

[영역] 5.기하



5-4-2.삼각형, 사각형의 넓이 구하기





◇「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. 삼각형의 넓이

 \triangle ABC에서 두 변의 길이 a, c와 그 끼인 각 \angle B의 크기를 알 때, 넓이 S는

1) 끼인각의 크기가 예각인 경우

 $\Rightarrow S = \frac{1}{2}ac\sin B$



$$\Rightarrow S = \frac{1}{2}ac\sin(180^{\circ} - B)$$

2. 사각형의 넓이

1) 평행사변형의 넓이

: 평행사변형 ABCD의 이웃하는 두 변의 길이가 a, b이고,

그 끼인 각 x가 예각일 때, 넓이 $S=ab\sin x$

2) 사각형의 넓이

: 사각형 ABCD의 두 대각선의 길이가 a, b이고,

두 대각선이 이루는 각 x가 예각일 때, 넓이 $S = \frac{1}{2}ab\sin x$





삼각형의 넓이

● h = c sinB이므로

 $\triangle ABC = \frac{1}{2}ah = \frac{1}{2}ac\sin B$ h = c sin (180° − B) 이旦로

사각형의 넓이

◉ 평행사변형 ABCD에서 x가 둔각이 면 $S = ab\sin(180^\circ - x)$

 $\triangle ABC = \frac{1}{2}ah = \frac{1}{2}ac\sin(180^{\circ} - B)$

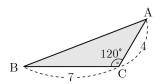
● 사각형 ABCD에서 *x*가 둔각이면 $S = \frac{1}{2}ab\sin\left(180^{\circ} - x\right)$



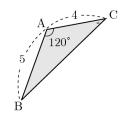
삼각형의 넓이 구하기

☑ 다음 그림과 같은 △ABC의 넓이를 구하여라.

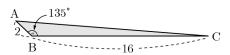
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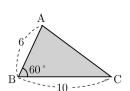
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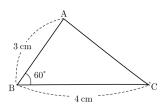


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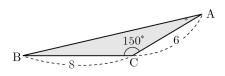
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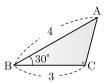




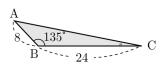
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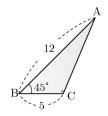
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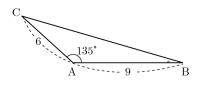
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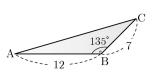
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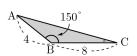
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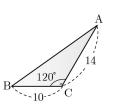
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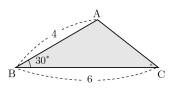
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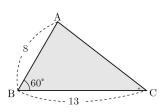
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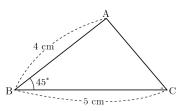
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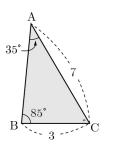
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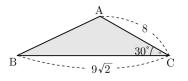


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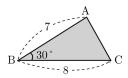


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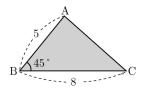




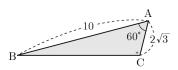
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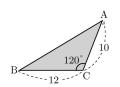
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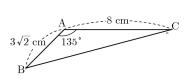
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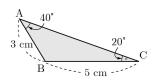
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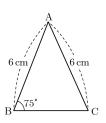
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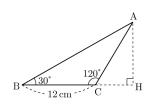


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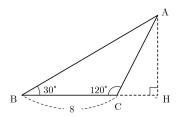


☑ 다음 그림과 같은 △ABC의 넓이를 구하여라.

26.

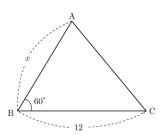


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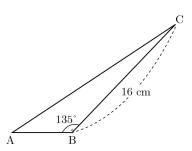


☐ 다음 그림과 같은 삼각형 ABC의 넓이가 주어질 때, 알맞은 길이를 구하여라.

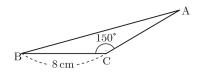
28. \triangle ABC의 넓이가 $30\sqrt{3}$ 일 때, \overline{AB} 의 길이를 구하여라.



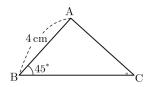
29. \triangle ABC 의 넓이가 $24\sqrt{2}$ cm²일 때, \overline{AB} 의 길이를 구하여 라.



30. \triangle ABC의 넓이가 $12\sqrt{3}$ cm²일 때, \overline{AC} 의 길이는?

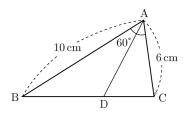


 ΔABC 의 넓이가 $6\sqrt{2}$ cm 2 일 때, \overline{BC} 의 길이를 구하여라.

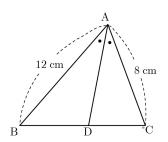


☑ 다음 물음에 답하여라.

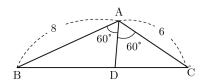
32. 다음 그림과 같이 ĀB=10cm, ĀC=6cm, ∠BAC=60° 인 △ABC에서 ∠BAC의 이등분선이 BC와 만나는 점을 D 라고 할 때, ĀD의 길이를 구하여라.



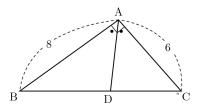
33. 다음 그림과 같은 \triangle ABC에서 \angle A=60 $^{\circ}$ 이고, \angle A의 이 등분선을 $\overline{\rm AD}$ 라 할 때, $\overline{\rm AD}$ 의 길이를 구하여라.



