◇「콘텐츠산업 진흥법 시행령」제33조에 의한 표시
1) 제작연월일 : 2016-08-25
2) 제작자 : 교육지대㈜
3) 이 콘텐츠는 「콘텐츠산업 진흥법」에 따라 최초 제작일부터 5년간 보호됩니다.

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

계산시 참고사항

1. 삼각형의 중선

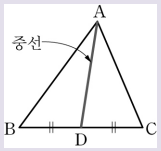
1) 삼각형의 중선: 삼각형에서 한 꼭짓점과 그 대변의 중점을 이은 선분

2) 중선의 성질

(1) 삼각형의 중선은 그 삼각형의 넓이를 이등분한다.

⇨ $\overline{AD}$가 중선이면 $\triangle ABD = \triangle ACD$

(2) 점 P가 $\overline{AD}$위의 점이면 $\triangle ABP = \triangle ACP$, $\triangle PBD = \triangle PCD$



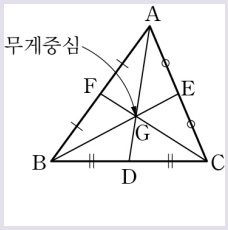
2. 삼각형의 무게중심

1) 삼각형의 무게중심: 삼각형의 세 중선의 교점

2) 무게중심의 성질

(1) 삼각형의 세 중선은 한 점(무게중심)에서 만난다.

(2) 삼각형의 무게중심은 세 중선의 길이를 각 꼭짓점으로부터 2 : 1로 나눈다. ⇨ $\overline{AG} : \overline{GD} = \overline{BG} : \overline{GE} = \overline{CG} : \overline{GF} = 2 : 1$



3. 삼각형의 무게중심과 넓이

삼각형 ABC의 무게중심 G에서

1) $\triangle GAB = \triangle GBC = \triangle GCA = \frac{1}{3}\triangle ABC$

2) $\triangle GAF = \triangle GBF = \triangle GBD = \triangle GCD = \triangle GCE = \triangle GAE = \frac{1}{6}\triangle ABC$

4. 삼각형의 무게중심의 응용

평행사변형 ABCD에서 $\overline{BC}$의 중점을 M, $\overline{CD}$의 중점을 N이라 할 때

1) 점 P는 $\triangle ABC$의 무게중심 ⇨ $\overline{BP} : \overline{PO} = 2 : 1$

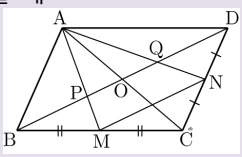
2) 점 Q는 $\triangle ACD$의 무게중심 ⇨ $\overline{DQ} : \overline{QO} = 2 : 1$

3) $\overline{BP} = \overline{PQ} = \overline{QD}$

4) $\overline{MN} = \frac{1}{2}\overline{BD}$

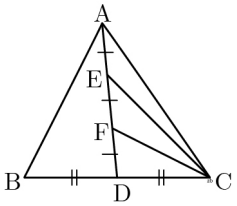
5) $\triangle ABM = \frac{1}{4}\square ABCD$

6) $\triangle ABP = \frac{1}{6}\square ABCD$



삼각형의 중선의 성질

◪ **다음 그림에서 $\overline{AD}$가 $\triangle ABC$의 중선이고 $\triangle ABD$의 넓이가 $9\,cm^2$일 때, 다음을 구하여라.**



1. $\triangle ADC$의 넓이

2. $\triangle ABC$의 넓이

3. $\triangle EFC$의 넓이

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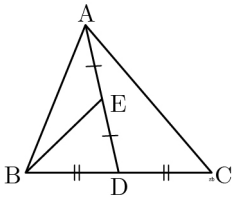
◪ 다음 그림에서 $\overline{AD}$가 $\triangle ABC$의 중선이고 $\triangle ABC$의 넓이가 $24\,cm^2$일 때, 다음을 구하여라.

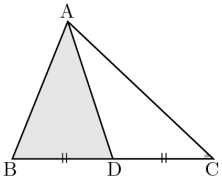


4. $\triangle ABD$의 넓이

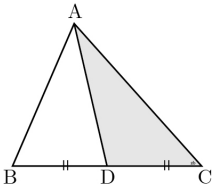
5. $\triangle ABE$의 넓이

◪ 다음 그림에서 $\overline{AD}$가 $\triangle ABC$의 중선이고, 점 E는 $\overline{AD}$의 중점일 때, 색칠한 부분의 넓이를 구하여라.

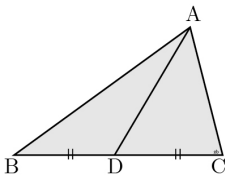
6. $\triangle ABC = 14cm^2$일 때



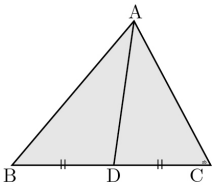
7. $\triangle ABC = 98cm^2$일 때



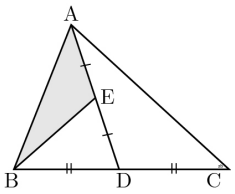
8. $\triangle ABD = 15cm^2$일 때



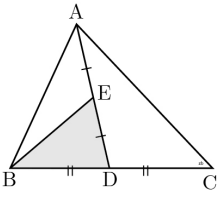
9. $\triangle ADC = 24cm^2$일 때



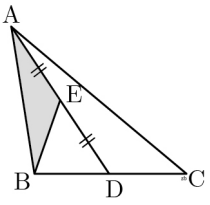
10. $\triangle ABC = 36cm^2$일 때



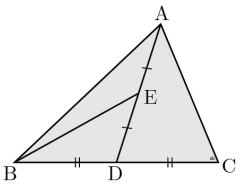
11. $\triangle ABC = 52cm^2$일 때



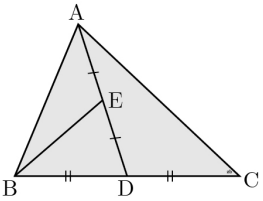
12. $\triangle ABC = 16\,cm^2$일 때



13. $\triangle ABE = 8cm^2$일 때



14. $\triangle EBD = 7cm^2$일 때



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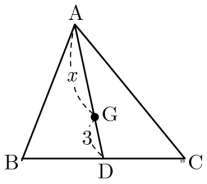
삼각형의 무게중심

◪ 다음 그림에서 점 G가 △ABC의 무게중심일 때, x의 값을 구하여라.

15.



