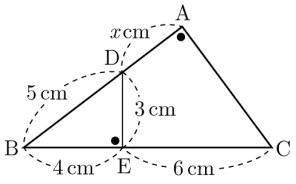

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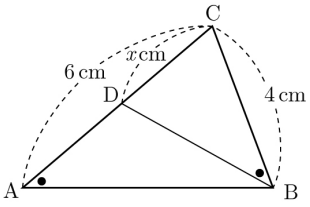

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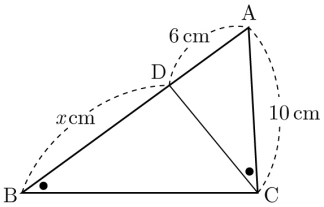
36.



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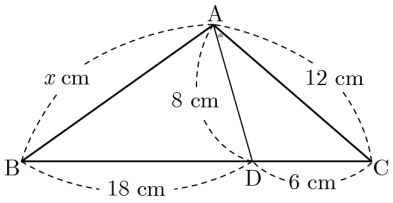

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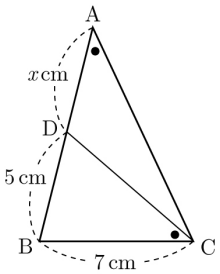

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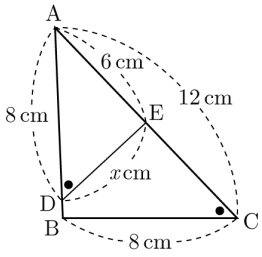

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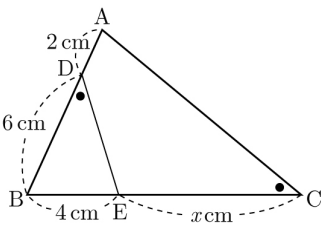

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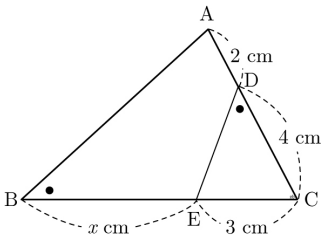

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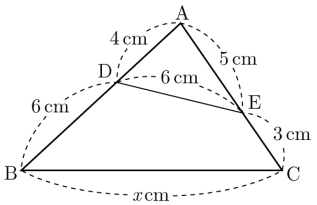

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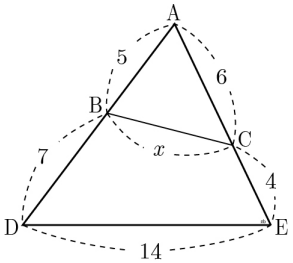

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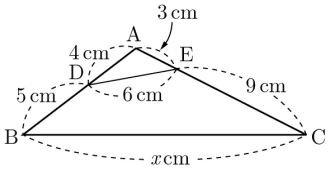

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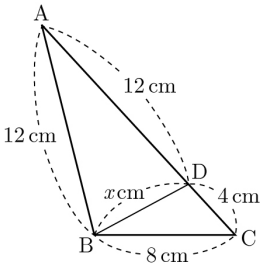

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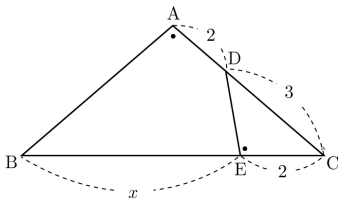
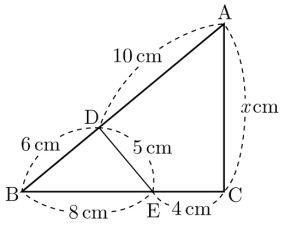
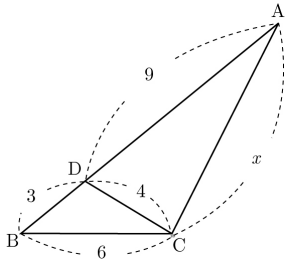
46.



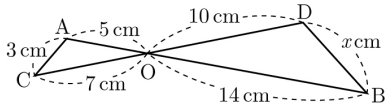
47.



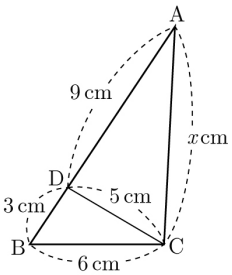
48.



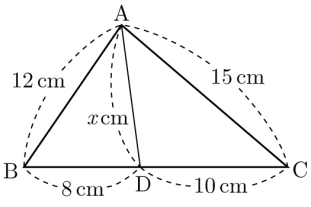
49.



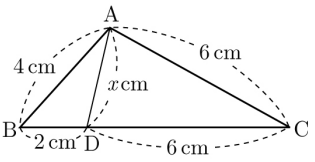
50.



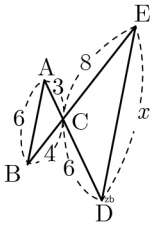
51.



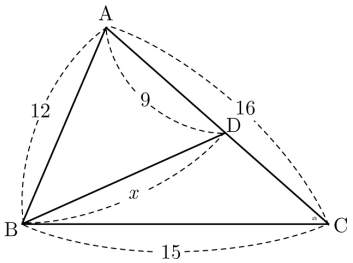
52.



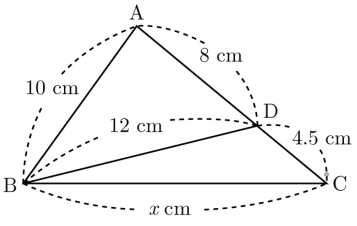
53.



54.



55.