34. 다음 그림과 같은 삼각형 ABC에서 \overline{AD} 의 길이를 구하여 라.



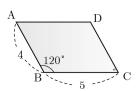
25. $\angle A = 90$ °, $\overline{AB} = 8$, $\overline{AC} = 6$ 인 $\triangle ABC$ 에서 $\angle A$ 의 이동 분선과 \overline{BC} 의 교점을 D라 할 때, \overline{AD} 의 길이를 구하여라.



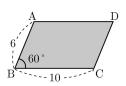
% 평행사변형의 넓이 구하기

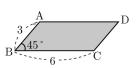
☑ 다음 그림과 같은 평행사변형 ABCD의 넓이를 구하여라.

36.

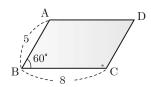


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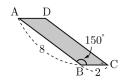




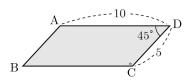
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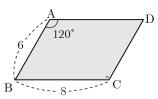
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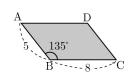
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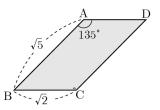
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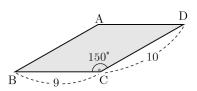
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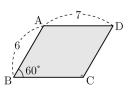
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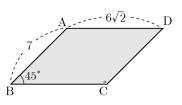
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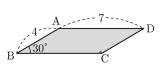
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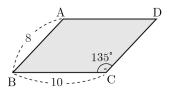
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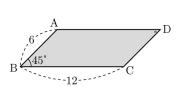


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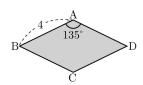
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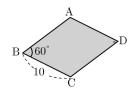


☑ 다음 그림과 같은 마름모의 넓이를 구하여라.

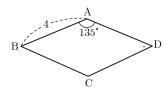
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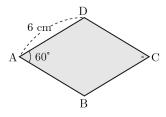
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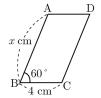
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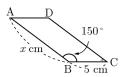
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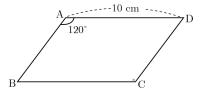
- ☑ 평행사변형 ABCD의 넓이가 주어질 때, 다음 물음에 답하 여라.
- 55. 평행사변형 ABCD의 넓이가 $12\sqrt{3}$ cm 2 일 때, \overline{AB} 의 길이를 구하여라.



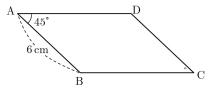
56. 평행사변형 ABCD의 넓이가 $20cm^2$ 일 때, \overline{AB} 의 길이를 구하여라.



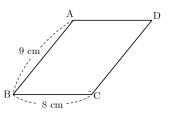
57. 다음 그림에서 평행사변형 ABCD의 넓이가 $35\sqrt{3}$ cm²일 때, \overline{AB} 의 길이를 구하여라.



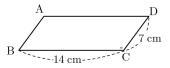
58. 다음 그림과 같은 평행사변형 ABCD의 넓이가 $24\sqrt{2}$ cm 2 일 때, \overline{BC} 의 길이를 구하여라.



59. 다음 그림의 평행사변형 ABCD의 넓이가 $36\sqrt{2}$ cm²일 때, $\angle C$ 의 크기를 구하여라. (단, $90^{\circ} < \angle C < 180^{\circ}$)



60. 평행사변형 ABCD의 넓이가 $49\sqrt{3}~cm^2$ 일 때, $\angle A$ 의 크 기를 구하여라. (단, $90\degree < \angle A < 180\degree$)

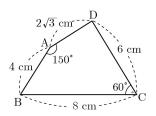




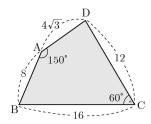
사각형의 넓이 구하기

☑ 다음 그림과 같은 □ABCD의 넓이를 구하여라.

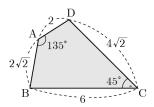
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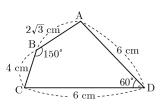
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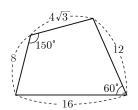
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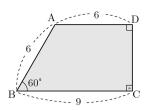


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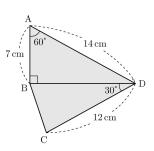


☑ 다음 그림과 같은 □ABCD의 넓이를 구하여라.

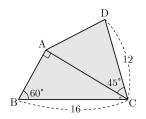
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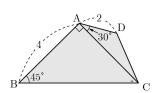
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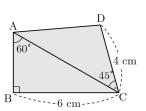
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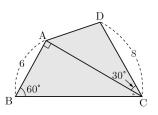


69.



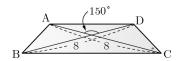
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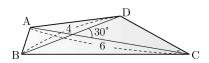


☑ 다음 사각형 ABCD의 넓이를 구하여라.

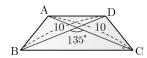
72.



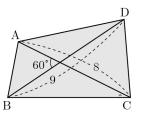
73.



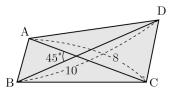
74.



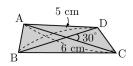
75.



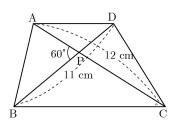
76.



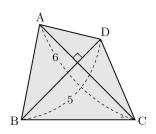
77.