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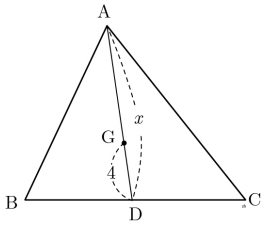

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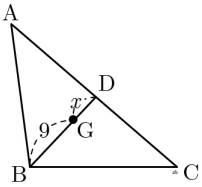

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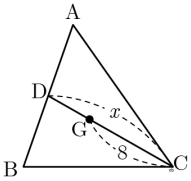

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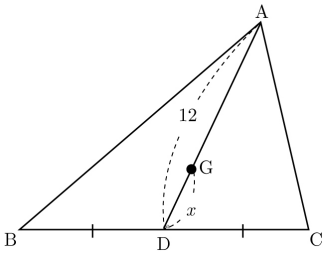

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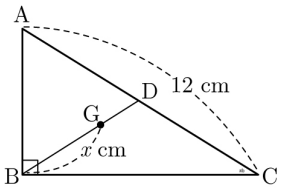

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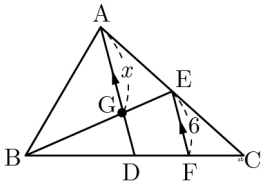

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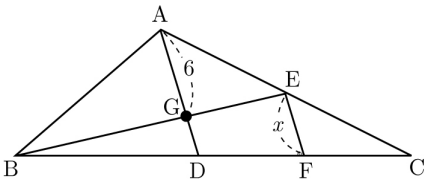

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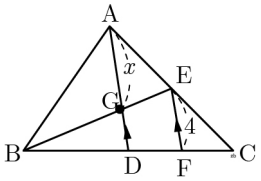

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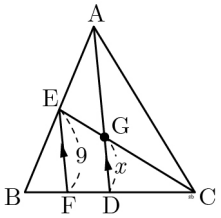

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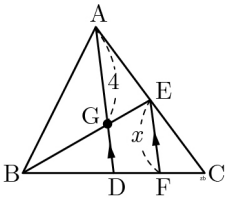

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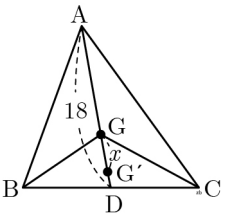
◪ 다음 그림에서 점 G가 △ABC의 무게중심이고, 점 G′은 △GBC의 무게중심일 때, x의 값을 구하여라.

26.



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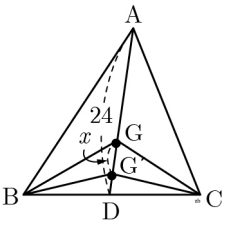

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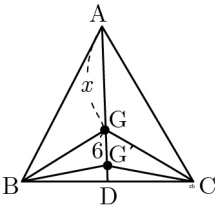

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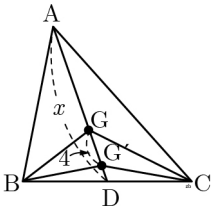

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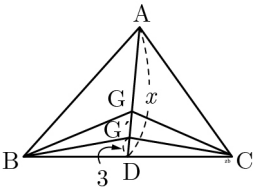
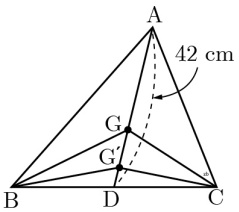


◪ 다음 그림에서 $\overline{AD}$는 △ABC의 중선이고, 점 G는 △ABC의 무게중심, 점 G′은 △GBC의 무게중심이다. $\overline{GG'}$의 길이를 구하여라.

31.



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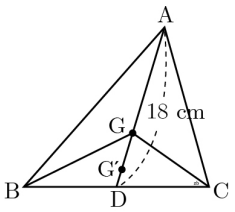

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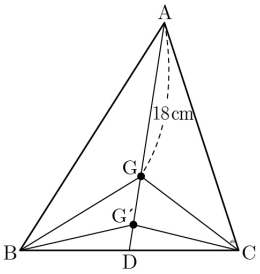

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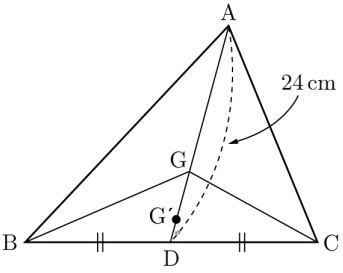

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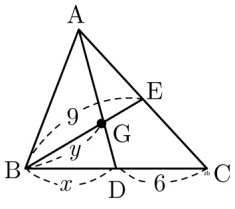
◪ 다음 그림에서 점 G가 △ABC의 무게중심일 때, $x+y$의 값을 구하여라.

35.



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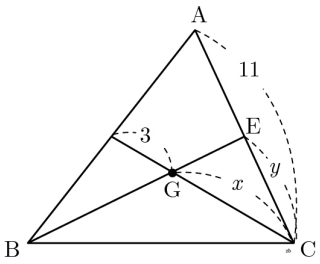

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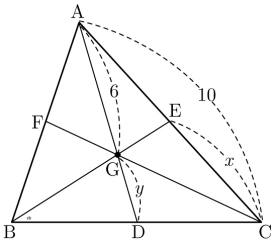

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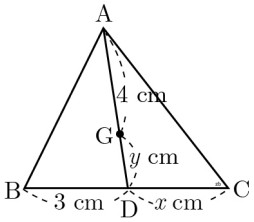

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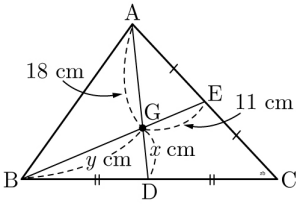

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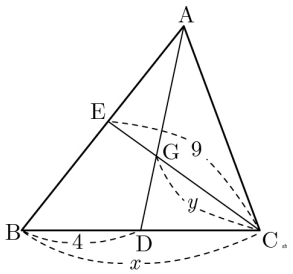
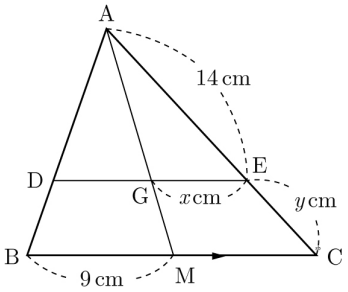
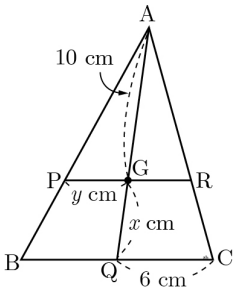


◪ 다음 그림에서 점 G는 △ABC의 무게중심이고, 평행인 선분이 주어질 때, x, y의 값을 각각 구하여라.

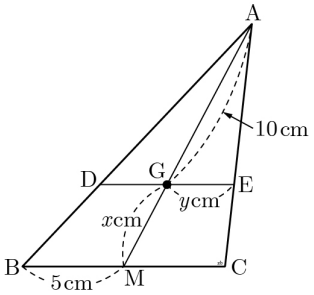
41. $\overline{DE}//\overline{BC}$



42. $\overline{PR}//\overline{BC}$



43. $\overline{BC}//\overline{DE}$



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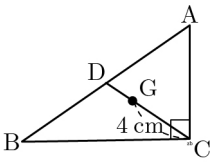
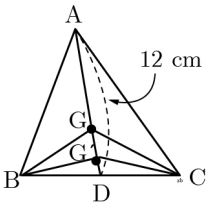
◪ 다음 물음에 답하여라.

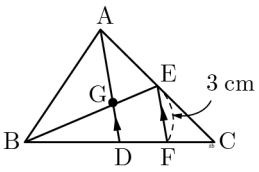
44. 다음 그림에서 점 G는 직각삼각형 ABC의 무게중심일 때, $\overline{AB}$의 길이를 구하여라.



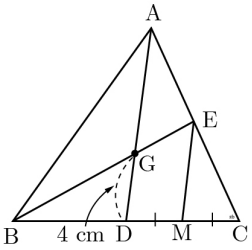
45. 다음 그림에서 점 G는 △ABC의 무게중심이고, 점 G′가 △GBC의 무게중심일 때, $\overline{GG'}$의 길이를 구하여라.