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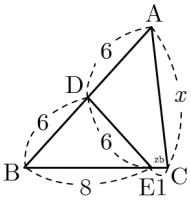
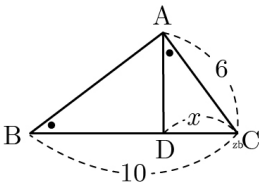
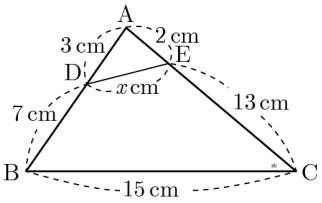
56.



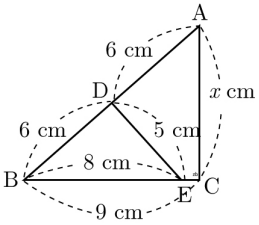
57.



58.

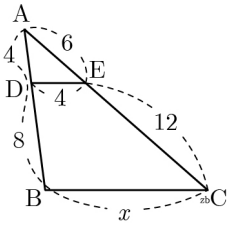


59.

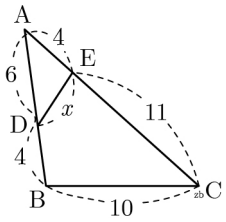


◪ 다음 그림에서 $\triangle ABC$와 닮음이 되는 삼각형을 찾고, x의 값을 구하여라.

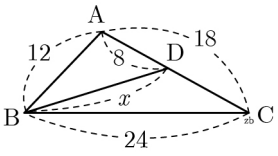
60.



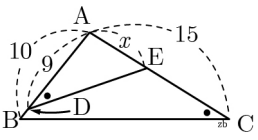
61.



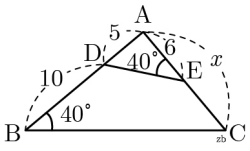
62.



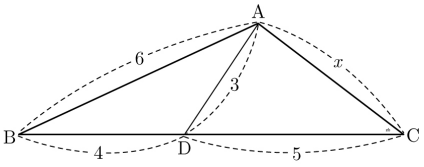
63.



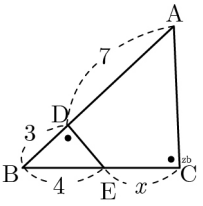
64.



65.



66.



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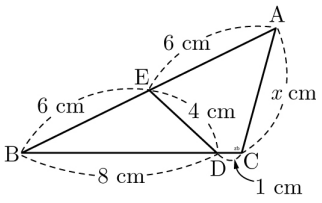
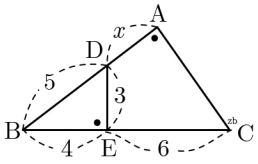
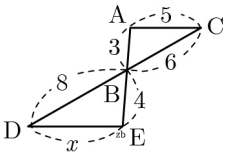
67.



68.

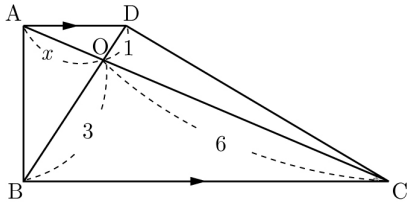


69.

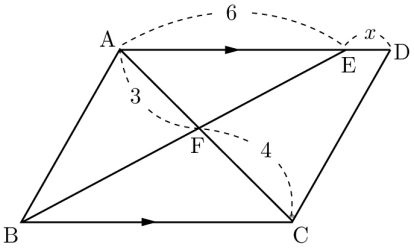


◪ 다음 그림에서 x의 값을 구하여라.

70.

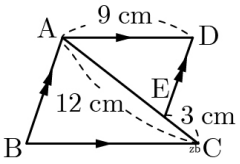


71.

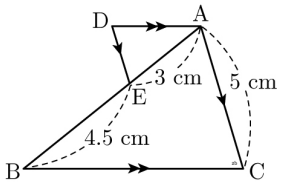


◪ 다음 물음에 답하여라.

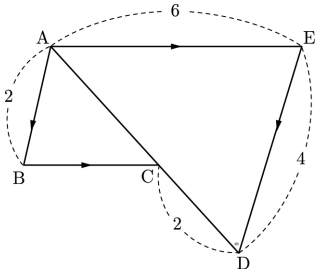
72. 다음 그림에서 $\overline{AD}//\overline{BC}$, $\overline{AB}//\overline{DE}$일 때, $\overline{BC}$의 길이를 구하여라.



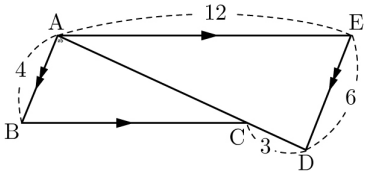
73. $\overline{DA}//\overline{BC}$, $\overline{AC}//\overline{DE}$일 때, $\overline{DE}$의 길이를 구하여라.



74. 다음 그림과 같이 $\overline{AB}//\overline{DE}$, $\overline{AE}//\overline{BC}$이고, $\overline{AB}=2$, $\overline{CD}=2$, $\overline{DE}=4$, $\overline{AE}=6$일 때, $\triangle ABC$의 둘레의 길이를 구하여라.



75. 다음 그림에서 $\overline{AB}//\overline{ED}$, $\overline{AE}//\overline{BC}$이고, $\overline{AB}=4$, $\overline{CD}=3$, $\overline{DE}=6$, $\overline{AE}=12$일 때, $\overline{AC}+\overline{BC}$의 값을 구하여라.