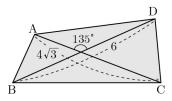
78.



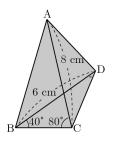
79.

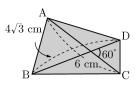


80.



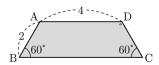
81.



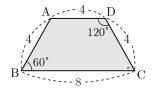


☑ 다음 사다리꼴 ABCD의 넓이를 구하여라.

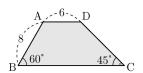
83.



84.

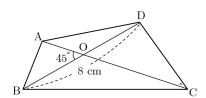


85.

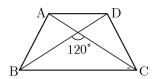


☑ 사각형 ABCD의 넓이가 주어질 때, 다음 물음에 답하여라.

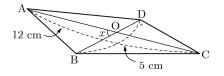
86. \square ABCD의 넓이가 $32\sqrt{2}$ cm 2 일 때, \overline{AC} 의 길이를 구하여라.



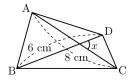
87. 등변사다리꼴 ABCD의 넓이가 $8\sqrt{3}$ cm²일 때, \overline{AC} 의 길이를 구하여라.



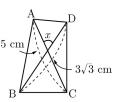
88. 사각형 ABCD의 넓이가 $15\sqrt{2}$ cm²일 때, $\angle x$ 의 크기를 구하여라. (단, 점 O는 두 대각선의 교점이고, $\angle x < 90$ °이 다.)



89. 사각형 ABCD의 넓이가 $12\sqrt{2}$ cm²일 때, $\angle x$ 의 크기를 구하여라. (단, 0°<x<90°)



90. 사각형 ABCD의 넓이가 $\frac{45}{4}$ cm²일 때, $\angle x$ 의 크기를 구하여라. (단, 0° < x < 90°)





정답및해설

- 1) $7\sqrt{3}$
- $\triangle ABC = \frac{1}{2} \times 4 \times 7 \times \sin(180^{\circ} 120^{\circ})$ $= \frac{1}{2} \times 4 \times 7 \times \frac{\sqrt{3}}{2} = 7\sqrt{3}$
- 2) $5\sqrt{3}$
- $\Rightarrow \Delta ABC = \frac{1}{2} \times 4 \times 5 \times \sin(180^{\circ} 120^{\circ})$ $= \frac{1}{2} \times 4 \times 5 \times \frac{\sqrt{3}}{2} = 5\sqrt{3}$
- 3) $8\sqrt{2}$
- $\triangle ABC = \frac{1}{2} \times 2 \times 16 \times \sin(180^{\circ} 135^{\circ})$ $= \frac{1}{2} \times 2 \times 16 \times \frac{\sqrt{2}}{2} = 8\sqrt{2}$
- 4) $15\sqrt{3}$
- $\Rightarrow \frac{1}{2} \times 10 \times 6 \times \sin 60^{\circ} = \frac{1}{2} \times 10 \times 6 \times \frac{\sqrt{3}}{2} = 15\sqrt{3}$
- 5) $3\sqrt{3} \text{ cm}^2$

=
$$\frac{1}{2}$$
 × sin60° × 3×4 = $\frac{1}{2}$ × $\frac{\sqrt{3}}{2}$ × 3×4 = 3 $\sqrt{3}$ (cm²)

- 6) 12
- $\triangle ABC = \frac{1}{2} \times 6 \times 8 \times \sin(180^{\circ} 150^{\circ})$ $= \frac{1}{2} \times 6 \times 8 \times \frac{1}{2} = 12$
- 7) $48\sqrt{2}$
- $\triangle ABC = \frac{1}{2} \times 8 \times 24 \times \sin(180^{\circ} 135^{\circ})$ $= \frac{1}{2} \times 8 \times 24 \times \frac{\sqrt{2}}{2} = 48\sqrt{2}$
- 8) $\frac{27\sqrt{2}}{2}$
- ightharpoonup ightharpoonup ightharpoonup 여장선과 점 ightharpoonup 대권 하자.

$$\triangle$$
ACH에서 $1:\sqrt{2}=\overline{\text{CH}}:6, \sqrt{2}\overline{\text{CH}}=6$

$$\therefore \overline{CH} = \frac{6}{\sqrt{2}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}$$

$$\therefore$$
 (\triangle ABC의 넓이)= $\frac{1}{2} \times 9 \times 3\sqrt{2} = \frac{27\sqrt{2}}{2}$

- 9) 8
- $\Rightarrow \frac{1}{2} \times 8 \times 4 \times \sin(180^{\circ} 150^{\circ}) = \frac{1}{2} \times 8 \times 4 \times \frac{1}{2} = 8$
- 10) 6
- $\Rightarrow \Delta ABC = \frac{1}{2} \times 4 \times 6 \times \sin 30^{\circ} = \frac{1}{2} \times 4 \times 6 \times \frac{1}{2} = 6$
- 11) $5\sqrt{2} \text{ cm}^2$
- $\Rightarrow \Delta ABC = \frac{1}{2} \times 4 \times 5 \times \sin 45^{\circ} = 5\sqrt{2} \text{ (cm}^2)$
- 12) $18\sqrt{2}$
- $\triangle ABC = \frac{1}{2} \times 8 \times 9\sqrt{2} \times \sin 30^{\circ}$ $= \frac{1}{2} \times 8 \times 9\sqrt{2} \times \frac{1}{2} = 18\sqrt{2}$
- 13) :
- \Rightarrow (\triangle ABC의 넓이) $=\frac{1}{2}\times4\times3\times\sin30^{\circ}=\frac{1}{2}\times4\times3\times\frac{1}{2}=3$
- 14) $15\sqrt{2}$
- \Leftrightarrow (\triangle ABC의 넓이) $= \frac{1}{2} \times 12 \times 5 \times \sin 45^{\circ} = \frac{1}{2} \times 12 \times 5 \times \frac{\sqrt{2}}{2} = 15\sqrt{2}$
- 15) $21\sqrt{2}$
- ⇒ (△ABC의 넓이)