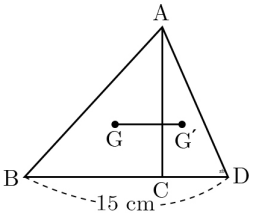
46. 다음 그림에서 점 G가 △ABC의 무게중심이고, $\overline{AD}$ // $\overline{EF}$일 때, $\overline{AG}$의 길이를 구하여라.



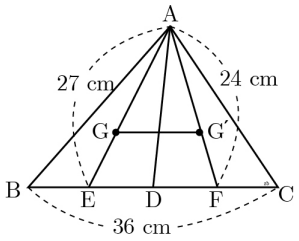
47. 다음 그림에서 점 G는 △ABC의 무게중심이고 점 M은 $\overline{DC}$의 중점이다. $\overline{DG}=4\text{cm}$일 때, $\overline{EM}$의 길이를 구하여라.



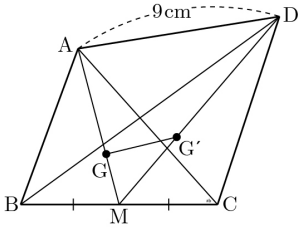
48. 점 G와 점 G′은 각각 △ABC와 △ACD의 무게중심이다. $\overline{BD}=15\text{cm}$일 때, $\overline{GG'}$의 길이를 구하여라.



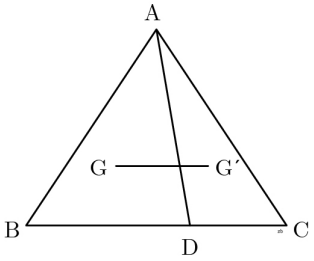
49. 다음 그림에서 $\overline{BD}=\overline{CD}$이고, 점 G, G′은 각각 △ABD, △ADC의 무게중심이다. $\overline{AE}=27\text{cm}$, $\overline{AF}=24\text{cm}$, $\overline{BC}=36\text{cm}$일 때, □GEFG′의 둘레의 길이를 구하여라.



50. 점 G는 △ABC의 무게중심, 점 G′은 △DBC의 무게중심이고, 점 M은 $\overline{BC}$의 중점이다. $\overline{AD}=9\text{cm}$일 때, $\overline{GG'}$의 길이를 구하여라.



51. 다음 그림에서 점 G와 점 G′은 각각 △ABD와 △ADC의 무게중심이다. $\overline{GG'}=6\text{cm}$이고 △ABC가 정삼각형일 때 △ABC의 둘레의 길이를 구하여라.



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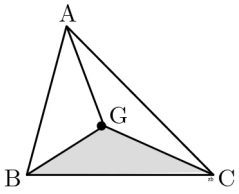
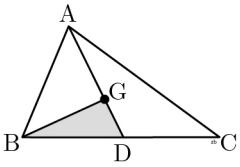
삼각형의 무게중심과 넓이

◪ 다음 그림에서 점 G가 △ABC의 무게중심이고, △ABC의 넓이가 $24\,\mathrm{cm}^2$일 때, 색칠한 부분의 넓이를 구하여라.

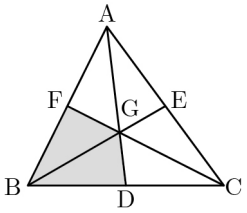
52.



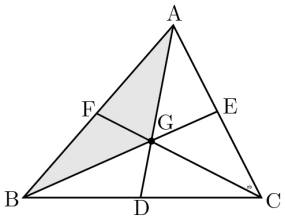
53.



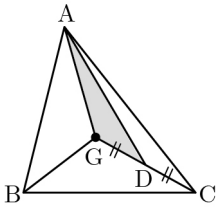
54.



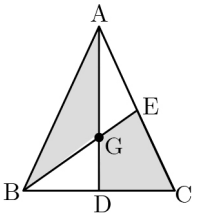
55.



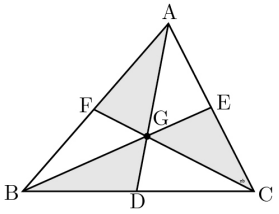
56.



57.

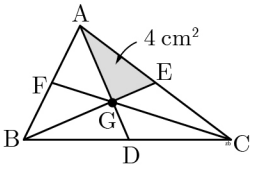


58.

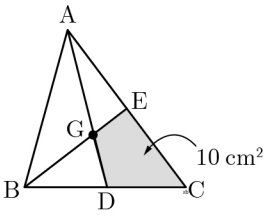


◪ 다음 그림에서 점 G가 △ABC의 무게중심이다. 색칠한 도형의 넓이가 다음과 같을 때, △ABC의 넓이를 구하여라.

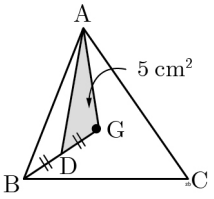
59.



60.



61.



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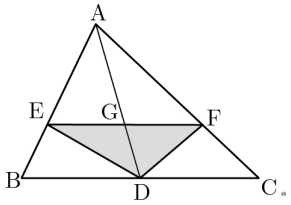
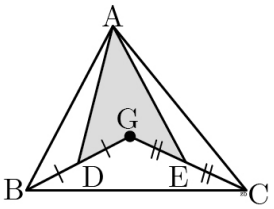
◪ **다음 그림에서 점 G는 △ABC의 무게중심이고, △ABC의 넓이가 주어질 때, 색칠한 부분의 넓이를 구하여라.**

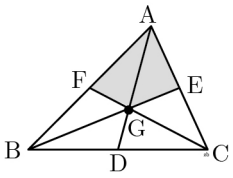
62. $\triangle ABC = 54cm^2$**일 때**



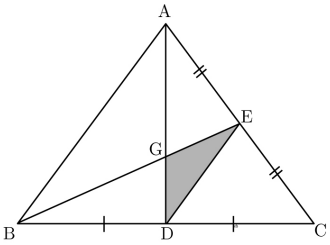
63. $\triangle ABC = 36\,cm^2$**일 때**



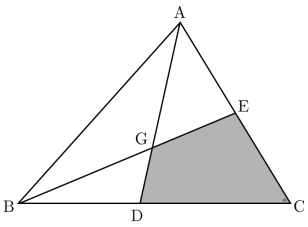
64. $\triangle ABC = 36\,cm^2$**일 때**



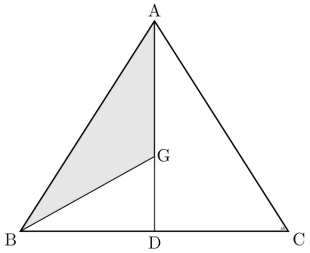
65. $\triangle ABC = 96cm^2$**일 때**



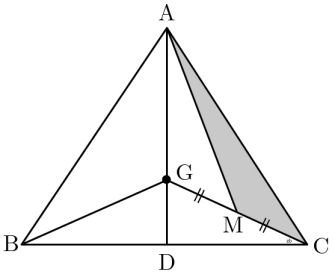
66. $\triangle ABC = 20cm^2$**일 때**



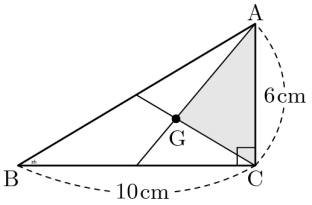
67. $\triangle ABC = 18cm^2$**일 때**



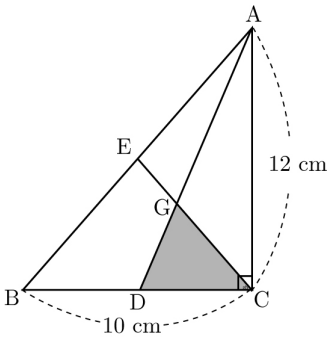
68. $\triangle ABC = 72cm^2$**일 때**



69.