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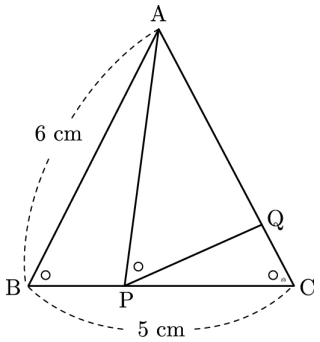
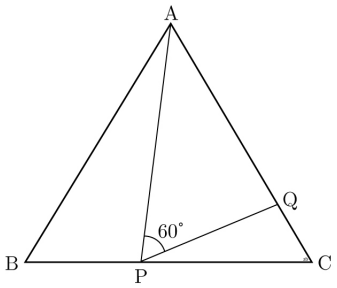
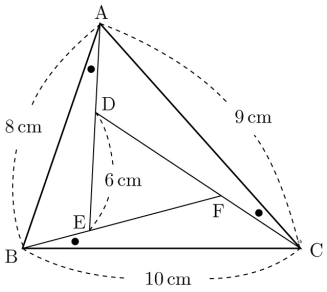
76. $\overline{AB}=\overline{AC}$인 이등변삼각형 ABC에서 $\overline{AB}=6\text{cm}$, $\overline{BC}=5\text{cm}$이고, $\overline{BP}:\overline{PC}=2:3$, $\angle B=\angle APQ$일 때, $\overline{AQ}$의 길이를 구하여라.



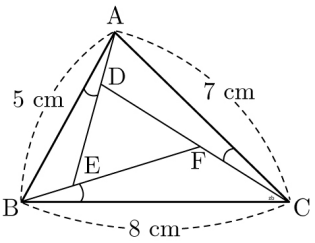
77. 정삼각형 $\triangle ABC$에서 $\overline{BP}:\overline{PC}=2:3$이고, $\angle APQ=60^\circ$일 때, $\overline{CQ}:\overline{QA}$의 값을 구하여라.



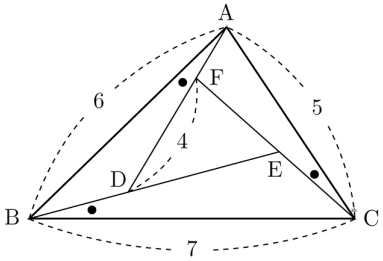
78. $\triangle ABC$에서 $\angle BAE=\angle CBF=\angle ACD$일 때, $\overline{EF}$의 길이를 구하여라.



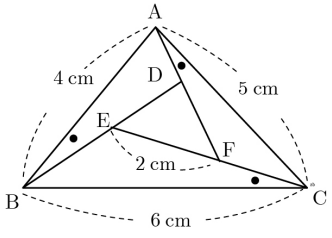
79. $\triangle ABC$에서 $\angle BAE=\angle CBF=\angle ACD$이고 $\overline{AB}=5\text{cm}$, $\overline{BC}=8\text{cm}$, $\overline{CA}=7\text{cm}$일 때, $\overline{DE}:\overline{EF}$를 구하여라.



80. 다음 그림의 $\triangle ABC$에서 $\angle BAD=\angle CBE=\angle ACF$이고 $\overline{FD}=4$일 때, $\triangle DEF$의 둘레의 길이를 구하여라.



81. $\triangle ABC$에서 $\overline{AB}=4\text{cm}$, $\overline{BC}=6\text{cm}$, $\overline{CA}=5\text{cm}$, $\overline{EF}=2\text{cm}$이고, $\angle ABD=\angle BCE=\angle CAF$일 때, $\overline{DE}$의 길이를 구하여라.



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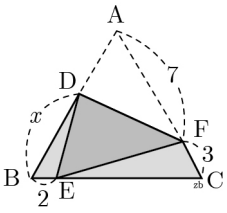
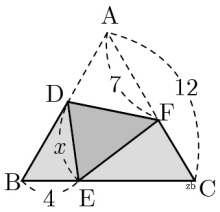
◪ 다음 그림과 같이 정삼각형 ABC를 접었을 때, x의 값을 구하여라.

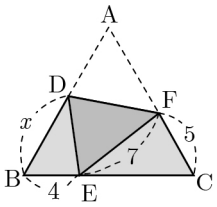
82.



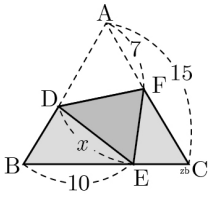
83.



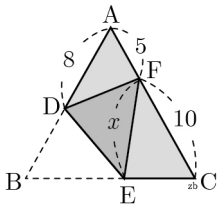
84.



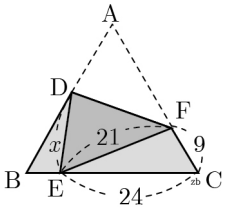
85.



86.

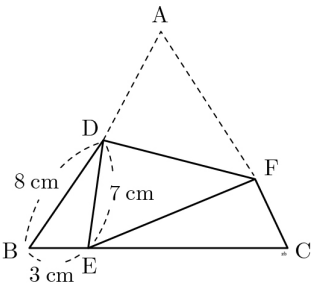


87.

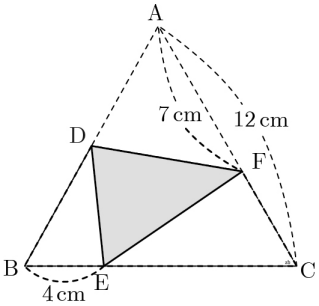


◪ 다음 물음에 답하여라.

88. 다음 그림과 같이 정삼각형 ABC를 $\overline{DF}$를 접는 선으로 하여 꼭짓점 A가 $\overline{BC}$ 위의 점 E에 오도록 접었다. $\overline{BE}=3\text{cm}$, $\overline{DE}=7\text{cm}$, $\overline{DB}=8\text{cm}$일 때, $\overline{AF}$의 길이를 구하여라.



