◇「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.

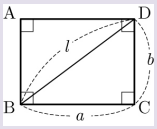
◇「콘텐츠산업 진흥법」외에도「저작권법」에 의하여 보호되는 콘텐츠의 경우, 그 콘텐츠의 전부 또는 일부를 무단으로 복제하거나 전송하는 것은 콘텐츠산업 진흥법 외에도 저작권법에 의한 법적 책임을 질 수 있습니다.

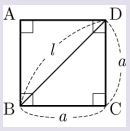
계산시 참고사항

1. 직사각형의 대각선의 길이

1) 직사각형의 대각선의 길이
: 가로의 길이가 a, 세로의 길이가 b인 직사각형 ABCD에서 대각선의 길이를 l이라 하면 $l=\sqrt{a^2+b^2}$

2) 정사각형의 대각선의 길이
: 한 변의 길이가 a인 정사각형 ABCD에서 대각선의 길이를 l이라 하면 $l=\sqrt{2}a$

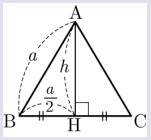




3. 삼각형의 높이와 넓이

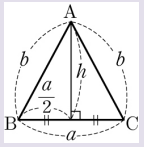
1) 정삼각형의 높이와 넓이
: 한 변의 길이가 a인 정삼각형 ABC에서 높이를 h, 넓이를 S라 하면

(1) 높이: $h=\frac{\sqrt{3}}{2}a$ (2) 넓이: $S=\frac{\sqrt{3}}{4}a^2$



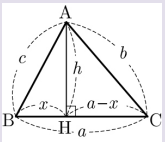
2) 이등변삼각형의 높이와 넓이
: 삼각형 ABC에서 높이를 h, 넓이를 S라 하면

(1) 높이: $h=\sqrt{b^2-\left(\frac{a}{2}\right)^2}$ (2) 넓이: $S=\frac{1}{2}ah$



3) 일반삼각형의 높이와 넓이
: 삼각형 ABC에서 높이를 h, 넓이를 S라 하면

(1) 높이: $h=\sqrt{c^2-x^2}=\sqrt{b^2-(a-x)^2}$ (2) 넓이: $S=\frac{1}{2}ah$



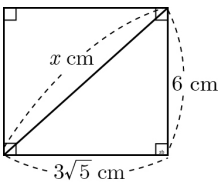
참고
◉ △ABH에서
$h=\sqrt{a^2-\left(\frac{a}{2}\right)^2}=\sqrt{\frac{3}{4}a^2}=\frac{\sqrt{3}}{2}a$
$S=\frac{1}{2}ah=\frac{1}{2}a\times\frac{\sqrt{3}}{2}a=\frac{\sqrt{3}}{4}a^2$

참고
◉ 이등변삼각형의 꼭지각의 꼭짓점에서 밑변에 그은 수선은 밑변을 이등분한다.

직사각형의 대각선의 길이

◪ 다음 직사각형에서 x의 값을 구하여라.

1.



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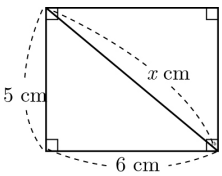

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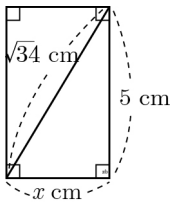

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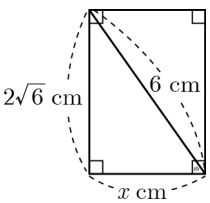

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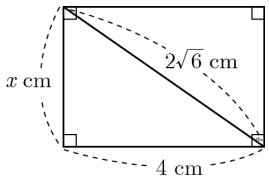
5.



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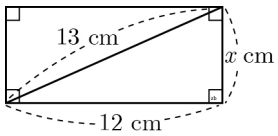

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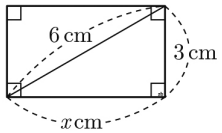

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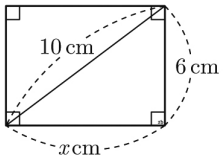

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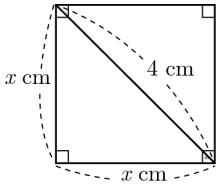

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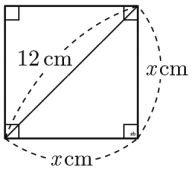

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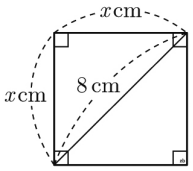

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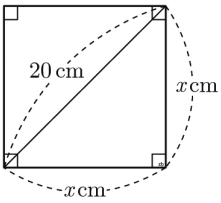
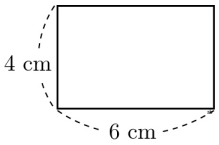


◪ **다음 직사각형의 대각선의 길이를 구하여라.**

13.



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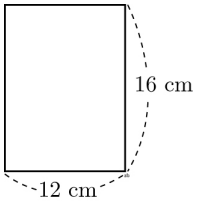

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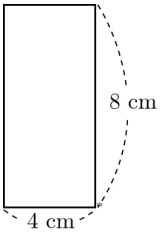

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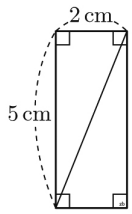

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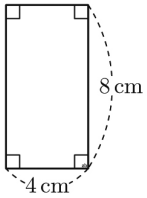

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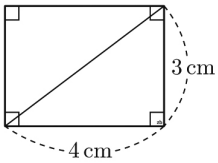

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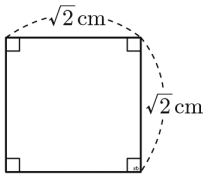

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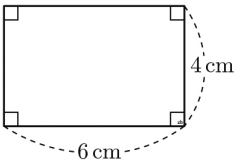

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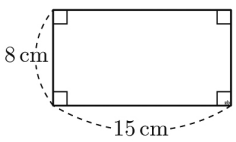

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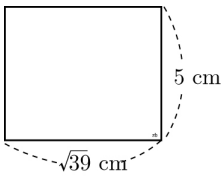

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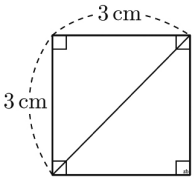

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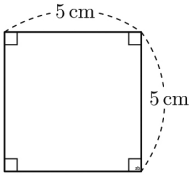

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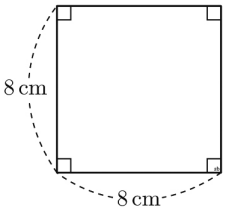

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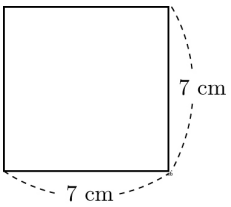

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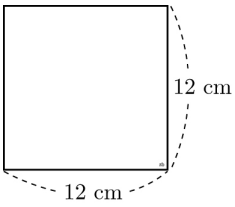

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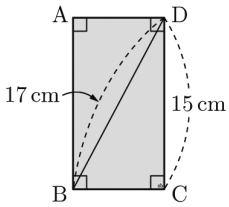
◪ 다음 그림에서 사각형 ABCD의 넓이를 구하여라.

