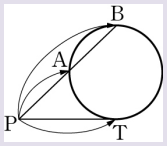
◇「콘텐츠산업 진흥법 시행령」제33조에 의한 표시
1) 제작연월일 : 2016-10-25
2) 제작자 : 교육지대㈜
3) 이 콘텐츠는 「콘텐츠산업 진흥법」에 따라 최초 제작일부터 5년간 보호됩니다.

◇「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.

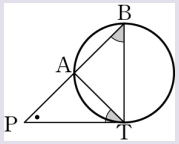
계산시 참고사항

1. 할선과 접선 사이의 관계

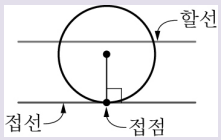
원의 외부의 한 점 P에서 그 원에 그은 접선과 할선이 원과 만나는 점을 각각 T, A, B라 하면 $\overline{PT}^2=\overline{PA}\times\overline{PB}$



설명) 오른쪽 그림과 같이 접선과 현의 관계에 의해
$\angle PTA=\angle PBT$이고, $\angle P$는 공통이므로
$\triangle PAT\backsim\triangle PTB$(AA 닮음)
따라서 $\overline{PA}:\overline{PT}=\overline{PT}:\overline{PB}$이므로 $\overline{PT}^2=\overline{PA}\times\overline{PB}$

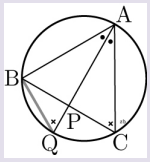
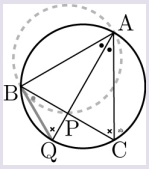


참고

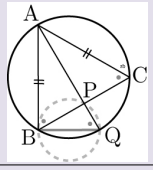


2. 할선과 접선의 활용

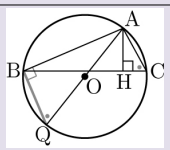
1) 각의 이등분선

(1) 	(2) 
$\triangle ABQ\backsim\triangle APC$이므로 $\overline{AB}:\overline{AP}=\overline{AQ}:\overline{AC}$ $\therefore\ \overline{AB}\times\overline{AC}=\overline{AP}\times\overline{AQ}$	$\angle BAP=\angle QBP$이므로 $\overline{BQ}$는 세 점 A, B, P를 지나는 원의 접선이므로 $\therefore\ \overline{QB}^2=\overline{QP}\times\overline{QA}$

2) 이등변삼각형에서의 응용

	$\angle ABP=\angle BQP$이므로 $\overline{AB}$는 세 점 B, P, Q를 지나는 원의 접선이므로 $\therefore\ \overline{AB}^2=\overline{AP}\times\overline{AQ}$

3) 외접원과 지름의 길이

	$\triangle ABQ\backsim\triangle AHC$이므로 $\overline{AB}:\overline{AH}=\overline{AQ}:\overline{AC}$ $\therefore\ \overline{AB}\times\overline{AC}=\overline{AQ}\times\overline{AH}$

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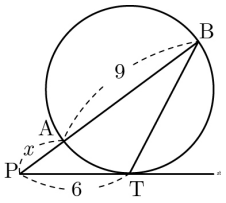
할선과 접선 사이의 관계

◪ 다음 그림에서 $\overline{PT}$는 점 T를 접점으로 하는 원 O의 접선일 때, x의 값을 구하여라.

1.



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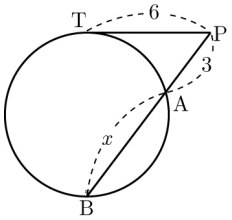

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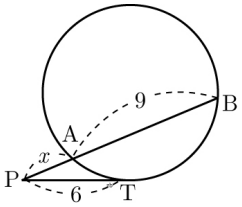

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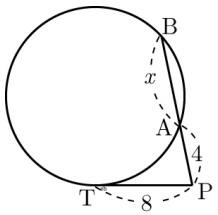

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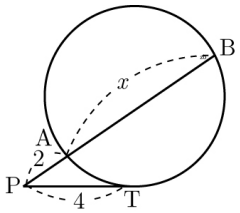

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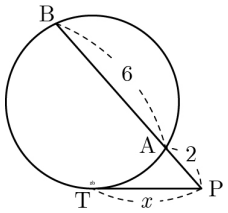

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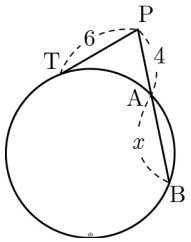