89. 정삼각형 ABC에서 $\overline{DF}$를 접는 선으로 하여 꼭짓점 A가 $\overline{BC}$위의 점 E에 오도록 접었을 때, $\overline{AC}=12\text{cm}$, $\overline{AF}=7\text{cm}$, $\overline{BE}=4\text{cm}$이다. $\overline{DE}$의 길이를 구하여라.



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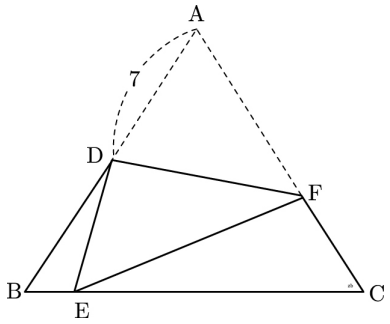
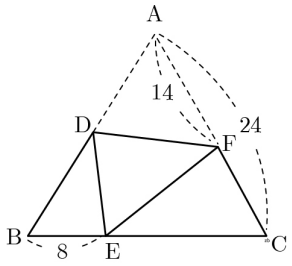
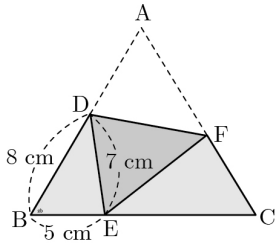
90. 한 변의 길이가 15cm인 정삼각형의 꼭짓점 A가 $\overline{BC}$ 위의 점 E에 겹치게 접었다. $\overline{BE}$가 3cm일 때, $\overline{AF}$의 길이를 구하여라.



91. 정삼각형 모양의 종이를 꼭짓점 A가 $\overline{BC}$ 위의 점 E와 만나도록 접은 것이다. $\overline{AF}=14$, $\overline{BE}=8$, $\overline{AC}=24$일 때, $\overline{AD}$의 길이를 구하여라.



92. 다음 그림과 같이 정삼각형 ABC에서 $\overline{DF}$를 접는 선으로 하여 꼭짓점 A가 $\overline{BC}$ 위의 점 E에 오도록 접었을 때, $\overline{AF}$의 길이를 구하여라.



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정답 및 해설

1) ○
⇨ AA 닮음

2) ×

3) ×

4) ×

5) ○
⇨ SAS 닮음

6) ×

7) ×

8) ×

9) ×

10) ○

11) X

12) X

13) O
⇨ $\angle B=\angle E=60^\circ$
$\angle C=\angle F=180^\circ-(40^\circ+60^\circ)=80^\circ$
∴ $\triangle ABC\backsim\triangle DEF$(AA 닮음)

14) O
⇨ $\overline{AB}:\overline{DE}=\overline{BC}:\overline{EF}=\overline{AC}:\overline{DF}=1:2$
∴ $\triangle ABC\backsim\triangle DEF$(SSS 닮음)

15) O
⇨ $\overline{AB}:\overline{DE}=\overline{BC}:\overline{EF}=1:2$
$\angle B=\angle E=180^\circ-(45^\circ+75^\circ)=60^\circ$
∴ $\triangle ABC\backsim\triangle DEF$(SAS 닮음)

16) X

17) $\angle D$, 40°, $\angle C$, AA

18) 2, 1, $\overline{EF}$, 6, 2, 1, $\overline{AC}$, 10, 2, 1, SSS

19) 6, 2, 3, 6, 2, 3, △DFE, SSS

20) $\overline{BC}$, 1, 2, $\overline{DF}$, 1, 2, $\angle F$, SAS

21) 8, 2, 1, $\angle F$, △EFD, SAS

22) $40^\circ, 60^\circ, 80^\circ$, $\angle D$, $\angle F$, △EDF, AA

23) $\triangle CEF\backsim\triangle RPQ$(SAS 닮음)
$\triangle ABC\backsim\triangle OMN$(AA 닮음)
⇨ $\overline{CE}:\overline{EF}=\overline{RP}:\overline{PQ}=2:3$이고, $\angle E=\angle P=45^\circ$이므로
$\triangle CEF\backsim\triangle RPQ$(SAS 닮음)
$\angle A=\angle O=60^\circ$, $\angle C=\angle N=30^\circ$

24) 9
⇨ $\triangle ABC\backsim\triangle FED$(AA 닮음)이고, 닮음비는 $8:6=4:3$이다. 이 때, $\overline{EF}$의 길이를 구하면 다음과 같다.
$4:3=12:\overline{EF}$, $4\overline{EF}=36$ ∴ $\overline{EF}=9$

25) 8cm

26) 6cm

27) 6
⇨ 두 삼각형의 닮음비가 $12:9=4:3$이므로
$8:\overline{A'B'}=4:3$이므로 $\overline{A'B'}=6$이다.