28.



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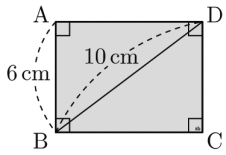

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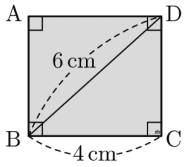

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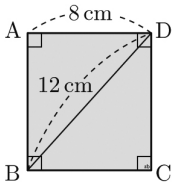

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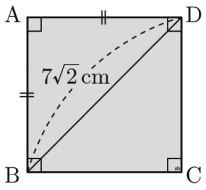
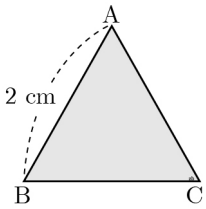


정삼각형의 높이와 넓이

◪ 다음 그림과 같은 정삼각형 ABC의 높이와 넓이를 각각 구하여라.

33.



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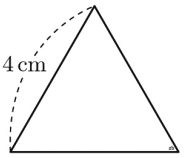

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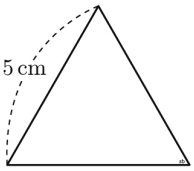

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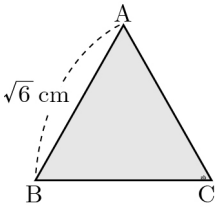

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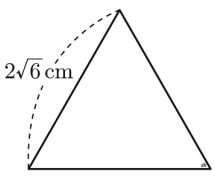

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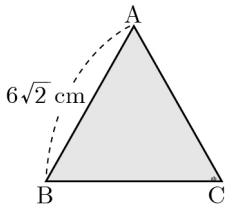
38.



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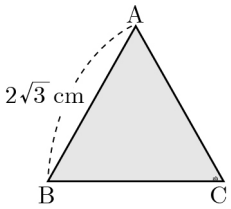

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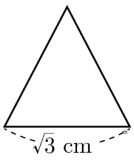
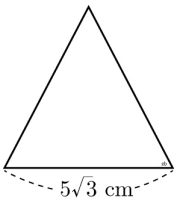
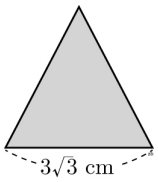


41.

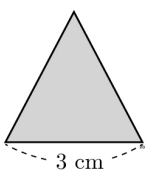


◪ 다음 정삼각형의 넓이를 구하여라.

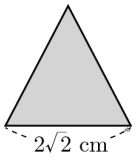
42.



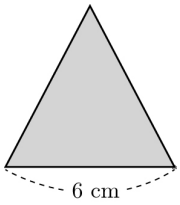
43.



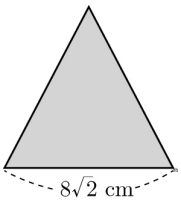
44.



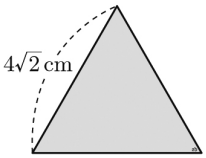
45.



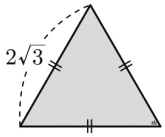
46.



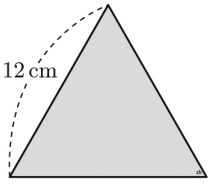
47.



48.



49.



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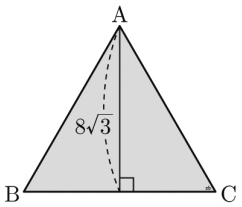
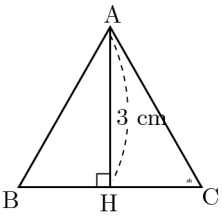
◪ 다음 그림과 같이 높이가 주어진 정삼각형 ABC의 넓이를 구하여라.

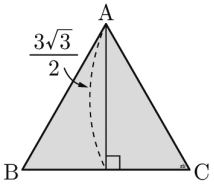
50.



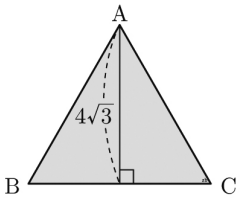
51.



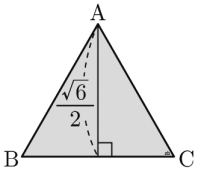
52.



53.

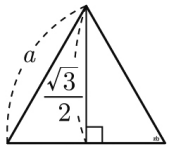


54.

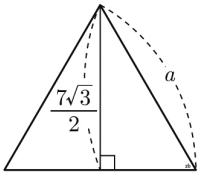


◪ 다음 그림과 같은 정삼각형에서 a의 값을 구하여라.

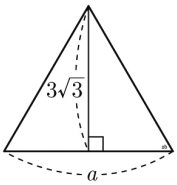
55.



56.

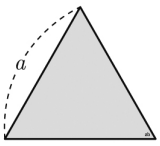


57.

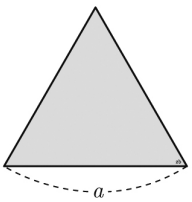


◪ 다음 그림과 같이 정삼각형의 넓이가 주어질 때, a의 값을 구하여라.

58. **넓이 :** $\sqrt{3}$



59. **넓이 :** $25\sqrt{3}$



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◪ 다음을 구하여라.

60. 높이가 $2\sqrt{3}$인 정삼각형의 한 변의 길이

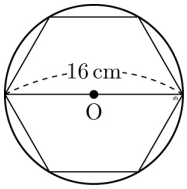
61. 높이가 9인 정삼각형의 한 변의 길이

62. 넓이가 $3\sqrt{3}$인 정삼각형의 한 변의 길이

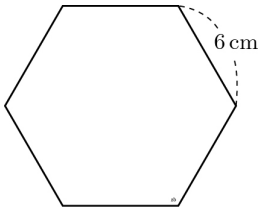
63. 넓이가 $25\sqrt{3}$인 정삼각형의 한 변의 길이

◪ 다음 물음에 답하여라.

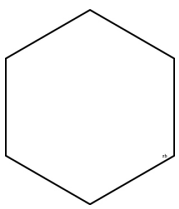
64. 다음 그림과 같이 지름이 $16\,\mathrm{cm}$인 원 O에 내접하는 정육각형의 넓이를 구하여라.



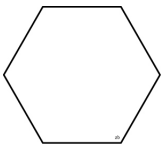
65. 다음 그림과 같이 한 변의 길이가 $6\mathrm{cm}$인 정육각형의 넓이를 구하여라.



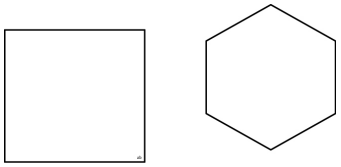
66. 다음 그림과 같이 둘레의 길이가 $12\,\mathrm{cm}$인 정육각형의 넓이를 구하여라.



67. 다음과 같이 넓이가 $24\sqrt{3}\,\mathrm{cm}^2$인 정육각형의 둘레의 길이를 구하여라.