$$= \frac{1}{2} \times 12 \times 7 \times \sin(180^{\circ} - 135^{\circ})$$
$$= \frac{1}{2} \times 12 \times 7 \times \frac{\sqrt{2}}{2} = 21\sqrt{2}$$

- 16) $35\sqrt{3}$
- \Rightarrow (△ABC의 넓이) $= \frac{1}{2} \times 10 \times 14 \times \sin(180^{\circ} 120^{\circ})$ $= \frac{1}{2} \times 10 \times 14 \times \frac{\sqrt{3}}{2} = 35\sqrt{3}$
- 17) $26\sqrt{3}$
- $\triangle ABC = \frac{1}{2} \times 8 \times 13 \times \sin 60^{\circ}$ $= \frac{1}{2} \times 8 \times 13 \times \frac{\sqrt{3}}{2} = 26\sqrt{3}$
- 18) $\frac{21\sqrt{3}}{4}$
- Arr Arr

$$=\frac{1}{2}\times7\times3\times\frac{\sqrt{3}}{2}=\frac{21\sqrt{3}}{4}$$

19) 14

$$\Rightarrow \frac{1}{2} \times 8 \times 7 \times \sin 30^{\circ} = \frac{1}{2} \times 8 \times 7 \times \frac{1}{2} = 14$$

$$\Rightarrow \frac{1}{2} \times 8 \times 5 \times \sin 45^{\circ} = \frac{1}{2} \times 8 \times 5 \times \frac{\sqrt{2}}{2} = 10\sqrt{2}$$

$$\Rightarrow \triangle ABC = \frac{1}{2} \times 10 \times 2\sqrt{3} \times \sin 60^{\circ}$$
$$= \frac{1}{2} \times 10 \times 2\sqrt{3} \times \frac{\sqrt{3}}{2} = 15$$

22) $30\sqrt{3}$

$$\Rightarrow \frac{1}{2} \times 12 \times 10 \times \sin(180^{\circ} - 120^{\circ})$$
$$= \frac{1}{2} \times 12 \times 10 \times \frac{\sqrt{3}}{2} = 30\sqrt{3}$$

23) 12 cm²

다 (△ABC의 넓이)
$$= \frac{1}{2} \times 3\sqrt{2} \times 8 \times \sin 135^{\circ}$$
$$= \frac{1}{2} \times 3\sqrt{2} \times 8 \times \sin (180^{\circ} - 135^{\circ})$$
$$= \frac{1}{2} \times 3\sqrt{2} \times 8 \times \frac{\sqrt{2}}{2} = 12 \text{ (cm}^2)$$

24)
$$\frac{15\sqrt{3}}{4}$$
 cm²

$$ightharpoonup$$
 $ightharpoonup$ ig

25) 9cm²

$$ightharpoonup \overline{AB} = \overline{AC}$$
이므로 $\angle ABC = \angle ACB = 75^{\circ}$
 $\therefore \angle BAC = 30^{\circ}$
 $\therefore (\triangle ABC 의 넓이) = \frac{1}{2} \times 6 \times 6 \times \sin 30^{\circ} = 9(\text{cm}^2)$

26) $36\sqrt{3} \text{ cm}^2$

$$ightharpoonup$$
 $ightharpoonup$ ig

27) $16\sqrt{3}$

$$ightharpoonup$$
 \angle BAC = 180 $^{\circ}$ $-$ (30 $^{\circ}$ +120 $^{\circ}$) = 30 $^{\circ}$ 이므로 \overline{AC} = \overline{BC} = 8이다.

$$\therefore$$
 (\triangle ABC의 넓이)
$$=\frac{1}{2}\times8\times8\times\sin\left(180\,^{\circ}-120\,^{\circ}\right)=16\,\sqrt{3}$$

28) 10

$$\Rightarrow$$
 (\triangle ABC의 넓이)= $\frac{1}{2} \times x \times 12 \times \sin 60^{\circ} = 30\sqrt{3}$
 $3\sqrt{3}x = 30\sqrt{3}$ $\therefore x = 10$

29) 6

$$\Rightarrow$$
 (\triangle ABC의 넓이)
$$= \frac{1}{2} \times \overline{AB} \times 16 \times \sin(180\,^{\circ} - 135\,^{\circ}) = 24\,\sqrt{2}$$
 따라서 $\overline{AB} = 6$ 이 된다.