28) 8, 2, 1, 3, 2, 1, △ACD, SSS

29) 6, 3, 2, $\angle B$, △DBA, SAS

30) 6, 2, 3, $\angle DCE$, △DEC, SAS

31) 3
⇨ △ABC와 △AED에서
$\angle ABC=\angle AED$, $\angle A$는 공통
따라서 $\triangle ABC\backsim\triangle AED$(AA 닮음)이므로
$(5+x):4=10:5$
$5(5+x)=40$, $5+x=8$ ∴ $x=3$

32) $\frac{16}{3}$

33) 6
⇨ △ABC와 △DAC에서
$\angle ABC=\angle DAC$, $\angle C$는 공통
따라서 $\triangle ABC\backsim\triangle DAC$(AA 닮음)이므로
$(5+4):x=x:4$, $x^2=36$ ∴ $x=6(\because x>0)$

34) 3
⇨ △ABC와 △EBD에서
$\angle BAC=\angle BED$, $\angle B$는 공통
따라서 $\triangle ABC\backsim\triangle EBD$(AA 닮음)이므로
$(5+x):4=(4+6):5$
$5(5+x)=40$, $5+x=8$ ∴ $x=3$

35) $\frac{8}{3}$
⇨ △ABC와 △BDC에서
$\angle CAB=\angle CBD$, $\angle C$는 공통
따라서 $\triangle ABC\backsim\triangle BDC$(AA 닮음)이므로

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$6:4=4:x$ $\therefore x=\frac{8}{3}$

36) $\frac{32}{3}$

⇨ △ABC와 △ACD에서
∠ABC = ∠ACD, ∠A는 공통
따라서 △ABC∽△ACD(AA 닮음)이므로
$(x+6):10=10:6$
$6(x+6)=100,\ 6x=64$ $\therefore x=\frac{32}{3}$

37) 16cm

38) $\frac{24}{5}$

⇨ △ABC와 △CBD에서
∠BAC = ∠BCD, ∠B는 공통
따라서 △ABC∽△CBD(AA 닮음)이므로
$(x+5):7=7:5$
$5(x+5)=49,\ 5x=24$ $\therefore x=\frac{24}{5}$

39) $\frac{16}{3}$

⇨ △ABC와 △AED에서
∠ACB = ∠ADE, ∠A는 공통
따라서 △ABC∽△AED(AA 닮음)이므로
$8:x=12:8$ $\therefore x=\frac{16}{3}$

40) 8

⇨ △ABC와 △EBD에서
∠ACB = ∠EDB, ∠B는 공통
따라서 △ABC∽△EBD(AA 닮음)이므로
$(4+x):6=(2+6):4$
$4(4+x)=48,\ 4+x=12$ $\therefore x=8$

41) 5

⇨ △ABC∽△EDC(AA 닮음)이다.
이 때, $\overline{AC}:\overline{EC}=\overline{BC}:\overline{DC}$가 성립하므로
$6:3=(x+3):4 \Rightarrow x+3=8 \Rightarrow \therefore x=5$

42) 12

⇨ △ABC와 △AED에서
$\overline{AB}:\overline{AE}=\overline{AC}:\overline{AD}=2:1$, ∠A는 공통
∴△ABC∽△AED(SAS 닮음)
따라서 $\overline{BC}:\overline{ED}=2:1$이므로
$x:6=2:1$ $\therefore x=12$

43) 7

⇨ △ABC와 △AED에서 $\overline{AB}:\overline{AE}=\overline{AC}:\overline{AD}=1:2$,
∠A가 공통이므로 △ABC∽△AED(SAS 닮음)이다.
따라서 $x:14=1:2,\ x=7$이다.

44) 18

⇨ △ABC와 △AED에서
$\overline{AB}:\overline{AE}=\overline{AC}:\overline{AD}=3:1$, ∠A는 공통
∴△ABC∽△AED(SAS 닮음)
따라서 $\overline{BC}:\overline{ED}=3:1$이므로
$x:6=3:1$ $\therefore x=18$

45) 6

⇨ △ABC와 △BDC에서
$\overline{AC}:\overline{BC}=\overline{BC}:\overline{DC}=2:1$, ∠C는 공통
∴△ABC∽△BDC(SAS 닮음)
따라서 $\overline{AB}:\overline{BD}=2:1$이므로
$12:x=2:1$ $\therefore x=6$

46) $\frac{11}{2}$

⇨ ∠C는 공통, ∠A = ∠E
△ABC∽△EDC(AA 닮음)이므로
$3:(2+x)=2:5$ $\therefore\ x=\frac{11}{2}$

47) 10

⇨ △ABC와 △EBD에서
$\overline{AB}:\overline{EB}=\overline{BC}:\overline{BD}=2:1$, ∠B는 공통
∴△ABC∽△EBD(SAS 닮음)
따라서 $\overline{AC}:\overline{ED}=2:1$이므로
$x:5=2:1$ $\therefore x=10$

48) 8

⇨ ∠B는 공통, $\overline{BD}:\overline{BC}=\overline{BC}:\overline{BA}$
△ABC∽△CBD(SAS 닮음)이므로
$3:6=4:x$ $\therefore\ x=8$

49) 6

⇨ △ACO와 △DBO에서
$\overline{AO}:\overline{DO}=\overline{CO}:\overline{BO}=1:2$,
∠AOC = ∠DOB(맞꼭지각)
∴△ACO∽△DBO(SAS 닮음)
따라서 $\overline{AC}:\overline{DB}=1:2$이므로
$3:x=1:2$ $\therefore x=6$

50) 10

⇨ △ABC와 △CBD에서
$\overline{AB}:\overline{CB}=\overline{BC}:\overline{BD}=2:1$, ∠B는 공통
∴△ABC∽△CBD(SAS 닮음)
따라서 $\overline{AC}:\overline{CD}=2:1$이므로
$x:5=2:1$ $\therefore x=10$

51) 10

⇨ △ABC와 △DBA에서
$\overline{AB}:\overline{DB}=\overline{BC}:\overline{BA}=3:2$, ∠B는 공통

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$\therefore \triangle ABC \backsim \triangle DBA$(SAS 닮음)
따라서 $\overline{AC}:\overline{DA}=3:2$이므로
$15:x=3:2$ $\therefore x=10$