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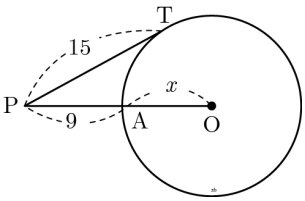

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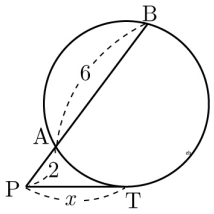

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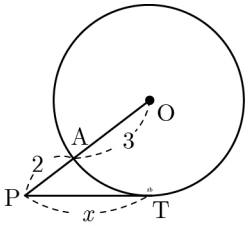

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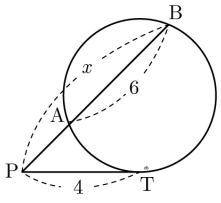
11.



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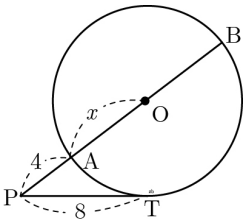

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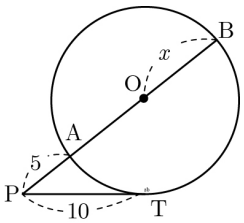

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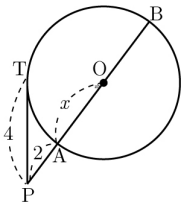

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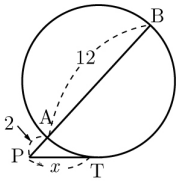

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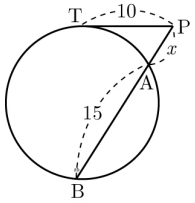

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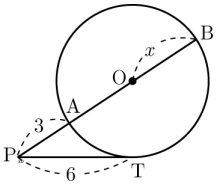

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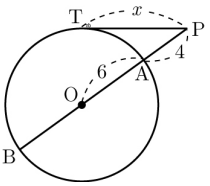

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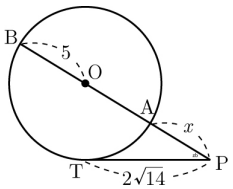

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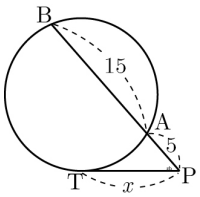

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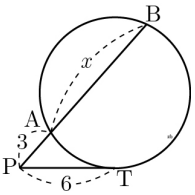

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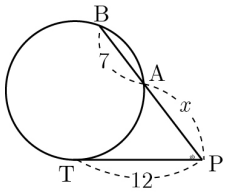

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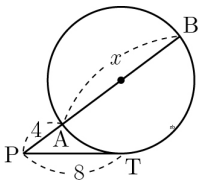

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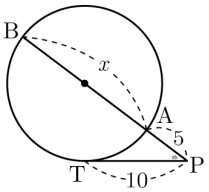

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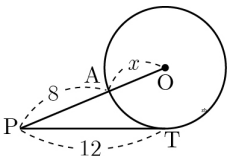

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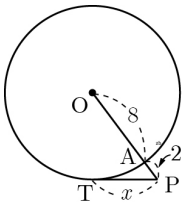

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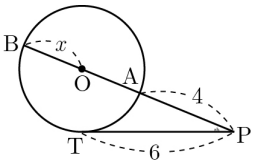

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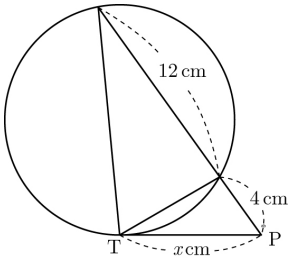
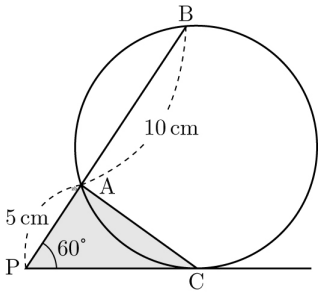
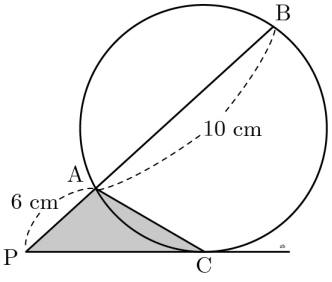