30) $6\sqrt{3}$ cm

$$\Rightarrow$$
 $\overline{AC} = x \text{ cm}$ 라 하면 $\frac{1}{2} \times 8 \times x \times \sin(180^{\circ} - 150^{\circ}) = 12\sqrt{3}$ $2x = 12\sqrt{3}$ $\therefore x = 6\sqrt{3}$

31) 6cm

32) $\frac{15\sqrt{3}}{4}$ cm

다 지 일이를
$$x$$
라고 하자.
 $\triangle ABC = \triangle ABD + \triangle ACD$
 $\frac{1}{2} \times \sin 60^{\circ} \times 10 \times 6 = \frac{1}{2} \times \sin 30^{\circ} \times 10x + \frac{1}{2} \times \sin 30^{\circ} \times 6x$
 $5x + 3x = 30\sqrt{3}$
 $\therefore x = \frac{30\sqrt{3}}{8} = \frac{15\sqrt{3}}{4}$

따라서
$$\overline{\rm AD} = \frac{15\sqrt{3}}{4} ({\rm cm})$$
이다.

33) $\frac{24\sqrt{3}}{\epsilon}$ cm

$$ightharpoonup \overline{\mathrm{AD}} = x$$
 라고 하면 $\triangle \mathrm{ABC}$ 의 넓이는 $\triangle \mathrm{ABD}$ 와 $\triangle \mathrm{ACD}$ 의 넓이의 합과 같으므로
$$\frac{1}{2} \times \sin 60\,^{\circ} \times 12 \times 8$$

$$= \frac{1}{2} \times \sin 30\,^{\circ} \times 12 \times x + \frac{1}{2} \times \sin 30\,^{\circ} \times 8 \times x$$

$$3x + 2x = 24\sqrt{3}, \ 5x = 24\sqrt{3} \qquad \therefore \ x = \frac{24\sqrt{3}}{5} \text{(cm)}$$

34) $\frac{24}{7}$

54)
$$\frac{1}{7}$$

$$\Rightarrow \triangle ABC = \frac{1}{2} \times 8 \times 6 \times \sin 120^{\circ} = 12\sqrt{3}$$

$$\triangle ABC = \triangle ABD + \triangle ADC$$
이므로 $\overline{AD} = x$ 라 하면 $12\sqrt{3} = \frac{1}{2} \times 8 \times x \times \sin 60^{\circ} + \frac{1}{2} \times x \times 6 \times \sin 60^{\circ}$

$$12\sqrt{3} = 2\sqrt{3}x + \frac{3\sqrt{3}}{2}x$$

$$\frac{7\sqrt{3}}{2}x = 12\sqrt{3} \qquad \therefore x = \frac{24}{7}$$

35)
$$\frac{24\sqrt{2}}{7}$$

$$\Rightarrow$$
 $\overline{\mathrm{AD}} = x$ 라고 하면

 $(\Delta ABC$ 의 넓이)= $(\Delta ABD$ 의 넓이)+ $(\Delta ACD$ 의 넓이)

$$\frac{1}{2} \times \sin 90^{\circ} \times 8 \times 6$$

$$=\frac{1}{2}\times\sin 45~^{\circ}\times 8\times x+\frac{1}{2}\times\sin 45~^{\circ}\times 6\times x$$

$$7\sqrt{2}x = 48$$
 $\therefore x = \frac{48}{7\sqrt{2}} = \frac{48\sqrt{2}}{14} = \frac{24\sqrt{2}}{7}$

36)
$$10\sqrt{3}$$

$$=4 \times 5 \times \sin(180^{\circ} - 120^{\circ}) = 4 \times 5 \times \frac{\sqrt{3}}{2} = 10\sqrt{3}$$

37)
$$30\sqrt{3}$$

$$\Rightarrow 6 \times 10 \times \sin 60^{\circ} = 6 \times 10 \times \frac{\sqrt{3}}{2} = 30\sqrt{3}$$

38)
$$9\sqrt{2}$$

$$\Rightarrow 3 \times 6 \times \sin 45^{\circ} = 3 \times 6 \times \frac{\sqrt{2}}{2} = 9\sqrt{2}$$

39)
$$20\sqrt{3}$$

$$=5\times8\times\sin60^{\circ}=5\times8\times\frac{\sqrt{3}}{2}=20\sqrt{3}$$

40)
$$25\sqrt{2}$$

$$\Rightarrow$$
 $\Box ABCD = 10 \times 5 \times \sin 45^{\circ} = 10 \times 5 \times \frac{\sqrt{2}}{2} = 25\sqrt{2}$

41)
$$20\sqrt{2}$$

$$\Rightarrow 5 \times 8 \times \sin(180^{\circ} - 135^{\circ}) = 5 \times 8 \times \frac{\sqrt{2}}{2} = 20\sqrt{2}$$

$$\Rightarrow \Box ABCD = 9 \times 10 \times \sin(180^{\circ} - 150^{\circ})$$

$$=9 \times 10 \times \frac{1}{2} = 45$$

$$\Rightarrow$$
 $\overline{\mathrm{BC}} = \overline{\mathrm{AD}} = 6\sqrt{2}$ 이므로

$$\square$$
ABCD = $7 \times 6\sqrt{2} \times \sin 45^{\circ} = 7 \times 6\sqrt{2} \times \frac{\sqrt{2}}{2} = 42$