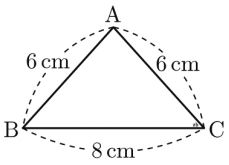
68. 다음 그림의 정사각형과 정육각형은 둘레의 길이가 같다. 정사각형의 넓이가 $36\mathrm{cm}^2$일 때, 정육각형의 넓이를 구하여라.



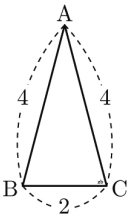
이등변삼각형의 높이와 넓이

◪ 다음 그림에서 이등변삼각형 ABC의 꼭짓점 A에서 $\overline{\mathrm{BC}}$에 내린 수선의 길이를 구하여라.

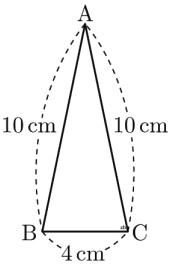
69.



70.



71.



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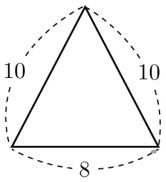
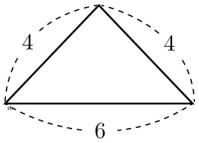
◪ 다음 그림과 같은 이등변삼각형의 꼭지각에서 내린 수선의 길이를 구하여라.

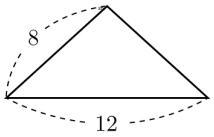
72.



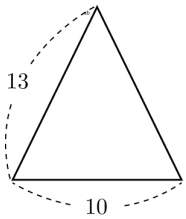
73.



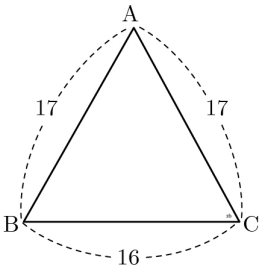
74.



75.

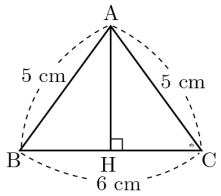


76.

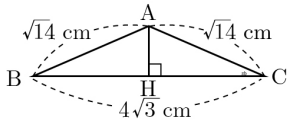


◪ 다음 그림과 같은 삼각형 ABC에서 $\overline{AH}$의 길이와 △ABC의 넓이를 각각 구하여라.

77.

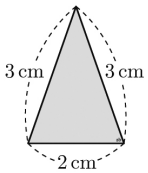


78.

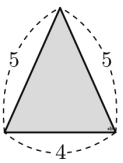


◪ 다음 이등변삼각형의 넓이를 구하여라.

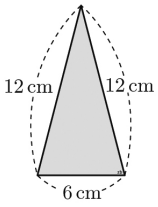
79.



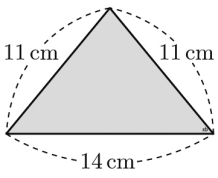
80.



81.



82.



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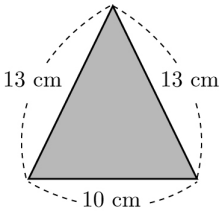
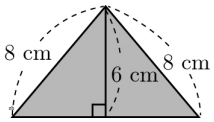
◪ 다음 그림과 같은 이등변삼각형의 넓이를 구하여라.

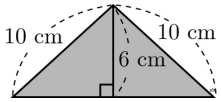
83.



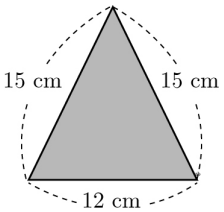
84.



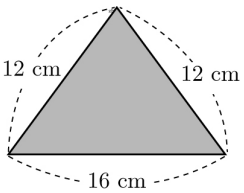
85.



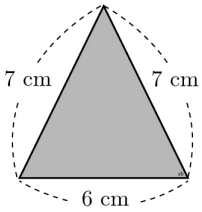
86.



87.



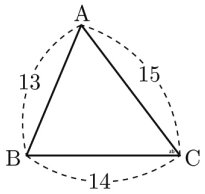
88.



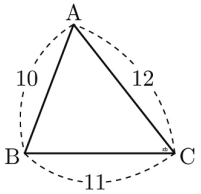
일반삼각형의 높이와 넓이

◪ 다음 그림에서 삼각형 ABC의 꼭짓점 A에서 $\overline{BC}$에 내린 수선의 길이를 구하여라.

89.



90.



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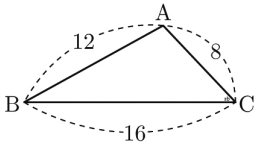

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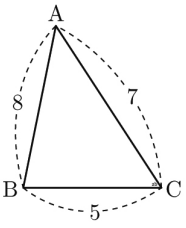

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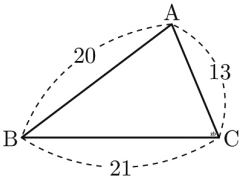

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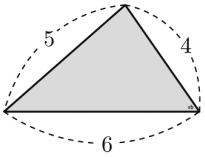
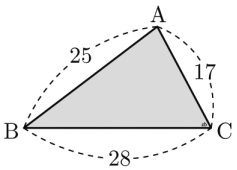
◪ 다음 삼각형 ABC의 넓이를 구하여라.

94.



95.



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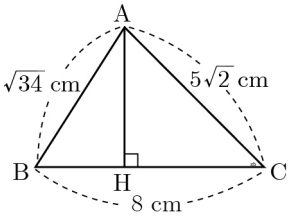

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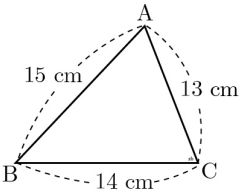
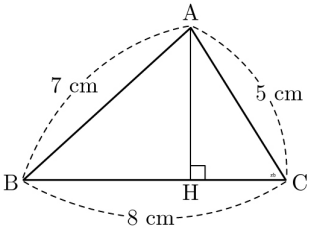
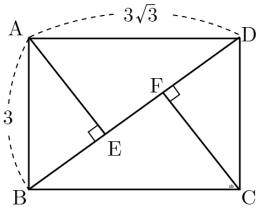


98.



◪ 직사각형 ABCD에서 $\overline{AB}=3$, $\overline{AD}=3\sqrt{3}$이고, 꼭짓점 A, C에서 대각선 BD에 내린 수선의 발을 각각 E, F라 할 때, $\overline{EF}$의 길이를 구하는 과정이다. 다음 길이를 구하여라.



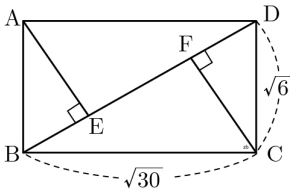
99. 피타고라스의 정리를 이용하여 대각선 $\overline{BD}$의 길이

100. $\overline{AE}$의 길이

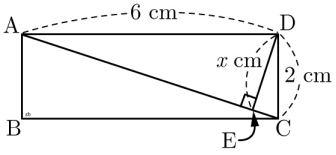
101. $\overline{EF}$의 길이

◪ 다음 직사각형 ABCD에서 알맞은 길이를 구하여라.