70.



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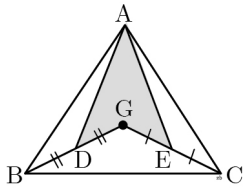
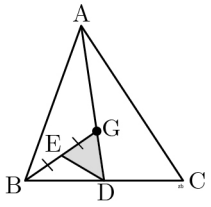
◪ 다음 그림에서 점 G가 △ABC의 무게중심이고, △ABC의 넓이가 18cm^2일 때, 색칠한 부분의 넓이를 구하여라.

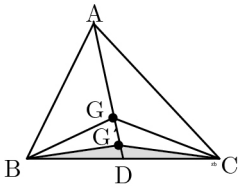
71.



72.

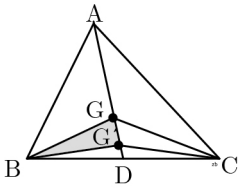


73.



(단, 점 G′은 △GBC의 무게중심)

74.

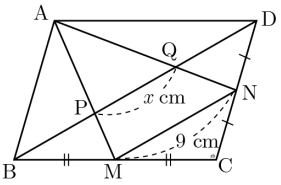


(단, 점 G′은 △GBC의 무게중심)

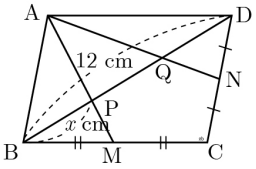
삼각형의 무게중심의 응용

◪ 다음 그림과 같은 평행사변형 ABCD에서 x의 값을 구하여라.(단, 점 O은 두 대각선의 교점이다.)

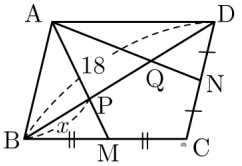
75.



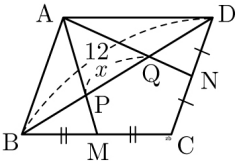
76.



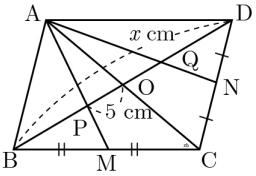
77.



78.



79.



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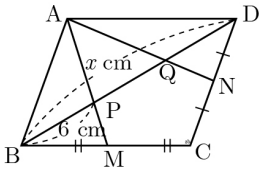
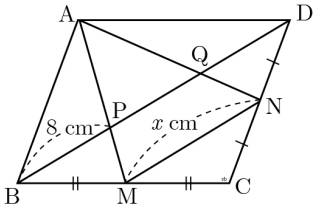
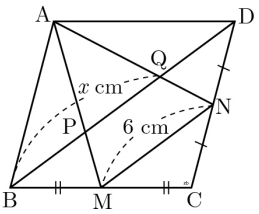
80.



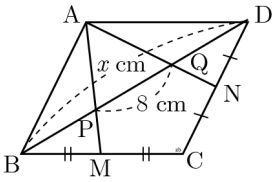
81.



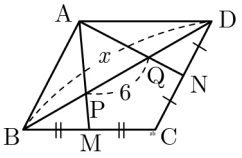
82.



83.



84.



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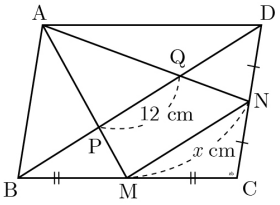

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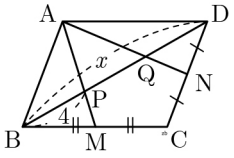

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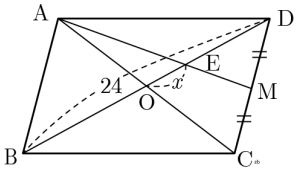

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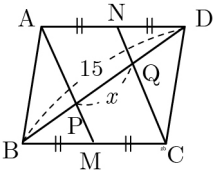

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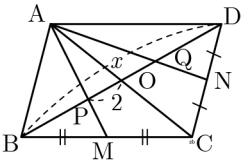

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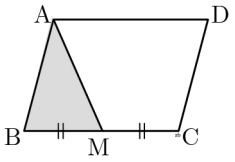
◪ 다음 그림의 평행사변형 ABCD의 넓이가 $48\,\mathrm{cm}^2$일 때, 색칠한 부분의 넓이를 구하여라.

90.



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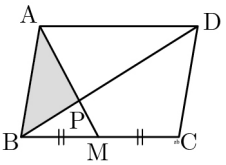

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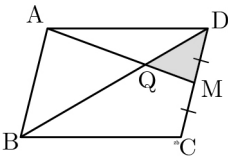

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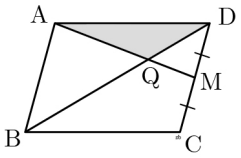

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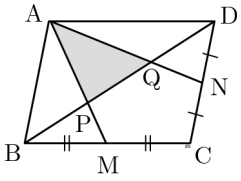
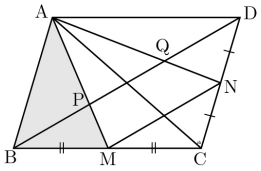


◪ 다음 그림과 같은 평행사변형 ABCD의 넓이가 $72\,\mathrm{cm}^2$일 때, 색칠한 부분의 넓이를 구하여라.

95.



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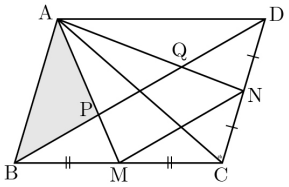

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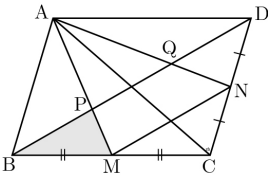

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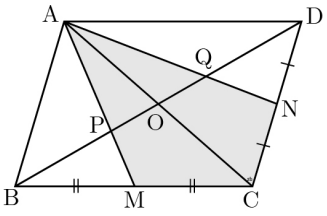

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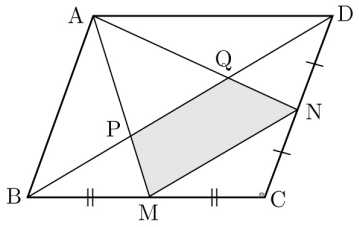
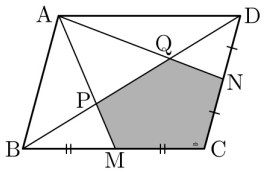
◪ 다음 그림과 같은 평행사변형 ABCD의 넓이가 주어질 때, 색칠한 부분의 넓이를 구하여라.