44)
$$40\sqrt{2}$$

$$\Rightarrow$$
 $\overline{\text{CD}} = \overline{\text{AB}} = 8$ 이므로

$$\Box ABCD = 8 \times 10 \times \sin(180^{\circ} - 135^{\circ})$$

$$= 8 \times 10 \times \frac{\sqrt{2}}{2} = 40\sqrt{2}$$

45) 8

$$\Rightarrow 2 \times 8 \times \sin(180^{\circ} - 150^{\circ}) = 2 \times 8 \times \frac{1}{2} = 8$$

46)
$$24\sqrt{3}$$

$$\Rightarrow \overline{AD} = \overline{BC} = 80$$
므로

$$\Box ABCD = 6 \times 8 \times \sin(180^{\circ} - 120^{\circ})$$

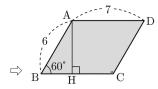
$$=6\times8\times\frac{\sqrt{3}}{2}=24\sqrt{3}$$

47)
$$\sqrt{5}$$

$$\Rightarrow \overline{\mathrm{AD}} = \overline{\mathrm{BC}} = \sqrt{2}$$
 이므로

$$\Box ABCD = \sqrt{5} \times \sqrt{2} \times \sin(180^{\circ} - 135^{\circ})$$
$$= \sqrt{5} \times \sqrt{2} \times \frac{\sqrt{2}}{2} = \sqrt{5}$$

48) $21\sqrt{3}$



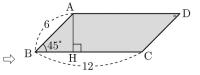
꼭짓점 A에서 \overline{BC} 에 내린 수선의 발을 H라 하면, $\triangle ABH$ 에서 $\overline{AH}:6=\sqrt{3}:2$ \therefore $\overline{AH}=3\sqrt{3}$ \therefore (평행사변형 ABCD의 넓이)= $7\times3\sqrt{3}=21\sqrt{3}$

49) 14

 \Rightarrow 꼭짓점 A에서 \overline{BC} 에 내린 수선의 발을 H라 하면 \triangle ABH에서 $\overline{AH}:4=1:2$ \therefore $\overline{AH}=2$

∴ (평행사변형 ABCD의 넓이)=7×2=14

50) $36\sqrt{2}$



꼭짓점 A에서 $\overline{\rm BC}$ 에 내린 수선의 발을 H라 하면 $\triangle {\rm ABH}$ 에서 $\overline{\rm AH}: 6=1:\sqrt{2}$ \therefore $\overline{\rm AH}=3\sqrt{2}$ \therefore (평행사변형 ABCD의 넓이)= $12\times3\sqrt{2}=36\sqrt{2}$

51) $8\sqrt{2}$

$$\Rightarrow 4 \times 4 \times \sin(180^{\circ} - 135^{\circ}) = 4 \times 4 \times \frac{\sqrt{2}}{2} = 8\sqrt{2}$$

52)
$$50\sqrt{3}$$

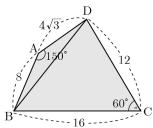
- $\Rightarrow 10 \times 10 \times \sin 60^{\circ} = 10 \times 10 \times \frac{\sqrt{3}}{2} = 50\sqrt{3}$
- 53) $8\sqrt{2}$
- 54) $18\sqrt{3} \text{ cm}^2$
- $\Rightarrow \Box ABCD = 6 \times 6 \times \sin 60^\circ$

$$=6 \times 6 \times \frac{\sqrt{3}}{2} = 18\sqrt{3} (cm^2)$$

- 55) 6
- $\Rightarrow 4 \times x \times \sin 60^{\circ} = 12\sqrt{3}$ $\therefore x = 6$
- 56) 8
- $\Rightarrow 5 \times x \times \sin(180^{\circ} 150^{\circ}) = 20$ $\therefore x = 8$
- 57) 7cm
- $ightarrow \overline{AB} = x$ 라고 하자. (평행사변형 ABCD의 넓이) $= x \times 10 \times \sin(180\,^{\circ} 120\,^{\circ}) = 35\,\sqrt{3}$ $\therefore x = 7$ 따라서 $\overline{AB} = 7$ 이 된다.
- 58) 8cm
- 59) 135°
- 60) 120°
- 61) $14\sqrt{3} \ cm^2$
- $\Rightarrow \Box ABCD = \triangle ABD + \triangle BCD$

$$= \frac{1}{2} \times 4 \times 2\sqrt{3} \times \sin(180^{\circ} - 150^{\circ}) + \frac{1}{2} \times 8 \times 6 \times \sin 60^{\circ}$$
$$= 2\sqrt{3} + 12\sqrt{3} = 14\sqrt{3}$$

- 62) $56\sqrt{3}$
- ⇨ 대각선 BD를 그으면

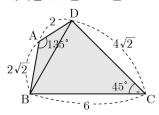


$$\Box ABCD = \triangle ABD + \triangle BCD$$

$$\begin{split} &= \frac{1}{2} \times 4\sqrt{3} \times 8 \times \sin(180° - 150°) + \frac{1}{2} \times 12 \times 16 \times \sin60° \\ &= \frac{1}{2} \times 4\sqrt{3} \times 8 \times \frac{1}{2} + \frac{1}{2} \times 12 \times 16 \times \frac{\sqrt{3}}{2} \\ &= 8\sqrt{3} + 48\sqrt{3} = 56\sqrt{3} \end{split}$$