52) 3
⇨ $\triangle ABC$와 $\triangle DBA$에서
$\overline{AB}:\overline{DB}=\overline{BC}:\overline{BA}=2:1$, $\angle B$는 공통
$\therefore \triangle ABC \backsim \triangle DBA$(SAS 닮음)
따라서 $\overline{AC}:\overline{DA}=2:1$이므로
$6:x=2:1$ $\therefore x=3$

53) 12
⇨ $\triangle ABC \backsim \triangle DEC$(SAS 닮음)이고
닮음비는 $\overline{AC}:\overline{DC}=1:2$이므로
$6:x=1:2$ $\therefore x=12$

54) $\frac{45}{4}$
⇨ $\angle A$는 공통, $\overline{AD}:\overline{AB}=\overline{AB}:\overline{AC}=3:4$ 이므로
$\triangle ABD \backsim \triangle ACB$(SAS 닮음)
$\overline{BD}:\overline{CB}=3:4$
$x:15=3:4$ $\therefore x=\frac{45}{4}$

55) 15cm
⇨ $\overline{AB}:\overline{AC}=\overline{AD}:\overline{AB}=4:5$, $\angle A$는 공통이므로
$\triangle ADB \backsim \triangle ABC$(SAS 닮음)이므로
$12:x=4:5$
$\therefore x=15$

56) 9
⇨ $\triangle ABC \backsim \triangle EBD$(SAS 닮음)이고
닮음비는 $\overline{AB}:\overline{EB}=3:2$이므로
$x:6=3:2$ $\therefore x=9$

57) $\frac{18}{5}$
⇨ $\triangle ABC \backsim \triangle DAC$(AA 닮음)이고
닮음비는 $\overline{BC}:\overline{AC}=5:3$이므로
$6:x=5:3$ $\therefore x=\frac{18}{5}$

58) 3

59) $\frac{15}{2}$cm
⇨ $\triangle BED$와 $\triangle BAC$에서 $\overline{AB}:\overline{BE}=\overline{BC}:\overline{BD}=3:2$,
$\angle B$는 공통이므로 $\triangle BED \backsim \triangle BAC$(SAS 닮음)이다.
$\overline{AC}:\overline{DE}=3:2$이므로 $\overline{AC}:5=3:2$ $\therefore \overline{AC}=\frac{15}{2}$cm

60) $\triangle ABC \backsim \triangle ADE$ (SAS 닮음), 12
⇨ 닮음비는 $\overline{AB}:\overline{AD}=3:1$이므로
$x:4=3:1$ $\therefore x=12$

61) $\triangle ABC \backsim \triangle AED$ (SAS 닮음), 4
⇨ 닮음비는 $\overline{AB}:\overline{AE}=5:2$이므로
$10:x=5:2$ $\therefore x=4$

62) $\triangle ABC \backsim \triangle ADB$ (SAS 닮음), 16
⇨ 닮음비는 $\overline{AB}:\overline{AD}=3:2$이므로
$24:x=3:2$ $\therefore x=16$

63) $\triangle ABC \backsim \triangle AED$ (AA 닮음), 6
⇨ 닮음비는 $\overline{AC}:\overline{AD}=5:3$이므로
$10:x=5:3$ $\therefore x=6$

64) $\triangle ABC \backsim \triangle AED$ (AA 닮음), $\frac{25}{2}$
⇨ 닮음비는 $\overline{AB}:\overline{AE}=5:2$이므로
$x:5=5:2$ $\therefore x=\frac{25}{2}$

65) $\triangle ABC \backsim \triangle DBA$(SAS닮음), $\frac{9}{2}$
⇨ $\triangle ABC \backsim \triangle DBA$(SAS닮음)이고, 닮음비는 3:2이다. 이때, $\overline{AC}$의 길이를 구하면 $x:3=3:2$, $x=\frac{9}{2}$이다.

66) $\triangle ABC \backsim \triangle EBD$ (AA 닮음), $\frac{7}{2}$
⇨ 닮음비는 $\overline{AB}:\overline{EB}=5:2$이므로
$(4+x):3=5:2$ $\therefore x=\frac{7}{2}$

67) $\triangle ABC \backsim \triangle DBE$ (SAS 닮음), 6
⇨ $\angle B$는 공통이고, $\overline{AB}:\overline{DB}=\overline{BC}:\overline{BE}=3:2$이므로
$\triangle ABC \backsim \triangle DBE$ (SAS 닮음)이다.
$3:2=x:4$ $\therefore x=6$

68) $\triangle ABC \backsim \triangle EBD$ (AA 닮음), 3
⇨ 닮음비는 $\overline{BC}:\overline{BD}=2:1$이므로
$(x+5):4=2:1$ $\therefore x=3$

69) $\triangle ABC \backsim \triangle EBD$(SAS 닮음), $\frac{20}{3}$
⇨ $\triangle ABC \backsim \triangle EBD$(SAS 닮음)
닮음비는 $\overline{AB}:\overline{EB}=3:4$이므로
$5:x=3:4$ $\therefore x=\frac{20}{3}$

70) 2
⇨ $\angle AOD=\angle COB$, $\angle DAO=\angle BCO$
$\triangle AOD \backsim \triangle COB$(AA 닮음)이므로
$1:3=x:6$ $\therefore x=2$

71) 2

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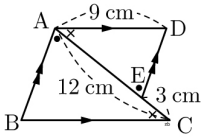
⇨ $\angle AFE=\angle CFB$, $\angle EAF=\angle BCF$
$\triangle AFE\backsim\triangle CFB$(AA 닮음)이므로
$3:4=6:(6+x)$ $\therefore\ x=2$