◪ **다음 물음에 답하여라.**

29. **다음 그림에서 직선 PC가 원의 접선이고, 점 C는 접점이다. $\overline{AP}=5\text{cm}$, $\overline{AB}=10\text{cm}$, $\angle P=60^\circ$ 일 때, 삼각형 APC의 넓이를 구하여라.**



30. **다음 그림에서 직선 PC가 원의 접선이고, 점 C는 접점이다. $\overline{AP}=6\text{cm}$, $\overline{AB}=10\text{cm}$, $\angle BPC=45^\circ$ 일 때, 삼각형 APC의 넓이를 구하여라.**



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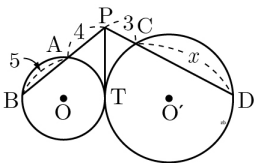
두 원의 공통접선

◪ 다음 그림에서 $\overline{PT}$은 각각 두 원 O와 O′의 공통접선일 때, x의 값을 구하여라.

31.



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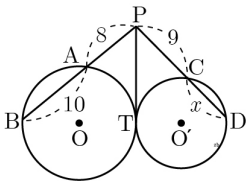

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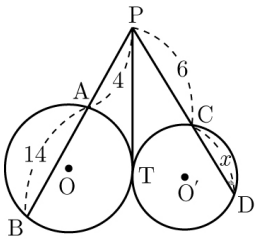

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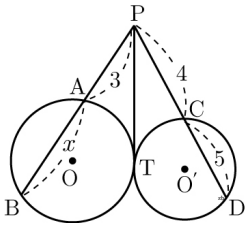

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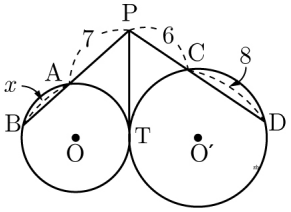
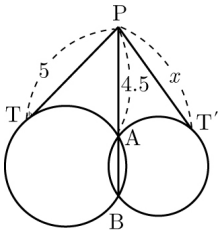


◪ 다음 그림에서 $\overline{PT}$, $\overline{PT'}$은 각각 점 T, T′을 접점으로 하는 두 원의 접선일 때, x의 값을 구하여라.

36.



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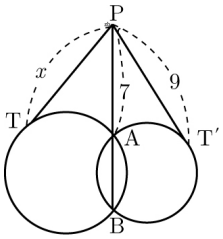
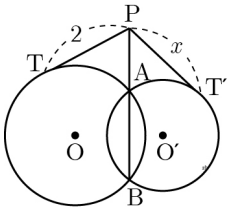


38.



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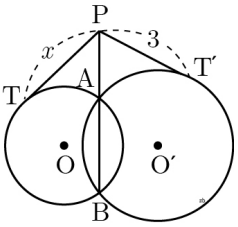

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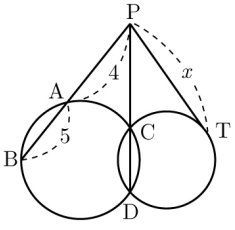

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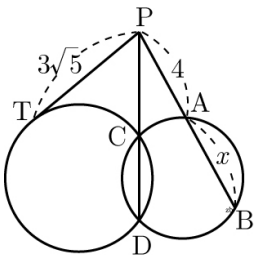
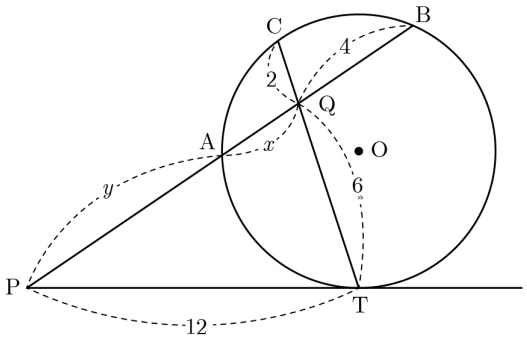
41.



◪ **다음 그림에서 $\overline{PT}, \overline{PT'}$은 원의 접선일 때, x, y의 값을 각각 구하여라.**

42.