⇒ 대각선 BD를 그으면



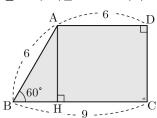
 $\square ABCD = \triangle ABD + \triangle BCD$

$$= \frac{1}{2} \times 2 \times 2\sqrt{2} \times \sin(180^{\circ} - 135^{\circ}) + \frac{1}{2} \times 4\sqrt{2} \times 6 \times \sin45^{\circ}$$

$$= \frac{1}{2} \times 2 \times 2\sqrt{2} \times \frac{\sqrt{2}}{2} + \frac{1}{2} \times 4\sqrt{2} \times 6 \times \frac{\sqrt{2}}{2}$$

$$= 2 + 12 = 14$$

- 64) $11\sqrt{3}$
- $\Rightarrow \Box ABCD = \triangle ABC + \triangle ACD$ $= \frac{1}{2} \times 4 \times 2\sqrt{3} \times \sin 150^{\circ} + \frac{1}{2} \times 6 \times 6 \times \sin 60^{\circ}$ $= 2\sqrt{3} + 9\sqrt{3} = 11\sqrt{3}$
- 65) $56\sqrt{3}$
- 66) $\frac{45\sqrt{3}}{2}$
- 다음 그림과 같이 꼭짓점 A에서 \overline{BC} 에 내린 수선의 발을 H라 하면 ΔABH 에서



$$\overline{\mathrm{AH}} = 6 \sin 60^{\circ} = 6 \times \frac{\sqrt{3}}{2} = 3\sqrt{3}$$

$$\therefore \Box ABCD = \frac{1}{2} \times (6+9) \times 3\sqrt{3} = \frac{45\sqrt{3}}{2}$$

- 67) $\frac{91\sqrt{3}}{2}$ cm²
- \Rightarrow 직각삼각형 ABD에서 $\overline{\mathrm{BD}} = \sqrt{14^2 7^2} = 7\sqrt{3} \, (\mathrm{cm})$
- $\therefore \Box ABCD = \triangle ABD + \triangle BCD$

$$= \frac{1}{2} \times 7 \times 14 \times \sin 60^{\circ} + \frac{1}{2} \times 7 \sqrt{3} \times 12 \times \sin 30^{\circ}$$

$$=\frac{49\sqrt{3}}{2}+21\sqrt{3}=\frac{91\sqrt{3}}{2}(\text{cm}^2)$$

- 68) $32\sqrt{3} + 24\sqrt{6}$
- \triangle ABC에서 $\overline{AC} = 16\sin 60^{\circ} = 16 \times \frac{\sqrt{3}}{2} = 8\sqrt{3}$ 이고 \triangle ACB = $180^{\circ} (90^{\circ} + 60^{\circ}) = 30^{\circ}$ 이므로

$$\Box ABCD = \triangle ABC + \triangle ACD$$

$$= \frac{1}{2} \times 16 \times 8\sqrt{3} \times \sin 30^{\circ} + \frac{1}{2} \times 8\sqrt{3} \times 12 \times \sin 45^{\circ}$$

$$= \frac{1}{2} \times 16 \times 8\sqrt{3} \times \frac{1}{2} + \frac{1}{2} \times 8\sqrt{3} \times 12 \times \frac{\sqrt{2}}{2}$$

$$= 32\sqrt{3} + 24\sqrt{6}$$

69) 10

$$\triangle$$
 \triangle ABC에서 $\overline{AC} = 4 \tan 45^\circ = 4 \times 1 = 4$ 이므로 \Box ABCD = \triangle ABC + \triangle ACD
$$= \frac{1}{2} \times 4 \times 4 + \frac{1}{2} \times 2 \times 4 \times \sin 30^\circ$$
$$= 8 + \frac{1}{2} \times 2 \times 4 \times \frac{1}{2}$$
$$= 8 + 2 = 10$$

70) $(6\sqrt{3}+4\sqrt{6})$ cm²

71) $30\sqrt{3}$

다
$$\triangle$$
 ABC에서 $\overline{AC} = 6 \tan 60^{\circ} = 6 \times \sqrt{3} = 6\sqrt{3}$ 이므로 \Box ABCD $= \triangle$ ABC $+ \triangle$ ACD $= \frac{1}{2} \times 6 \times 6\sqrt{3} + \frac{1}{2} \times 6\sqrt{3} \times 8 \times \sin 30^{\circ}$ $= 18\sqrt{3} + \frac{1}{2} \times 6\sqrt{3} \times 8 \times \frac{1}{2}$ $= 18\sqrt{3} + 12\sqrt{3} = 30\sqrt{3}$

72) 16

$$\Rightarrow$$
 (\square ABCD의 넓이)
$$=\frac{1}{2}\times8\times8\times\sin(180°-150°)=\frac{1}{2}\times8\times8\times\frac{1}{2}=16$$

73) 6

$$\Rightarrow$$
 (\square ABCD의 넓이)
$$=\frac{1}{2}\times4\times6\times\sin30^{\circ}=\frac{1}{2}\times4\times6\times\frac{1}{2}=6$$

74) $25\sqrt{2}$

당 (
$$\square$$
ABCD의 넓이)
$$= \frac{1}{2} \times 10 \times 10 \times \sin(180^{\circ} - 135^{\circ})$$
$$= \frac{1}{2} \times 10 \times 10 \times \frac{\sqrt{2}}{2} = 25\sqrt{2}$$