72) 12 cm



⇨
$\triangle ABC\backsim\triangle EDA$(AA 닮음)이고
닮음비는 $\overline{AC}:\overline{EA}=4:3$이므로
$\overline{BC}:9=4:3$ $\therefore\ \overline{BC}=12(\text{cm})$

73) 2cm

⇨ $\angle ABC=\angle EAD$(엇각)이고, $\overline{DE}$의 연장선과 $\overline{BC}$와 만나는 점을 F라 하면 □ADFC는 평행사변형이므로 $\angle C=\angle D$이다.
즉, $\triangle ABC\backsim\triangle EAD$(AA 닮음)이다.
따라서 $\overline{AC}:\overline{DE}=\overline{AB}:\overline{AE}$가 성립하므로
$5:\overline{DE}=7.5:3$ $\therefore\ \overline{DE}=2\text{cm}$

74) 7

⇨ $\angle BAC=\angle ADE$(엇각), $\angle ACB=\angle DAE$(엇각)이므로
$\triangle ABC\backsim\triangle DEA$(AA닮음)이다.
이 때, $\overline{AB}:\overline{DE}=\overline{BC}:\overline{EA}$이므로 $2:4=\overline{BC}:6$, $\overline{BC}=3$이고,
$\overline{AB}:\overline{DE}=\overline{AC}:\overline{DA}$이므로 $2:4=\overline{AC}:(\overline{AC}+2)$,
$\overline{AC}=2$이다. 따라서 $\triangle ABC$의 둘레의 길이는 7이다.

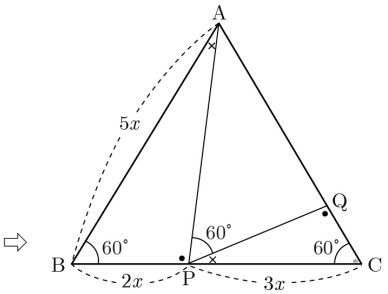
75) 14

⇨ $\overline{AB}//\overline{ED}$이므로 $\angle BAC=\angle EDA$(엇각)이고,
$\overline{AE}//\overline{BC}$이므로 $\angle ACB=\angle DAE$(엇각)이다.
따라서 $\triangle ABC\backsim\triangle DEA$(AA 닮음)이다.
이 때, $\overline{AB}:\overline{DE}=\overline{AC}:\overline{AD}$이므로
$4:6=\overline{AC}:(\overline{AC}+3)$
$6\overline{AC}=4\overline{AC}+12$ $\therefore\ \overline{AC}=6$
또, $\overline{AB}:\overline{DE}=\overline{BC}:\overline{AE}$이므로
$4:6=\overline{BC}:12$ $\therefore\ \overline{BC}=8$
그러므로 $\overline{AC}+\overline{BC}=14$이다.

76) 5cm

⇨ $\angle APC=\angle B+\angle BAP$
$\angle APQ+\angle QPC=\angle B+\angle BAP$
$\angle APQ=\angle B$ 이므로 $\angle BAP=\angle QPC$이다.
$\triangle ABP\backsim\triangle PCQ$(AA 닮음)이므로
$\overline{AB}:\overline{BP}=\overline{PC}:\overline{CQ}$
$6:2=3:\overline{CQ}$ $\therefore\ \overline{CQ}=1$
$\therefore\ \overline{AQ}=\overline{AC}-\overline{CQ}=6-1=5(\text{cm})$

77) 6 : 19



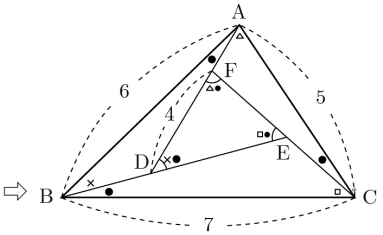
⇨
삼각형의 외각의 성질에 의해 위의 그림과 같이 나타내면
$\triangle ABP\backsim\triangle PCQ$(AA닮음)이다.
$\overline{BP}:\overline{PC}=2:3$이므로 $\overline{BP}=2x$, $\overline{PC}=3x$라 하면
$\overline{AB}=5x$이다. 이 때, $\overline{AB}:\overline{PC}=\overline{BP}:\overline{CQ}$가 성립하므로
$5x:3x=2x:\overline{CQ}$, $\overline{CQ}=\frac{6}{5}x$이고, $\overline{QA}=5x-\frac{6}{5}x=\frac{19}{5}x$이다. 따라서 $\overline{CQ}:\overline{QA}=6:19$이다.

78) $\frac{15}{2}$cm

79) 5 : 8

⇨ 삼각형의 한 외각은 이웃하지 않는 두 내각의 크기의 합과 같다. 즉, $\angle BAE+\angle ABE=\angle DEF$,
$\angle CBF+\angle BCF=\angle EFD$, $\angle ACD+\angle CAD=\angle EDF$
이고, $\angle BAE=\angle CBF=\angle ACD$이므로
$\angle A=\angle EDF$, $\angle B=\angle DEF$, $\angle C=\angle DFE$이다.
따라서 $\triangle ABC\backsim\triangle DEF$(AA닮음)이고,
$\overline{DE}:\overline{EF}=\overline{AB}:\overline{BC}=5:8$이다.

80) 12



⇨
위 그림에서 삼각형의 한 외각은 이웃하지 않는 두 내각의 크기와 같다.
즉, $\angle FDE=\angle BAD+\angle ABD=\angle B$,
$\angle DEF=\angle CBE+\angle BCE=\angle C$,
$\angle DFE=\angle ACF+\angle CAF=\angle A$이다.
따라서 $\triangle BCA\backsim\triangle DEF$(AA 닮음)이고,
닮음비는 3:2이므로 $\triangle ABC$의 둘레가 18일 때
$\triangle DEF$의 둘레는 $\frac{2}{3}\times 18=12$이다.