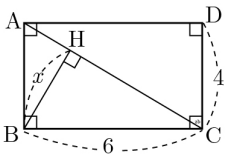
102. 직사각형 ABCD의 꼭짓점 A, C에서 대각선 BD에 내린 수선의 발을 각각 E, F라고 할 때, $\overline{EF}$의 길이



103. 직사각형 ABCD의 꼭짓점 D에서 대각선 AC에 내린 수선의 발을 E라고 할 때, $\overline{DE}$의 길이



104. 직사각형 ABCD의 꼭짓점 B에서 대각선 AC에 내린 수선의 발을 H라고 할 때, $\overline{BH}$의 길이



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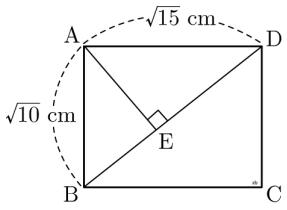
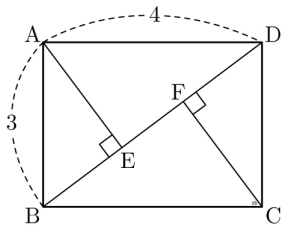
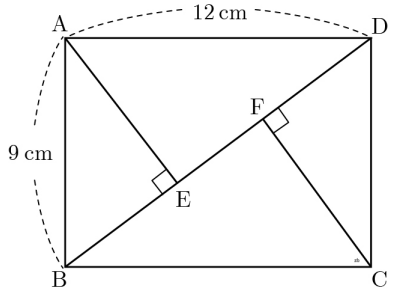
105 직사각형 ABCD의 꼭짓점 A에서 대각선 BD에 내린 수선의 발을 E라고 할 때, $\overline{AE}$의 길이



106 $\overline{AB}=3$, $\overline{AD}=4$인 직사각형 ABCD의 두 꼭짓점 A, C에서 대각선 BD에 내린 수선의 발을 각각 E, F라고 할 때, $\overline{EF}$의 길이



107 다음 그림과 같은 직사각형 ABCD의 두 꼭짓점 A, C에서 대각선 BD에 내린 수선의 발을 각각 E, F라고 할 때, $\overline{ED}$의 길이



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정답 및 해설

1) 9

2) $\sqrt{61}$

3) 3

4) $2\sqrt{3}$

5) $2\sqrt{2}$

6) 5

7) $3\sqrt{3}$
⇨ $x=\sqrt{6^2-3^2}=3\sqrt{3}$

8) 8
⇨ $x=\sqrt{10^2-6^2}=8$

9) $2\sqrt{2}$

10) $6\sqrt{2}$
⇨ $x^2+x^2=12^2,\ 2x^2=144,\ x^2=72$
$\therefore\ x=6\sqrt{2}\ (x>0)$

11) $4\sqrt{2}$
⇨ $x^2+x^2=8^2,\ 2x^2=64,\ x^2=32$
$\therefore\ x=4\sqrt{2}\ (x>0)$

12) $10\sqrt{2}$
⇨ $x^2+x^2=20^2,\ 2x^2=400$
$x^2=200 \quad \therefore\ x=10\sqrt{2}\ (x>0)$

13) $2\sqrt{13}\,\mathrm{cm}$
⇨ $\sqrt{4^2+6^2}=2\sqrt{13}\,(\mathrm{cm})$

14) 20cm
⇨ $\sqrt{12^2+16^2}=20\,(\mathrm{cm})$

15) $4\sqrt{5}\,\mathrm{cm}$
⇨ $\sqrt{4^2+8^2}=4\sqrt{5}\,(\mathrm{cm})$

16) $\sqrt{29}\,\mathrm{cm}$
⇨ (대각선의 길이)$=\sqrt{2^2+5^2}=\sqrt{29}\,(\mathrm{cm})$

17) $4\sqrt{5}\,\mathrm{cm}$
⇨ (대각선의 길이)$=\sqrt{4^2+8^2}=4\sqrt{5}\,(\mathrm{cm})$

18) 5cm
⇨ (대각선의 길이)$=\sqrt{4^2+3^2}=5\,(\mathrm{cm})$

19) 2cm
⇨ (대각선의 길이)$=\sqrt{2}\times\sqrt{2}=2\,(\mathrm{cm})$

20) $2\sqrt{13}\,\mathrm{cm}$
⇨ (대각선의 길이)$=\sqrt{6^2+4^2}=2\sqrt{13}\,(\mathrm{cm})$

21) 17cm
⇨ (대각선의 길이)$=\sqrt{15^2+8^2}=17\,(\mathrm{cm})$

22) 8cm
⇨ $\sqrt{(\sqrt{39})^2+5^2}=8\,(\mathrm{cm})$

23) $3\sqrt{2}\ \mathrm{cm}$

24) $5\sqrt{2}\,\mathrm{cm}$

25) $8\sqrt{2}\,\mathrm{cm}$

26) $7\sqrt{2}\,\mathrm{cm}$

27) $12\sqrt{2}\,\mathrm{cm}$

28) $120\mathrm{cm}^2$
⇨ $\overline{\mathrm{BC}}=\sqrt{17^2-15^2}=8\,(\mathrm{cm})$
$\therefore$ (직사각형 ABCD의 넓이)$=15\times8=120\,(\mathrm{cm}^2)$

29) $48\,\mathrm{cm}^2$
⇨ $\overline{\mathrm{AD}}=\sqrt{10^2-6^2}=8$
(직사각형 ABCD의 넓이)
=(가로의 길이)×(세로의 길이)
$=8\times6=48\,(\mathrm{cm}^2)$

30) $8\sqrt{5}\,\mathrm{cm}^2$
⇨ $\overline{\mathrm{DC}}=\sqrt{6^2-4^2}=2\sqrt{5}\,(\mathrm{cm})$
(직사각형 ABCD의 넓이)$=4\times2\sqrt{5}=8\sqrt{5}\,(\mathrm{cm}^2)$

31) $32\sqrt{5}\,\mathrm{cm}^2$
⇨ $\overline{\mathrm{AB}}=\sqrt{12^2-8^2}=4\sqrt{5}\,(\mathrm{cm})$
(직사각형 ABCD의 넓이)$=8\times4\sqrt{5}=32\sqrt{5}\,(\mathrm{cm}^2)$

32) $49\mathrm{cm}^2$
⇨ $2\overline{\mathrm{AB}}^2=(7\sqrt{2})^2=98,\ \overline{\mathrm{AB}}^2=49$이므로
(정사각형 ABCD의 넓이)$=49\,\mathrm{cm}^2$

33) 높이: $\sqrt{3}\,\mathrm{cm}$, 넓이: $\sqrt{3}\,\mathrm{cm}^2$
⇨ (높이)$=\dfrac{\sqrt{3}}{2}\times2=\sqrt{3}\,(\mathrm{cm})$
(넓이)$=\dfrac{\sqrt{3}}{4}\times2^2=\sqrt{3}\,(\mathrm{cm}^2)$

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34) 높이: $2\sqrt{3}\,\text{cm}$, 넓이: $4\sqrt{3}\,\text{cm}^2$