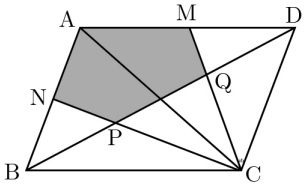
99. $\square ABCD = 48\,cm^2$



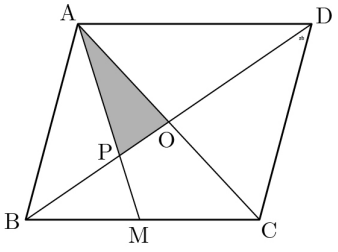
100. $\square ABCD = 30cm^2$



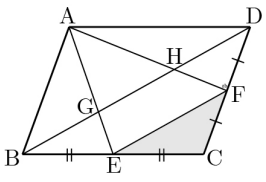
101. $\square ABCD = 108\,cm^2$



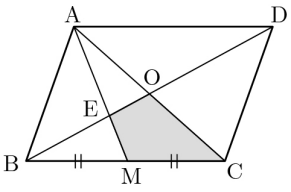
102. $\square ABCD = 24\,cm^2$



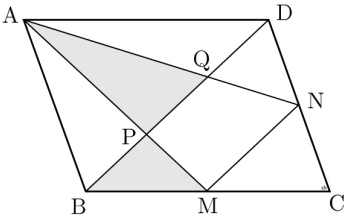
103. $\triangle AGH = 8\,cm^2$



104. $\square ABCD = 96\,cm^2$



105. $\square ABCD = 48\,cm^2$



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정답 및 해설

1) $9\,\mathrm{cm}^2$

⇨ $\triangle ADC = \triangle ABD = 9\,\mathrm{cm}^2$

2) $18\,\mathrm{cm}^2$

⇨ $\triangle ABC = \triangle ADC + \triangle ABD = 9+9 = 18\,(\mathrm{cm}^{2})$

3) $3\,\mathrm{cm}^2$

⇨ $\triangle EFC = \frac{1}{3}\triangle ADC = \frac{1}{3}\times 9 = 3\,(\mathrm{cm}^2)$

4) $12\,\mathrm{cm}^2$

⇨ $\triangle ABD = \frac{1}{2}\triangle ABC = \frac{1}{2}\times 24 = 12\,(\mathrm{cm}^2)$

5) $6\,\mathrm{cm}^2$

⇨ $\triangle ABE = \frac{1}{2}\triangle ABD = \frac{1}{4}\triangle ABC = \frac{1}{4}\times 24 = 6\,(\mathrm{cm}^2)$

6) $7\mathrm{cm}^2$

7) $49\mathrm{cm}^2$

8) $30\mathrm{cm}^2$

9) $48\mathrm{cm}^2$

10) $9\mathrm{cm}^2$

11) $13\mathrm{cm}^2$

12) $4\,\mathrm{cm}^2$

⇨ $\triangle ABE = \frac{1}{2}\triangle ABD = \frac{1}{2}\times\left(\frac{1}{2}\triangle ABC\right)$

$= \frac{1}{4}\triangle ABC = \frac{1}{4}\times 16 = 4(\mathrm{cm}^2)$

13) $32\mathrm{cm}^2$

14) $28\mathrm{cm}^2$

15) 6

16) 12

17) $\frac{9}{2}$

18) 12

19) 4

⇨ $x = \frac{1}{3}\overline{AD} = \frac{1}{3}\times 12 = 4$

20) 4cm

⇨ 점 D는 직각삼각형 ABC의 빗변의 중심이므로 외심이다. 이 때, $\overline{AD}=\overline{BD}=\overline{CD}$이므로 $\overline{BD}=6\mathrm{cm}$이다.

따라서 $\overline{BG}:\overline{GD}=2:1$이고, $x=\frac{2}{3}\times 6=4$이다.

21) 8

⇨ 점 G가 $\triangle ABC$의 무게중심이므로 $\overline{AE}=\overline{EC}$

$\triangle ADC$에서 $\overline{AD}//\overline{EF}$이므로 삼각형의 중점 연결 정리에 의해

$\overline{AD}=2\overline{EF}=2\times 6=12$

$\therefore\ x=\overline{AG}=\frac{2}{3}\overline{AD}=\frac{2}{3}\times 12=8$

22) $\frac{9}{2}$

⇨ $\overline{GD}=\frac{1}{2}\overline{AG}=3$, $\overline{BG}:\overline{GE}=2:1$이므로

$2:3=3:x$ $\therefore\ x=\frac{9}{2}$

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

⇨ 점 G가 $\triangle ABC$의 무게중심이므로 $\overline{AE}=\overline{EC}$

$\triangle ADC$에서 $\overline{AD}//\overline{EF}$이므로 삼각형의 중점 연결 정리에 의해 $\overline{AD}=2\overline{EF}=2\times 4=8$

$\therefore\ x=\overline{AG}=\frac{2}{3}\overline{AD}=\frac{2}{3}\times 8=\frac{16}{3}$

24) 6

⇨ 점 G가 $\triangle ABC$의 무게중심이므로 $\overline{AE}=\overline{EB}$

$\triangle ABD$에서 $\overline{AD}//\overline{EF}$이므로

삼각형의 중점 연결 정리에 의해

$\overline{AD}=2\overline{EF}=2\times 9=18$

$\therefore\ x=\overline{GD}=\frac{1}{3}\overline{AD}=\frac{1}{3}\times 18=6$

25) 3

⇨ 점 G가 $\triangle ABC$의 무게중심이므로 $\overline{AE}=\overline{EC}$

$\overline{AD}=\frac{3}{2}\overline{AG}=\frac{3}{2}\times 4=6$

$\triangle ADC$에서 $\overline{AD}//\overline{EF}$이므로 삼각형의 중점 연결 정리에 의해

$\therefore\ x=\overline{EF}=\frac{1}{2}\overline{AD}=\frac{1}{2}\times 6=3$

26) 4

⇨ $\overline{GD}=\frac{1}{3}\overline{AD}=\frac{1}{3}\times 18=6$

$\therefore\ x=\overline{GG'}=\frac{2}{3}\overline{GD}=\frac{2}{3}\times 6=4$

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

⇨ $\overline{GD}=\frac{1}{3}\overline{AD}=\frac{1}{3}\times 24=8$

$\therefore\ x=\overline{GG'}=\frac{2}{3}\overline{GD}=\frac{2}{3}\times 8=\frac{16}{3}$

28) 18

⇨ $\overline{GD}=\frac{3}{2}\overline{GG'}=\frac{3}{2}\times 6=9$

$\therefore\ x=\overline{AG}=2\overline{GD}=2\times 9=18$

29) 18

⇨ $\overline{GD}=\frac{3}{2}\overline{GG'}=\frac{3}{2}\times 4=6$

$\therefore\ x=3\overline{GD}=3\times 6=18$

30) 27

⇨ $\overline{GD}=3\overline{G'D}=3\times 3=9$

$\therefore\ x=\overline{AD}=3\overline{GD}=3\times 9=27$

31) $\frac{28}{3}$cm

⇨ $\overline{AG}:\overline{GD}=2:1$이므로 $\overline{GD}=\frac{1}{3}\times 42=14\,(\mathrm{cm})$이다.