81) $\frac{4}{3}$

82) $\frac{16}{3}$

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⇨ △BDE∽△CEF(AA 닮음)
$\overline{BD}:\overline{CE}=\overline{BE}:\overline{CF}$에서
$\overline{CE}=\overline{BC}-\overline{BE}=10-2=8$이므로
$x:8=2:3 \quad \therefore\ x=\frac{16}{3}$

83) $\frac{28}{5}$
⇨ △BDE와 △CEF에서 $\angle B=\angle C=60^\circ$
$\angle BDE+\angle BED=120^\circ$, $\angle BED+\angle CEF=120^\circ$이므로
$\angle BDE=\angle CEF$
$\therefore$ △BDE∽△CEF (AA 닮음)
$\overline{BE}:\overline{CF}=\overline{DE}:\overline{EF}$에서 $\overline{EF}=\overline{AF}=7$,
$\overline{CF}=\overline{AC}-\overline{AF}=12-7=5$이므로
$4:5=x:7 \quad \therefore\ x=\frac{28}{5}$

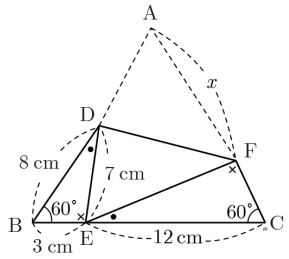
84) $\frac{32}{5}$
⇨ △BDE∽△CEF(AA 닮음)
$\overline{BD}:\overline{CE}=\overline{BE}:\overline{CF}$에서
$\overline{CE}=\overline{BC}-\overline{BE}=12-4=8$이므로
$x:8=4:5 \quad \therefore\ x=\frac{32}{5}$

85) $\frac{35}{4}$
⇨ △BDE∽△CEF(AA 닮음)
$\overline{BE}:\overline{CF}=\overline{DE}:\overline{EF}$에서
$\overline{EF}=\overline{AF}=7$, $\overline{CF}=15-7=8$이므로
$10:8=x:7 \quad \therefore\ x=\frac{35}{4}$

86) $\frac{35}{4}$
⇨ △ADF∽△CFE(AA 닮음)
$\overline{AD}:\overline{CF}=\overline{DF}:\overline{FE}$에서
$\overline{DF}=\overline{BD}=\overline{AB}-\overline{AD}=15-8=7$이므로
$8:10=7:x \quad \therefore\ x=\frac{35}{4}$

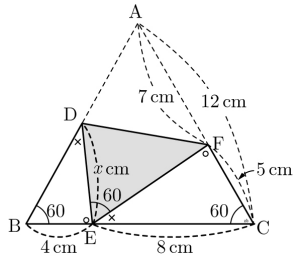
87) 14
⇨ △BDE∽△CEF(AA 닮음)
$\overline{BE}:\overline{CF}=\overline{DE}:\overline{EF}$에서
$\overline{BE}=\overline{BC}-\overline{EC}=30-24=6$이므로
$6:9=x:21 \quad \therefore\ x=14$

88) $\frac{21}{2}$ cm
⇨



△DBE∽△ECF(AA닮음)이므로
$\overline{DB}:\overline{EC}=\overline{DE}:\overline{EF}$가 성립한다.
즉, $8:12=7:\overline{EF}$, $\overline{EF}=\frac{21}{2}$cm이다.
이 때, $\overline{AF}=\overline{EF}$이므로 $x=\frac{21}{2}$ cm이다.

89) $\frac{28}{5}$cm
⇨



$\overline{DE}=x$cm라 하면 △BDE∽△CEF(AA 닮음)이므로
$\overline{BE}:\overline{CF}=\overline{DE}:\overline{EF}$가 성립한다. $\overline{AF}=\overline{EF}=7$cm이고,
$4:5=x:7$, $x=\frac{28}{5}$이다. 따라서 $\overline{DE}=\frac{28}{5}$cm이다.

90) $\frac{21}{2}$cm
⇨ △BDE∽△CEF(AA 닮음)이고,
$\overline{AD}=\overline{DE}$, $\overline{AF}=\overline{EF}$이므로
$\overline{BD}:\overline{DE}=\overline{CE}:\overline{EF}$
$8:7=12:\overline{EF} \quad \therefore\ \overline{AF}=\overline{EF}=\frac{21}{2}$ cm

91) $\frac{56}{5}$
⇨ $\overline{AF}=\overline{FE}$, $\overline{AD}=\overline{DE}$이고
△BDE∽△CEF(AA 닮음)이므로
$\overline{DE}:\overline{BE}=\overline{EF}:\overline{CF}$
$\overline{DE}:8=14:10 \quad \therefore\ \overline{DE}=\frac{56}{5}$

92) $\frac{35}{4}$ cm
⇨ △BED와 △CFE에서 $\angle B=\angle C$이고,
$\angle B+\angle BDE=\angle DEF+\angle CEF$이므로 $\angle BDE=\angle CEF$
이다. 따라서 △BED∽△CFE(AA 닮음)이다.
정삼각형 ABC의 한 변의 길이는 15cm이고,
$\overline{EC}=10$cm일 때, $\overline{BD}:\overline{CE}=\overline{DE}:\overline{EF}$가 성립하므로

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$8:10=7:\overline{EF}$, $\overline{EF}=\frac{35}{4}$cm 이다.

따라서 $\overline{AF}=\frac{35}{4}$cm 이다.

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