⇨ (높이) $=\frac{\sqrt{3}}{2}\times 4=2\sqrt{3}\,(\text{cm})$

(넓이) $=\frac{\sqrt{3}}{4}\times 4^2=4\sqrt{3}\,(\text{cm}^2)$

35) 높이: $\frac{5\sqrt{3}}{2}\text{cm}$, 넓이: $\frac{25\sqrt{3}}{4}\,\text{cm}^2$

⇨ (높이) $=\frac{\sqrt{3}}{2}\times 5=\frac{5\sqrt{3}}{2}\,(\text{cm})$

(넓이) $=\frac{\sqrt{3}}{4}\times 5^2=\frac{25\sqrt{3}}{4}\,(\text{cm}^2)$

36) 높이: $\frac{3\sqrt{2}}{2}\text{cm}$, 넓이: $\frac{3\sqrt{3}}{2}\text{cm}^2$

⇨ (높이) $=\frac{\sqrt{3}}{2}\times\sqrt{6}=\frac{\sqrt{18}}{2}=\frac{3\sqrt{2}}{2}\,(\text{cm})$

(넓이) $=\frac{\sqrt{3}}{4}\times(\sqrt{6})^2=\frac{3\sqrt{3}}{2}\,(\text{cm}^2)$

37) 높이: $3\sqrt{2}\,\text{cm}$, 넓이: $6\sqrt{3}\,\text{cm}^2$

⇨ (높이) $=\frac{\sqrt{3}}{2}\times 2\sqrt{6}=3\sqrt{2}\,(\text{cm})$

(넓이) $=\frac{\sqrt{3}}{4}\times(2\sqrt{6})^2=6\sqrt{3}\,(\text{cm}^2)$

38) 높이: $3\sqrt{6}\,\text{cm}$, 넓이: $18\sqrt{3}\,\text{cm}^2$

⇨ (높이) $=\frac{\sqrt{3}}{2}\times 6\sqrt{2}=3\sqrt{6}\,(\text{cm})$

(넓이) $=\frac{\sqrt{3}}{4}\times(6\sqrt{2})^2=18\sqrt{3}\,(\text{cm}^2)$

39) 높이: 3cm, 넓이: $3\sqrt{3}\,\text{cm}^2$

⇨ (높이) $=\frac{\sqrt{3}}{2}\times 2\sqrt{3}=3(\text{cm})$

(넓이) $=\frac{\sqrt{3}}{4}\times(2\sqrt{3})^2=3\sqrt{3}\,(\text{cm}^2)$

40) 높이: $\frac{3}{2}\text{cm}$, 넓이: $\frac{3\sqrt{3}}{4}\,\text{cm}^2$

⇨ (높이) $=\frac{\sqrt{3}}{2}\times\sqrt{3}=\frac{3}{2}\,(\text{cm})$

(넓이) $=\frac{\sqrt{3}}{4}\times(\sqrt{3})^2=\frac{3\sqrt{3}}{4}\,(\text{cm}^2)$

41) 높이: $\frac{15}{2}\text{cm}$, 넓이: $\frac{75\sqrt{3}}{4}\,\text{cm}^2$

⇨ (높이) $=\frac{\sqrt{3}}{2}\times 5\sqrt{3}=\frac{15}{2}\,(\text{cm})$

(넓이) $=\frac{\sqrt{3}}{4}\times(5\sqrt{3})^2=\frac{75\sqrt{3}}{4}\,(\text{cm}^2)$

42) $\frac{27\sqrt{3}}{4}\text{cm}^2$

⇨ $\frac{\sqrt{3}}{4}\times(3\sqrt{3})^2=\frac{27\sqrt{3}}{4}\,(\text{cm}^2)$

43) $\frac{9\sqrt{3}}{4}\text{cm}^2$

⇨ $\frac{\sqrt{3}}{4}\times 3^2=\frac{9\sqrt{3}}{4}\,(\text{cm}^2)$

44) $2\sqrt{3}\,\text{cm}^2$

⇨ $\frac{\sqrt{3}}{4}\times(2\sqrt{2})^2=2\sqrt{3}\,(\text{cm}^2)$

45) $9\sqrt{3}\,\text{cm}^2$

⇨ $\frac{\sqrt{3}}{4}\times 6^2=9\sqrt{3}\,(\text{cm}^2)$

46) $32\sqrt{3}\,\text{cm}^2$

⇨ $\frac{\sqrt{3}}{4}\times(8\sqrt{2})^2=32\sqrt{3}\,(\text{cm}^2)$

47) $8\sqrt{3}\,\text{cm}^2$

⇨ (넓이) $=\frac{\sqrt{3}}{4}\times(4\sqrt{2})^2=8\sqrt{3}\,(\text{cm})^2$

48) $3\sqrt{3}$

⇨ (넓이) $=\frac{\sqrt{3}}{4}\times(2\sqrt{3})^2=3\sqrt{3}$

49) $36\sqrt{3}\,\text{cm}^2$

⇨ (넓이) $=\frac{\sqrt{3}}{4}\times 12^2=36\sqrt{3}\,(\text{cm})^2$

50) $64\sqrt{3}$

⇨ 정삼각형 ABC의 한 변의 길이를 a라 하면

$\frac{\sqrt{3}}{2}a=8\sqrt{3}$ $\therefore\ a=16$

$\therefore$ (정삼각형 ABC의 넓이)

$=\frac{\sqrt{3}}{4}a^2=\frac{\sqrt{3}}{4}\times 16^2=64\sqrt{3}$

51) $\triangle\text{ABC}=3\sqrt{21}\,\text{cm}^2$

52) $\frac{9\sqrt{3}}{4}$

⇨ 정삼각형 ABC의 한 변의 길이를 a라 하면

$\frac{\sqrt{3}}{2}a=\frac{3\sqrt{3}}{2}$ $\therefore\ a=3$

$\therefore$ (정삼각형 ABC의 넓이) $=\frac{\sqrt{3}}{4}\times 3^2=\frac{9\sqrt{3}}{4}$

53) $16\sqrt{3}$

⇨ 정삼각형 ABC의 한 변의 길이를 a라 하면

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$\frac{\sqrt{3}}{2}a=4\sqrt{3}$ $\therefore a=8$

$\therefore$ (정삼각형 ABC의 넓이)$=\frac{\sqrt{3}}{4}\times 8^2=16\sqrt{3}$

54) $\frac{\sqrt{3}}{2}$

⇨ 정삼각형 ABC의 한 변의 길이를 a라 하면

$\frac{\sqrt{3}}{2}a=\frac{\sqrt{6}}{2}$ $\therefore a=\sqrt{2}$

$\therefore$ (정삼각형 ABC의 넓이)$=\frac{\sqrt{3}}{4}\times(\sqrt{2})^2=\frac{\sqrt{3}}{2}$