또, $\overline{GG'}:\overline{G'D}=2:1$이므로 $\overline{GG'}=\frac{2}{3}\times 14=\frac{28}{3}\,(\mathrm{cm})$이다.

32) 4cm

⇨ $\overline{AG}:\overline{GD}=2:1$이므로 $\overline{GD}=\frac{1}{3}\times 18=6\,(\mathrm{cm})$이다.

또, $\overline{GG'}:\overline{G'D}=2:1$이므로 $\overline{GG'}=\frac{2}{3}\times 6=4\,(\mathrm{cm})$이다.

33) 6cm

34) $\frac{16}{3}$ cm

⇨ $\overline{AG}:\overline{GD}=2:1$, $\overline{GG'}:\overline{G'D}=2:1$이다.

$\overline{AD}=24$cm일 때,

$\overline{GG'}=\frac{2}{3}\overline{GD}=\frac{2}{3}\times\frac{1}{3}\overline{AD}=\frac{2}{9}\overline{AD}=\frac{2}{9}\times 24=\frac{16}{3}\,(\mathrm{cm})$

35) 12

⇨ $x=6$, $y=\frac{2}{3}\times 9=6$

$\therefore\ x+y=12$

36) 11.5

⇨ $x=3\times 2=6$, $y=\frac{11}{2}=5.5$

$\therefore\ x+y=11.5$

37) 8

⇨ $\overline{AE}=\overline{CE}$이므로 $x=5$이고, $\overline{AG}:\overline{GD}=2:1$이므로

$y=3$이다. 이 때, $x+y=8$이다.

38) 5

⇨ $\overline{BD}=\overline{CD}$이므로 $x=3$

$\overline{AG}:\overline{GD}=2:1$이므로 $4:y=2:1$ $\therefore y=2$

$\therefore x+y=3+2=5$

39) 31

⇨ $\overline{AG}:\overline{GD}=2:1$이므로 $\overline{AG}=18$cm이면 $x=9$이다.

또, $\overline{BG}:\overline{EG}=2:1$이므로 $\overline{EG}=11$cm이면 $y=22$이다.

$\therefore\ x+y=31$

40) 14

⇨ $x=4\times 2=8$, $y=9\times\frac{2}{3}=6$

$\therefore\ x+y=14$

41) $x=6$, $y=7$

⇨ $\overline{AM}$은 중선이므로 $\overline{MC}=9$cm이다.

$\overline{AG}:\overline{AM}=\overline{EG}:\overline{MC}=2:3$이므로 $x:9=2:3$, $x=6$이다.

$\overline{AG}:\overline{GM}=\overline{AE}:\overline{EC}=2:1$이므로 $14:y=2:1$, $y=7$이다.

42) $x=5$, $y=4$

⇨ $\overline{AG}:\overline{GQ}=2:1$이므로 $\overline{AG}=10$cm일 때, $x=5$이다.

또, $\overline{BQ}=\overline{CQ}$, $\overline{AG}:\overline{AQ}=\overline{PG}:\overline{BQ}=2:3$이므로

$2:3=y:6$, $y=4$이다.

43) $x=5$, $y=\frac{10}{3}$

⇨ $x=\frac{1}{2}\times 10=5$

$y:5=2:3$ $\therefore\ y=\frac{10}{3}$

44) 12cm

⇨ $\overline{CD}=\frac{3}{2}\overline{CG}=\frac{3}{2}\times 4=6(\mathrm{cm})$

이때, 직각삼각형의 빗변의 중점은 외심이므로

$\overline{AD}=\overline{BD}=\overline{CD}=6$cm

$\therefore\ \overline{AB}=\overline{AD}+\overline{BD}=6+6=12(\mathrm{cm})$

45) $\frac{8}{3}$ cm

⇨ $\overline{GD}=\frac{1}{3}\overline{AD}=\frac{1}{3}\times 12=4(\mathrm{cm})$

$\therefore\ \overline{GG'}=\frac{2}{3}\overline{GD}=\frac{2}{3}\times 4=\frac{8}{3}(\mathrm{cm})$

46) 4cm

⇨ 점 G가 $\triangle ABC$의 무게중심이므로 $\overline{AE}=\overline{EC}$

$\triangle ADC$에서 $\overline{AD}\,//\,\overline{EF}$이므로

삼각형의 중점연결 정리에 의해

$\overline{AD}=2\overline{EF}=2\times 3=6(\mathrm{cm})$

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$\therefore\ \overline{AG}=\frac{2}{3}\overline{AD}=\frac{2}{3}\times 6=4(\mathrm{cm})$

47) 6cm

⇨ $\overline{AG}:\overline{GD}=2:1$이므로 $\overline{AG}=8\mathrm{cm}$이다.

이 때, 점 E, M은 $\overline{AC}$, $\overline{CD}$의 중점이다.

따라서 $\overline{EM}=\frac{1}{2}\overline{AD}$이므로 $\overline{EM}=\frac{1}{2}\times 12=6(\mathrm{cm})$이다.

48) 5cm

49) 47cm

⇨ $\overline{BE}=\overline{ED}$, $\overline{DF}=\overline{FC}$이므로 $\overline{EF}=\frac{1}{2}\overline{BC}=18\mathrm{cm}$이다.

이 때, $\overline{AG}:\overline{AD}=\overline{GG'}:\overline{EF}=2:3$이므로

$2:3=\overline{GG'}:18$ $\therefore\ \overline{GG'}=12\mathrm{cm}$

또, $\overline{AG}:\overline{EG}=\overline{AG'}:\overline{FG'}=2:1$이므로

$\overline{EG}=\frac{1}{3}\times 27=9(\mathrm{cm})$, $\overline{FG'}=\frac{1}{3}\times 24=8(\mathrm{cm})$이다.

$\therefore$ (□GEFG′의 둘레의 길이)$=9+18+8+12=47(\mathrm{cm})$

50) 3cm

51) 54cm

⇨ $\overline{AG}$, $\overline{AG'}$의 연장선이 $\overline{BC}$와 만나는 점을 각각 E, F라 하면 $\overline{BE}=\overline{ED}$, $\overline{DF}=\overline{FC}$이다.

또, $\overline{AG}:\overline{AE}=\overline{GG'}:\overline{EF}=2:3$이므로 $\overline{GG'}=6\mathrm{cm}$일 때, $\overline{EF}$의 길이를 구하면 $2:3=6:\overline{EF}\Rightarrow\ \overline{EF}=9\mathrm{cm}$이다.

따라서 $\overline{BC}=18\mathrm{cm}$이고, △ABC는 정삼각형이므로 그 둘레의 길이는 $18\times 3=54(\mathrm{cm})$이다.