75) $18\sqrt{3}$

$$\Rightarrow \Box ABCD = \frac{1}{2} \times 8 \times 9 \times \sin 60^{\circ}$$
$$= \frac{1}{2} \times 8 \times 9 \times \frac{\sqrt{3}}{2} = 18\sqrt{3}$$

76) $20\sqrt{2}$

$$\Box ABCD = \frac{1}{2} \times 8 \times 10 \times \sin 45^{\circ}$$

$$= \frac{1}{2} \times 8 \times 10 \times \frac{\sqrt{2}}{2} = 20\sqrt{2}$$

77) $\frac{15}{2}$ cm²

$$\Rightarrow \frac{1}{2} \times 5 \times 6 \times \sin 30^{\circ} = \frac{1}{2} \times 5 \times 6 \times \frac{1}{2} = \frac{15}{2} (\text{cm}^2)$$

78) $33\sqrt{3} \text{ cm}^2$

79) 15

$$\Rightarrow \Box ABCD = \frac{1}{2} \times 6 \times 5 \times \sin 90^{\circ} = \frac{1}{2} \times 6 \times 5 \times 1 = 15$$

80) $6\sqrt{6}$

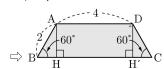
$$\Rightarrow \Box ABCD = \frac{1}{2} \times 4\sqrt{3} \times 6 \times \sin(180^{\circ} - 135^{\circ})$$
$$= \frac{1}{2} \times 4\sqrt{3} \times 6 \times \frac{\sqrt{2}}{2} = 6\sqrt{6}$$

81) $12\sqrt{3} \text{ cm}^2$

82) 18cm²

$$\Rightarrow \frac{1}{2} \times 6 \times 4\sqrt{3} \times \sin 60^{\circ}$$
$$= \frac{1}{2} \times 6 \times 4\sqrt{3} \times \frac{\sqrt{3}}{2} = 18(\text{cm}^2)$$

83) $5\sqrt{3}$

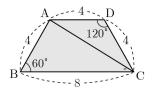


꼭짓점 A, D에서 \overline{BC} 에 내린 수선의 발을 각각 H, H'이라 하면 $\triangle ABH$ 에서

$$\overline{AH}: 2 = \sqrt{3}: 2$$
 \therefore $\overline{AH} = \sqrt{3}$
 $\overline{BH}: 2 = 1: 2$ \therefore $\overline{BH} = 1$
 \therefore (사다리꼴 ABCD의 넓이)
$$= \frac{1}{2} \times \{4 + (1 + 4 + 1)\} \times \sqrt{3} = 5\sqrt{3}$$

84) $12\sqrt{3}$

⇒ 대각선 AC를 그으면



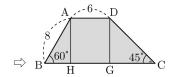
 $\Box ABCD = \triangle ABC + \triangle ACD$

$$= \frac{1}{2} \times 4 \times 8 \times \sin 60^{\circ} + \frac{1}{2} \times 4 \times 4 \times \sin (180^{\circ} - 120^{\circ})$$

$$= \frac{1}{2} \times 4 \times 8 \times \frac{\sqrt{3}}{2} + \frac{1}{2} \times 4 \times 4 \times \frac{\sqrt{3}}{2}$$

$$= 8\sqrt{3} + 4\sqrt{3} = 12\sqrt{3}$$

85) $8(4\sqrt{3}+3)$



꼭짓점 A에서 \overline{BC} 에 내린 수선의 발을 H,

꼭짓점 D에서 \overline{BC} 에 내린 수선의 발을 G라 하면

$$\triangle$$
ABH에서 $\overline{AH}: 8 = \sqrt{3}: 2$ $\therefore \overline{AH} = 4\sqrt{3}$

$$\overline{BH}$$
: 8 = 1:2 $\therefore \overline{BH}$ = 4

$$\triangle$$
DCG에서 $\overline{\text{CG}}:4\sqrt{3}=1:1$ \therefore $\overline{\text{CG}}=4\sqrt{3}$

$$= \frac{1}{2} \times \left\{ 6 + \left(4 + 6 + 4\sqrt{3}\right) \right\} \times 4\sqrt{3} = 8\left(4\sqrt{3} + 3\right)$$

86) 16cm

87)
$$4\sqrt{2}$$
 cm

 \Rightarrow 등변사다리꼴의 두 대각선의 길이가 같으므로 $\overline{{
m AC}} = x$ 라 하면

$$8\sqrt{3} = \frac{1}{2}x^2\sin 60^\circ$$
, $\frac{\sqrt{3}}{4}x^2 = 8\sqrt{3}$, $x^2 = 32$
 $\therefore x = 4\sqrt{2}$ (cm)

$$\Rightarrow \frac{1}{2} \times 6 \times 8 \times \sin x = 12\sqrt{2}$$

$$\sin x = \frac{\sqrt{2}}{2} \qquad \therefore \angle x = 45^{\circ}$$

90) 60°

$$\Rightarrow \frac{1}{2} \times 5 \times 3\sqrt{3} \times \sin x = \frac{45}{4}$$

$$\sin x = \frac{\sqrt{3}}{2} \qquad \therefore \angle x = 60^{\circ}$$