55) 1

⇨ $\frac{\sqrt{3}}{2}\times a=\frac{\sqrt{3}}{2}$ $\therefore a=1$

56) 7

⇨ $\frac{\sqrt{3}}{2}a=\frac{7\sqrt{3}}{2}$ $\therefore a=7$

57) 6

⇨ $\frac{\sqrt{3}}{2}a=3\sqrt{3}$ $\therefore a=6$

58) 2

⇨ $\frac{\sqrt{3}}{4}a^2=\sqrt{3},\ a^2=4$ $\therefore a=2\ (a>0)$

59) 10

⇨ $\frac{\sqrt{3}}{4}a^2=25\sqrt{3},\ a^2=100$ $\therefore a=10\ (a>0)$

60) 4

⇨ 정삼각형의 한 변의 길이를 a라 하면

$\frac{\sqrt{3}}{2}a=2\sqrt{3}$ $\therefore a=4$

61) $6\sqrt{3}$

⇨ 정삼각형의 한 변의 길이를 a라 하면

$\frac{\sqrt{3}}{2}a=9$ $\therefore a=6\sqrt{3}$

62) $2\sqrt{3}$

⇨ 정삼각형의 한 변의 길이를 a라 하면

$\frac{\sqrt{3}}{4}a^2=3\sqrt{3}, a^2=12$ $\therefore a=2\sqrt{3}\ (\because a>0)$

63) 10

⇨ 정삼각형의 한 변의 길이를 a라 하면

$\frac{\sqrt{3}}{4}a^2=25\sqrt{3}, a^2=100$ $\therefore a=10(\because a>0)$

64) $96\sqrt{3}\ \mathrm{cm}^2$

⇨ 지름이 16 cm이면 반지름은 8 cm이 되고 정육각형은 한 변의 길이가 8 cm인 정삼각형으로 6등분된다. 이 정삼각형의 넓이는 $\frac{\sqrt{3}}{4}\times 8^2=\frac{\sqrt{3}}{4}\times 64=16\sqrt{3}\ (\mathrm{cm}^2)$이고, 정육각형의 넓이는 정삼각형 넓이의 6배와 같으므로 $16\sqrt{3}\times 6=96\sqrt{3}\ (\mathrm{cm}^2)$

65) $54\sqrt{3}\ \mathrm{cm}^2$

⇨ 정육각형의 넓이는 한 변의 길이가 6 cm인 정삼각형 6개의 넓이와 같으므로 $6\times\left(\frac{\sqrt{3}}{4}\times 6^2\right)=54\sqrt{3}\ (\mathrm{cm}^2)$

66) $6\sqrt{3}\ \mathrm{cm}^2$

⇨ 둘레의 길이가 12 cm이므로 한 변의 길이가 2 cm인 정육면체이다. 정육면체의 넓이는 한 변의 길이가 2 cm인 정삼각형 6개의 넓이의 합과 같으므로 $\frac{\sqrt{3}}{4}\times 2^2\times 6=6\sqrt{3}\ (\mathrm{cm}^2)$이다.

67) 24cm

⇨ 정육각형을 6등분하여 정삼각형으로 나누면

정삼각형 1개의 넓이는 $\frac{1}{6}\times 24\sqrt{3}=4\sqrt{3}\ (\mathrm{cm}^2)$이므로

정삼각형의 한 변의 길이를 a라고 하면

$\frac{\sqrt{3}}{4}a^2=4\sqrt{3},\ a^2=16$ $\therefore a=4\ (\mathrm{cm})\ (a>0)$

정육각형의 한 변의 길이도 4 cm가 되어서 정육각형의 둘레의 길이는 $4\times 6=24(\mathrm{cm})$이다.

68) $24\sqrt{3}\ \mathrm{cm}^2$

⇨ 정사각형의 넓이가 36이므로 한 변의 길이는 6이고 그 둘레의 길이는 24이다.

둘레의 길이가 24인 정육각형의 한 변의 길이는 4이다.

정육각형은 한 변의 길이가 4인 6개의 정삼각형으로 이루어져 있으므로 정육각형의 넓이는

$\frac{\sqrt{3}}{4}\times 4^2\times 6=24\sqrt{3}$ 이다.

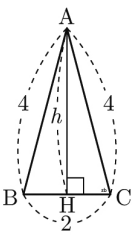
69) $2\sqrt{5}\ \mathrm{cm}$

⇨ 이등변 삼각형의 꼭지각의 이등분선은 밑변을 수직이등분한다. 꼭짓점 A에서 $\overline{\mathrm{BC}}$에 내린 수선의 발을 H, 수선의 길이를 h cm라 하면 $\overline{\mathrm{BH}}=4\ \mathrm{cm}$이다.

$h^2=6^2-4^2=20$ $\therefore h=2\sqrt{5}\ \mathrm{cm}$

70) $\sqrt{15}$

⇨



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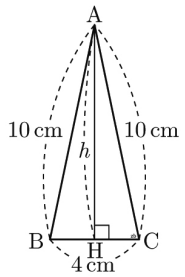
꼭짓점 A에서 $\overline{BC}$에 내린 수선의 발을 H, 수선의 길이를 h라 하면, $\overline{BH}=\frac{2}{2}=1$이므로

$h^2=4^2-1^2=15 \quad \therefore h=\sqrt{15}$

71) $4\sqrt{6}\,\text{cm}$

⇨ 

꼭짓점 A에서 $\overline{BC}$에 내린 수선의 발을 H, 수선의 길이를 h라 하면, $\overline{BH}=\frac{4}{2}=2(\text{cm})$이다.

$h^2=10^2-2^2=96 \quad \therefore h=4\sqrt{6}\ \text{cm}$

72) $2\sqrt{21}$

⇨ $\sqrt{10^2-4^2}=2\sqrt{21}$

73) $\sqrt{7}$

⇨ $\sqrt{4^2-3^2}=\sqrt{7}$

74) $2\sqrt{7}$

⇨ $\sqrt{8^2-6^2}=2\sqrt{7}$

75) 12

⇨ $\sqrt{13^2-5^2}=12$

76) 15

77) $\overline{AH}=4\text{cm},\ \triangle ABC=12\text{cm}^2$

⇨ $\overline{BH}=\overline{CH}=3(\text{cm})$이므로 $\overline{AH}=\sqrt{5^2-3^2}=4(\text{cm})$

$\therefore \triangle ABC=\frac{1}{2}\times 6\times 4=12(\text{cm}^2)$

78) $\overline{AH}=\sqrt{2}\,\text{cm},\ \triangle ABC=2\sqrt{6}\,\text{cm}^2$

⇨ $\overline{BH}=\overline{CH}=2\sqrt{3}\,(\text{cm})$이므로

$\overline{AH}=\sqrt{(\sqrt{14})^2-(2\sqrt{3})^2}=\sqrt{2}\,(\text{cm})$

$\therefore \triangle ABC=\frac{1}{2}\times 4\sqrt{3}\times\sqrt{2}=2\sqrt{6}\,(\text{cm}^2)$