52) $8\mathrm{cm}^2$

53) $4\mathrm{cm}^2$

54) $8\mathrm{cm}^2$

⇨ $\square BDGF=\triangle GBD+\triangle GBF$

$=\frac{1}{6}\triangle ABC+\frac{1}{6}\triangle ABC=\frac{1}{3}\triangle ABC$

55) $8\mathrm{cm}^2$

56) $4\mathrm{cm}^2$

⇨ (색칠한 부분의 넓이)

$=\frac{1}{2}\triangle AGC=\frac{1}{2}\times\left(\frac{1}{3}\triangle ABC\right)$

$=\frac{1}{6}\triangle ABC=\frac{1}{6}\times 24=4(\mathrm{cm}^2)$

57) $16\mathrm{cm}^2$

⇨ (색칠한 부분의 넓이)

$=\frac{1}{3}\triangle ABC+\frac{1}{3}\triangle ABC$

$=\frac{2}{3}\triangle ABC=\frac{2}{3}\times 24=16(\mathrm{cm}^2)$

58) $12\mathrm{cm}^2$

⇨ $\triangle AFG+\triangle GBD+\triangle GCE$

$=\frac{1}{6}\triangle ABC+\frac{1}{6}\triangle ABC+\frac{1}{6}\triangle ABC$

$=\frac{1}{2}\triangle ABC=\frac{1}{2}\times 24=12(\mathrm{cm}^2)$

59) $24\mathrm{cm}^2$

⇨ $\triangle ABC=6\triangle GAE=6\times 4=24(\mathrm{cm}^2)$

60) $30\mathrm{cm}^2$

⇨ $\triangle ABC=3\square GDCE=3\times 10=30(\mathrm{cm}^2)$

61) $30\mathrm{cm}^2$

⇨ $\triangle ABC=3\triangle GAB$

$=3\times(2\triangle ADG)=6\triangle ADG=6\times 5=30(\mathrm{cm}^2)$

62) $12\mathrm{cm}^2$

⇨ $\triangle ABD=\frac{1}{2}\times 54=27(\mathrm{cm}^2)$이므로

$\triangle AED=\frac{2}{3}\times 27=18(\mathrm{cm}^2)$

(△EDG의 넓이)$=18\times\frac{1}{3}=6(\mathrm{cm}^2)$

(△DEF의 넓이)$=6\times 2=12(\mathrm{cm}^2)$

63) $12\mathrm{cm}^2$

⇨ (색칠한 부분의 넓이)

$=\frac{1}{3}\triangle ABC=\frac{1}{3}\times 36=12(\mathrm{cm}^2)$

64) $12\mathrm{cm}^2$

⇨ (색칠한 부분의 넓이)

$=\frac{1}{3}\triangle ABC=\frac{1}{3}\times 36=12(\mathrm{cm}^2)$

65) $8\mathrm{cm}^2$

⇨ $\triangle ABC=12\triangle GDE$에서 $96=12\triangle GDE$

$\therefore\ \triangle GDE=8(\mathrm{cm}^2)$

66) $\frac{20}{3}\mathrm{cm}^2$

⇨ $\square GDCE=\frac{1}{3}\triangle ABC=\frac{20}{3}(\mathrm{cm}^2)$

67) $6\mathrm{cm}^2$

68) $12\mathrm{cm}^2$

69) $10\mathrm{cm}^2$

⇨ △ABC의 넓이는 $\frac{1}{2}\times 6\times 10=30(\mathrm{cm}^2)$이므로

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$\triangle AGC = \frac{1}{3}\triangle ABC = 10(\text{cm}^2)$

70) 10cm^2

⇨ $\triangle ABC = \frac{1}{2}\times 10\times 12 = 60(\text{cm}^2)$

$\triangle GDC = \frac{1}{6}\triangle ABC = 10(\text{cm}^2)$

71) 6cm^2

⇨ (색칠한 부분의 넓이)

$= \frac{1}{2}\triangle ABG + \frac{1}{2}\triangle AGC$

$= \frac{1}{2}\times\left(\frac{1}{3}\triangle ABC\right) + \frac{1}{2}\times\left(\frac{1}{3}\triangle ABC\right)$

$= \frac{1}{6}\triangle ABC + \frac{1}{6}\triangle ABC$

$= \frac{1}{3}\triangle ABC = \frac{1}{3}\times 18 = 6(\text{cm}^2)$

72) $\frac{3}{2}\text{cm}^2$

⇨ (색칠한 부분의 넓이)

$= \frac{1}{2}\triangle GBD = \frac{1}{2}\times\left(\frac{1}{6}\triangle ABC\right)$

$= \frac{1}{12}\triangle ABC = \frac{1}{12}\times 18 = \frac{3}{2}(\text{cm}^2)$

73) 2cm^2

⇨ (색칠한 부분의 넓이)

$= \frac{1}{3}\triangle GBC = \frac{1}{3}\times\left(\frac{1}{3}\triangle ABC\right)$

$= \frac{1}{9}\triangle ABC = \frac{1}{9}\times 18 = 2(\text{cm}^2)$

74) 2cm^2

⇨ (색칠한 부분의 넓이)

$= \frac{1}{3}\triangle GBC = \frac{1}{3}\times\left(\frac{1}{3}\triangle ABC\right)$

$= \frac{1}{9}\triangle ABC = \frac{1}{9}\times 18 = 2(\text{cm}^2)$

75) 6

⇨ △BCD에서 삼각형의 두 변의 중점을 연결한 선분의 성질에 의해서 $\overline{BD} = 2\overline{MN} = 2\times 9 = 18(\text{cm})$

$\overline{BP} = \overline{PQ} = \overline{QD}$이므로 $x = \frac{1}{3}\overline{BD} = \frac{1}{3}\times 18 = 6$

76) 4

77) 6

78) 4

79) 30

⇨ $\overline{BP} : \overline{PO} = 2:1$이므로

$\overline{BP} : 5 = 2:1 \quad \therefore \overline{BP} = 10(\text{cm})$

따라서 $\overline{BO} = \overline{BP} + \overline{PO} = 10 + 5 = 15(\text{cm})$이므로

$x = 2\overline{BO} = 2\times 15 = 30$

80) 18

81) 12

⇨ $\overline{BP} = \overline{PQ} = \overline{QD}$이므로 $\overline{BD} = 3\overline{BP} = 3\times 8 = 24(\text{cm})$

△BCD에서 삼각형의 두 변의 중점을 연결한 선분의 성질에 의해서 $x = \frac{1}{2}\overline{BD} = \frac{1}{2}\times 24 = 12$

82) 8

⇨ △BCD에서 삼각형의 두 변의 중점을 연결한 선분의 성질에 의해서 $\overline{BD} = 2\overline{MN} = 2\times 6 = 12(\text{cm})$

$\overline{BP} = \overline{PQ} = \overline{QD}$이므로 $x = \frac{2}{3}\overline{BD} = \frac{2}{3}\times 12 = 8$

83) 24

84) 18

85) 18

⇨ $\overline{BP} = \overline{PQ} = \overline{QD}$이므로 $\overline{BD} = 3\overline{PQ} = 3\times 12 = 36(\text{cm})$

△BCD에서 삼각형의 두 변의 중점을 연결한 선분의 성질에 의해서 $x = \frac{1}{2}\overline{BD} = \frac{1}{2}\times 36 = 18$

86) 12

87) 4

⇨ 점 E는 △ACD의 무게중심이고, $\overline{DE} : \overline{EO} = 2:1$이다. 이때, $\overline{DO} = \overline{BO} = 12$이므로 $x = \frac{1}{3}\times 12 = 4$이다.