79) $2\sqrt{2}\ \text{cm}^2$

⇨ (높이)$=\sqrt{3^2-\left(\frac{2}{2}\right)^2}=\sqrt{8}=2\sqrt{2}\,(\text{cm})$

$\therefore$ (넓이)$=\frac{1}{2}\times 2\times 2\sqrt{2}=2\sqrt{2}\ (\text{cm}^2)$

80) $2\sqrt{21}$

⇨ (높이)$=\sqrt{5^2-\left(\frac{4}{2}\right)^2}=\sqrt{21}$

(넓이)$=\frac{1}{2}\times 4\times\sqrt{21}=2\sqrt{21}$

81) $9\sqrt{15}\,\text{cm}^2$

⇨ (높이)$=\sqrt{12^2-\left(\frac{6}{2}\right)^2}=3\sqrt{15}\,(\text{cm})$

$\therefore$ (넓이)$=\frac{1}{2}\times 6\times 3\sqrt{15}=9\sqrt{15}\,(\text{cm}^2)$

82) $42\sqrt{2}\,\text{cm}^2$

⇨ (높이)$=\sqrt{11^2-\left(\frac{14}{2}\right)^2}=6\sqrt{2}\,(\text{cm})$

$\therefore$ (넓이)$=\frac{1}{2}\times 14\times 6\sqrt{2}=42\sqrt{2}\,(\text{cm}^2)$

83) 60cm^2

⇨ $h=\sqrt{13^2-5^2}=12(\text{cm})$

$\therefore\ S=\frac{1}{2}\times 10\times 12=60(\text{cm}^2)$

84) $12\sqrt{7}\,\text{cm}^2$

⇨ $x=\sqrt{8^2-6^2}=2\sqrt{7}\,(\text{cm})$

$\therefore\ S=\frac{1}{2}\times 2\sqrt{7}\times 2\times 6=12\sqrt{7}\,(\text{cm}^2)$

85) 48cm^2

⇨ $x=\sqrt{10^2-6^2}=8(\text{cm})$

$\therefore\ S=\frac{1}{2}\times 8\times 2\times 6=48(\text{cm}^2)$

86) $18\sqrt{21}\,\text{cm}^2$

⇨ $h=\sqrt{15^2-6^2}=3\sqrt{21}\,(\text{cm})$

$\therefore\ S=\frac{1}{2}\times 12\times 3\sqrt{21}=18\sqrt{21}\,(\text{cm}^2)$

87) $32\sqrt{5}\,\text{cm}^2$

⇨ $h=\sqrt{12^2-8^2}=4\sqrt{5}\,(\text{cm})$

$\therefore\ S=\frac{1}{2}\times 16\times 4\sqrt{5}=32\sqrt{5}\,(\text{cm}^2)$

88) $6\sqrt{10}\,\text{cm}^2$

⇨ $h=\sqrt{7^2-3^2}=2\sqrt{10}\,(\text{cm})$

$\therefore\ S=\frac{1}{2}\times 6\times 2\sqrt{10}=6\sqrt{10}\,(\text{cm}^2)$

89) 12

⇨ 꼭짓점 A에서 $\overline{BC}$에 내린 수선의 발을 H, 수선의 길이를 h, $\overline{BH}=x$라 하면 $\overline{HC}=14-x$이다.

$h^2=13^2-x^2$

$h^2=15^2-(14-x)^2$

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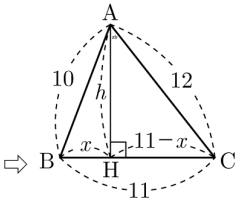
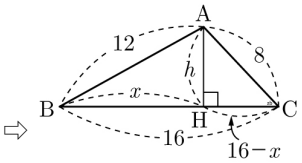
$13^2-x^2=15^2-(14-x)^2$
이 식을 정리하면 $x=5$
$\therefore\ h=\sqrt{13^2-5^2}=12$

90) $\frac{3\sqrt{39}}{2}$



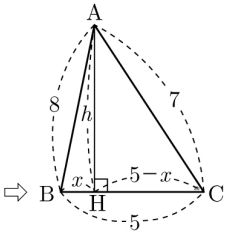
꼭짓점 A에서 $\overline{BC}$에 내린 수선의 발을 H, 수선의 길이를 h라 하면, $\overline{BH}=x$라 하면, $\overline{HC}=11-x$이다.
$\triangle ABH$에서 $h^2=10^2-x^2$
$\triangle ACH$에서 $h^2=12^2-(11-x)^2$
$10^2-x^2=12^2-(11-x)^2 \quad \therefore\ x=\frac{7}{2}$
$\therefore h=\sqrt{10^2-\left(\frac{7}{2}\right)^2}=\frac{3\sqrt{39}}{2}$

91) $\frac{3\sqrt{15}}{2}$



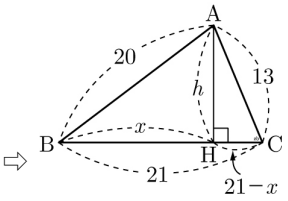
꼭짓점 A에서 $\overline{BC}$에 내린 수선의 발을 H, 수선의 길이를 h라 하면, $\overline{BH}=x$라 하면, $\overline{HC}=16-x$이다
$\triangle ABH$에서 $h^2=12^2-x^2$
$\triangle ACH$에서 $h^2=8^2-(16-x)^2$
$12^2-x^2=8^2-(16-x)^2 \quad \therefore\ x=\frac{21}{2}$
$\therefore\ h=\sqrt{12^2-\left(\frac{21}{2}\right)^2}=\frac{3\sqrt{15}}{2}$

92) $4\sqrt{3}$



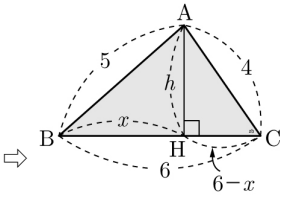
꼭짓점 A에서 $\overline{BC}$에 내린 수선의 발을 H, 수선의 길이를 h라 하면, $\overline{BH}=x$라 하면, $\overline{HC}=5-x$이다.
$\triangle ABH$에서 $h^2=8^2-x^2$
$\triangle ACH$에서 $h^2=7^2-(5-x)^2$
$8^2-x^2=7^2-(5-x)^2 \quad \therefore\ x=4$
$\therefore h=\sqrt{8^2-4^2}=4\sqrt{3}$

93) 12



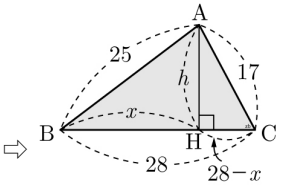
꼭짓점 A에서 $\overline{BC}$에 내린 수선의 발을 H, 수선의 길이를 h라 하면, $\overline{BH}=x$라 하면, $\overline{HC}=21-x$
$\triangle ABH$에서 $h^2=20^2-x^2$
$\triangle ACH$에서 $h^2=13^2-(21-x)^2$
$20^2-x^2=13^2-(21-x)^2 \quad \therefore\ x=16$
$\therefore h=\sqrt{20^2-16^2}=12$

94) $\frac{15\sqrt{7}}{4}$



꼭짓점 A에서 $\overline{BC}$에 내린 수선의 발을 H, 수선의 길이를 h라 하면, $\overline{BH}=x$라 하면, $\overline{HC}=6-x$이다.
$\triangle ABH$에서 $h^2=5^2-x^2$
$\triangle ACH$에서 $h^2=4^2-(6-x)^2$
$5^2-x^2=4^2-(6-x)^2 \quad \therefore\ x=\frac{15}{4}$
$\therefore h=\sqrt{5^2-\left(\frac{15}{4}\right)^2}=\frac{5\sqrt{7}}{4}$
$\therefore$ (넓이)$=\frac{1}{2}\times 6\times\frac{5\sqrt{7}}{4}=\frac{15\sqrt{7}}{4}$