88) 5

89) 12

90) 12cm^2

⇨ (색칠한 부분의 넓이)

$= \frac{1}{2}\triangle ABC = \frac{1}{2}\times\left(\frac{1}{2}\square ABCD\right)$

$= \frac{1}{4}\square ABCD = \frac{1}{4}\times 48 = 12(\text{cm}^2)$

91) 8cm^2

⇨ (색칠한 부분의 넓이)

$= \frac{1}{3}\triangle ABC = \frac{1}{3}\times\left(\frac{1}{2}\square ABCD\right)$

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

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92) $4\,\mathrm{cm}^2$

⇨ (색칠한 부분의 넓이)

$$=\frac{1}{6}\triangle ACD=\frac{1}{6}\times\left(\frac{1}{2}\square ABCD\right)$$

$$=\frac{1}{12}\square ABCD=\frac{1}{12}\times 48=4(\mathrm{cm}^2)$$

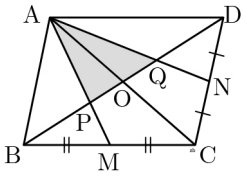
93) $8\,\mathrm{cm}^2$

⇨ (색칠한 부분의 넓이)

$$=\frac{1}{3}\triangle ACD=\frac{1}{3}\times\left(\frac{1}{2}\square ABCD\right)$$

$$=\frac{1}{6}\square ABCD=\frac{1}{6}\times 48=8(\mathrm{cm}^2)$$

94) $8\,\mathrm{cm}^2$

⇨ 

(색칠한 부분의 넓이)

$=\triangle APO+\triangle AOQ$

$$=\frac{1}{6}\triangle ABC+\frac{1}{6}\triangle ACD$$

$$=\frac{1}{12}\square ABCD+\frac{1}{12}\square ABCD$$

$$=\frac{1}{6}\square ABCD$$

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

95) $18\mathrm{cm}^2$

⇨ $\triangle ABM=\frac{1}{2}\triangle ABC=\frac{1}{2}\times\frac{1}{2}\square ABCD$

$$=\frac{1}{4}\square ABCD=\frac{1}{4}\times 72=18(\mathrm{cm}^2)$$

96) $12\mathrm{cm}^2$

⇨ 점 P는 $\triangle ABC$의 무게중심이므로

$$\triangle ABP=\frac{1}{3}\triangle ABC=\frac{1}{3}\times\frac{1}{2}\square ABCD$$

$$=\frac{1}{6}\square ABCD=\frac{1}{6}\times 72=12(\mathrm{cm}^2)$$

97) $6\mathrm{cm}^2$

⇨ 점 P는 $\triangle ABC$의 무게중심이므로

$$\triangle PBM=\frac{1}{6}\triangle ABC=\frac{1}{6}\times\frac{1}{2}\square ABCD$$

$$=\frac{1}{12}\square ABCD=\frac{1}{12}\times 72=6(\mathrm{cm}^2)$$

98) $36\mathrm{cm}^2$

⇨ $\square AMCN=\triangle AMC+\triangle ACN$

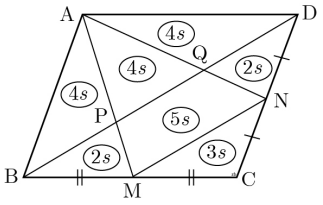
$$=\frac{1}{2}\triangle ABC+\frac{1}{2}\triangle ACD$$

$$=\frac{1}{2}\times\frac{1}{2}\square ABCD+\frac{1}{2}\times\frac{1}{2}\square ABCD$$

$$=\frac{1}{2}\square ABCD=\frac{1}{2}\times 72=36(\mathrm{cm}^2)$$

99) $10\,\mathrm{cm}^2$

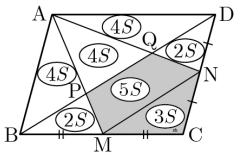
⇨ 점 P와 Q는 $\triangle ABC$와 $\triangle ACD$의 무게중심이므로 나눠지는 넓이의 비는 아래 그림과 같다.



$\square ABCD=48\,\mathrm{cm}^2$일 때, $\square PMNQ$의 넓이를 구하면

$\square PMNQ=\frac{5}{24}\times 48=10(\mathrm{cm}^2)$이다.

100) $10\mathrm{cm}^2$

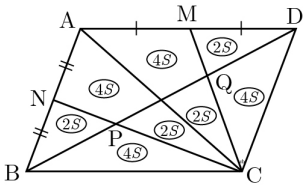
⇨ 

점 P와 Q는 각각 $\triangle ABC$와 $\triangle ACD$의 무게중심이고, 이 때 나눠지는 도형의 넓이의 비는 위의 그림과 같다.

$\square ABCD=30\mathrm{cm}^2$일 때, 오각형 PMCNQ의 넓이를 구하면 $\frac{8}{24}\times 30=10\,(\mathrm{cm}^2)$이다.

101) $36\,\mathrm{cm}^2$

⇨ 점 P와 Q는 각각 $\triangle ABC$와 $\triangle ACD$의 무게중심이고, 무게중심에 의해 나눠지는 도형의 넓이의 비는 아래 그림과 같다.



$\square ABCD=108\mathrm{cm}^2$일 때, 오각형 ANPQM의 넓이를 구하면 $\frac{8}{24}\times\square ABCD=\frac{8}{24}\times 108=36\mathrm{cm}^2$이다.

102) $2\,\mathrm{cm}^2$

⇨ 점 P는 $\triangle ABC$의 무게중심이고, 삼각형의 세 중선에 의해 6등분으로 나눠지는 삼각형의 넓이는 모두 같다.

$\square ABCD=24\mathrm{cm}^2$일 때, $\triangle ABC=\frac{1}{2}\times 24=12\,(\mathrm{cm}^2)$이고,

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$\triangle APO = \frac{1}{6} \times 12 = 2\,(\mathrm{cm}^2)$이다.

103) $6\,\mathrm{cm}^2$

104) $16\,\mathrm{cm}^2$

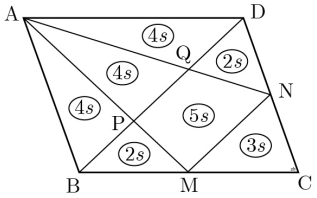
⇨ 점 E는 $\triangle ABC$의 무게중심이다. 이 때, 삼각형의 세 중선에 의해 6등분으로 나눠지는 삼각형의 넓이는 모두 같다.

따라서 $\square ABCD = 96\mathrm{cm}^2$일 때,

$$\square EMCO = \frac{1}{3}\triangle ABC = \frac{1}{3} \times \frac{1}{2}\square ABCD$$
$$= \frac{1}{6} \times 96 = 16\,(\mathrm{cm}^2)$$

105) $12\,\mathrm{cm}^2$

⇨ 점 P와 Q는 각각 $\triangle ABC$, $\triangle ACD$의 무게중심이고, 무게중심에 의해서 나누어지는 도형의 넓이의 비는 아래 그림과 같다.



$\square ABCD = 48\,\mathrm{cm}^2$일 때,

$\triangle PBM = \frac{2}{24}\square ABCD = \frac{1}{12} \times 48 = 4(\mathrm{cm}^2)$이고,

$\triangle APQ = \frac{4}{24}\square ABCD = \frac{1}{6} \times 48 = 8(\mathrm{cm}^2)$이다.

따라서 $\triangle PBM + \triangle APQ = 12$이다.

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