95) 210



꼭짓점 A에서 $\overline{BC}$에 내린 수선의 발을 H, 수선의 길이를 h라 하면, $\overline{BH}=x$라 하면, $\overline{HC}=28-x$이다.
$\triangle ABH$에서 $h^2=25^2-x^2$
$\triangle ACH$에서 $h^2=17^2-(28-x)^2$
$25^2-x^2=17^2-(28-x)^2 \quad \therefore\ x=20$
$\therefore\ h=\sqrt{25^2-20^2}=15$
$\therefore$ ($\triangle ABC$의 넓이)$=\frac{1}{2}\times 28\times 15=210$

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96) 20cm^2

⇨ $\overline{BH}=x\,\text{cm}$라 하면 $\overline{CH}=8-x(\text{cm})$이므로

$\triangle ABH$에서 $\overline{AH}^2=(\sqrt{34})^2-x^2$ ……㉠

$\triangle ACH$에서 $\overline{AH}^2=(5\sqrt{2})^2-(8-2)^2$ ……㉡

㉠, ㉡에서 $(\sqrt{34})^2-x^2=(5\sqrt{2})^2-(8-x)^2$

$16x=48$ $\therefore x=3(\text{cm})$

따라서 $\overline{AH}=\sqrt{(\sqrt{34})^2-3^2}=\sqrt{25}=5(\text{cm})$이므로

$\triangle ABC=\frac{1}{2}\times 8\times 5=20(\text{cm}^2)$

97) $84\,\text{cm}^2$

⇨ 점 A에서 $\overline{BC}$에 내린 수선의 발을 D라 하고,

$\overline{BD}=x$라 하면 $\overline{DC}=14-x$이다.

직각삼각형 ABD에서 $\overline{AD}^2=225-x^2$

직각삼각형 ADC에서 $\overline{AD}^2=169-(14-x)^2$

즉 $225-x^2=169-(14-x)^2$이므로

$225-x^2=-27+28x-x^2$, $28x=252$ $\therefore x=9$

직각삼각형 ABD에서 $\overline{AD}=\sqrt{15^2-9^2}=12(\text{cm})$

$\therefore \triangle ABC=\frac{1}{2}\times 14\times 12=84(\text{cm}^2)$

98) $10\sqrt{3}\,\text{cm}^2$

⇨ $\overline{BH}=x$, $\overline{CH}=8-x$ 라고 하자.

$\triangle ABH$에서 $\overline{AH}^2=7^2-x^2$ 이고

$\triangle ACH$에서 $\overline{AH}^2=5^2-(8-x)^2$ 이 되어서

$49-x^2=25-64+16x-x^2$, $16x=88$ $\therefore x=\frac{11}{2}(\text{cm})$

$\overline{AH}=\sqrt{49-\left(\frac{11}{2}\right)^2}=\sqrt{49-\frac{121}{4}}=\sqrt{\frac{196-121}{4}}$

$=\sqrt{\frac{75}{4}}=\frac{5\sqrt{3}}{2}(\text{cm})$

$\therefore$ ($\triangle ABC$의 넓이)$=\frac{1}{2}\times 8\times\frac{5\sqrt{3}}{2}=10\sqrt{3}(\text{cm}^2)$

99) 6

⇨ $\triangle ABD$에서

$\overline{BD}=\sqrt{(3\sqrt{3})^2+3^2}=\sqrt{27+9}=\sqrt{36}=6$

100) $\frac{3\sqrt{3}}{2}$

⇨ $\overline{AE}\times\overline{BD}=\overline{AB}\times\overline{AD}$이므로

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

101) 3

⇨ $\triangle ABE$에서 $\overline{BE}=\sqrt{3^2-\left(\frac{3\sqrt{3}}{2}\right)^2}=\sqrt{\frac{9}{4}}=\frac{3}{2}$

$\triangle ABE\equiv\triangle CDF$이므로

$\overline{EF}=\overline{BD}-\overline{BE}-\overline{DF}=6-\frac{3}{2}-\frac{3}{2}=3$

102) 4

⇨ $\triangle BCD$에서 $\overline{BD}=\sqrt{(\sqrt{30})^2+(\sqrt{6})^2}=\sqrt{36}=6$

$\overline{BD}\times\overline{CF}=\overline{BC}\times\overline{CD}$

$6\times\overline{CF}=\sqrt{30}\times\sqrt{6}$ $\therefore \overline{CF}=\sqrt{5}$

$\triangle CDF$에서

$\overline{DF}^2+(\sqrt{5})^2=(\sqrt{6})^2$ $\therefore \overline{DF}=\sqrt{6-5}=1$

$\therefore \overline{EF}=\overline{BD}-\overline{BE}-\overline{DF}=6-1-1=4$

103) $\frac{3\sqrt{10}}{5}$

⇨ $\overline{AC}=\sqrt{6^2+2^2}=2\sqrt{10}$

$\triangle ACD$의 넓이를 이용하면

$\frac{1}{2}\times 2\times 6=\frac{1}{2}\times 2\sqrt{10}\times x$

$\therefore x=\frac{3\sqrt{10}}{5}$

104) $\frac{12\sqrt{13}}{13}$

105) $\sqrt{6}\,\text{cm}$

⇨ 직각삼각형 ABD에서 $\overline{BD}=\sqrt{10+15}=5(\text{cm})$

직각삼각형 ABD에서 $\overline{AB}\times\overline{AD}=\overline{BD}\times\overline{AE}$이므로

$\sqrt{10}\times\sqrt{15}=5\overline{AE}$ $\therefore \overline{AE}=\sqrt{6}(\text{cm})$

106) $\frac{7}{5}$

⇨ $\triangle ABD$에서 $\overline{BD}=\sqrt{3^2+4^2}=\sqrt{9+16}=5$

$\overline{AE}\times\overline{BD}=\overline{AD}\times\overline{AB}$, $\overline{AE}\times 5=4\times 3$

$\therefore \overline{AE}=\frac{12}{5}$

$\triangle ABE$에서

$\overline{BE}=\sqrt{3^2-\left(\frac{12}{5}\right)^2}=\sqrt{9-\frac{144}{25}}=\sqrt{\frac{81}{25}}=\frac{9}{5}$

$\therefore \overline{EF}=\overline{BD}-\overline{BE}-\overline{DF}=5-\frac{9}{5}-\frac{9}{5}=\frac{7}{5}$

107) 9.6 cm

⇨ 직각삼각형 ABD에서 $\overline{BD}=\sqrt{12^2+9^2}=15(\text{cm})$

이때 $\overline{AD}^2=\overline{ED}\times\overline{BD}$이므로

$12^2=15\overline{ED}$ $\therefore \overline{ED}=\frac{48}{5}=9.6(\text{cm})$

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