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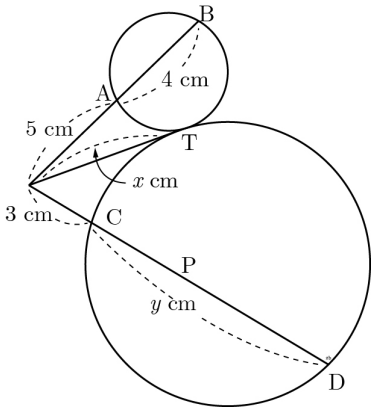

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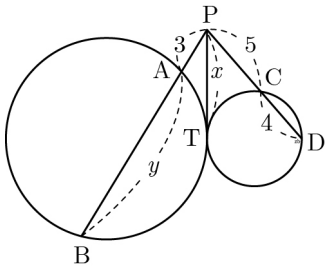

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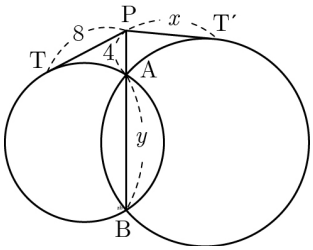
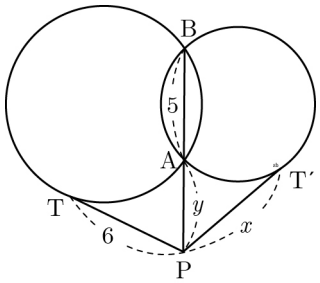
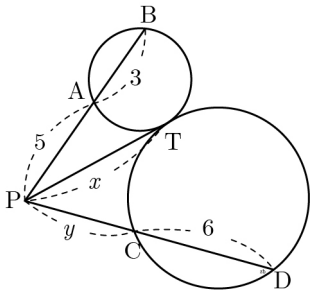


46.



47.



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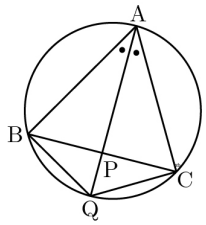
할선과 접선의 응용

◪ 다음 그림에서 $\angle BAQ = \angle CAQ$일 때, 다음 설명 중 옳은 것에는 ○표, 옳지 않은 것에는 ×표 하여라.



48. $\angle QBP = \angle BAP$ ( )

49. $\overline{BQ}^2 = \overline{QP} \times \overline{PA}$ ( )

50. $\triangle ABP \backsim \triangle AQC$ ( )

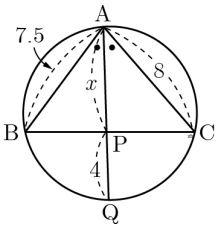
51. $\overline{AB} : \overline{AC} = \overline{AP} : \overline{AQ}$ ( )

52. $\overline{AB} \times \overline{AC} = \overline{AP} \times \overline{AQ}$ ( )

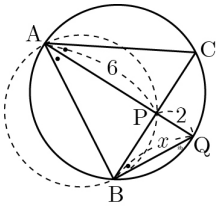
53. $\overline{BQ}$는 세 점 A, B, P를 지나는 원의 접선이다. ( )

◪ 다음 그림에서 $\angle BAQ = \angle CAQ$일 때, x의 값을 구하여라.

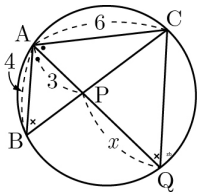
54.



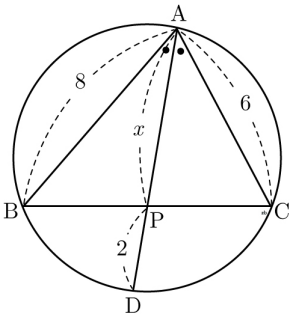
55.



56.

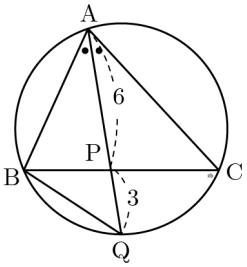


57.

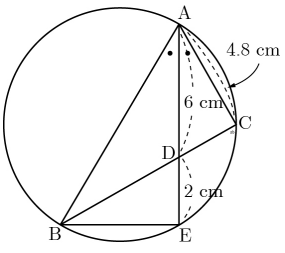


◪ 다음 물음에 답하여라.

58. 다음 그림에서 $\triangle ABC$는 원에 내접하고 $\overline{AQ}$는 $\angle A$의 이등분선이다. $\overline{AP} = 6$, $\overline{PQ} = 3$일 때, $\overline{BQ}$의 길이를 구하여라.



59. $\triangle ABC$는 원에 내접하고 $\overline{AE}$는 $\angle A$를 이등분한다. $\overline{AC} = 4.8\text{cm}$, $\overline{AD} = 6\text{cm}$, $\overline{DE} = 2\text{cm}$일 때, $\overline{AB} + \overline{BE}$의 값을 구하여라.



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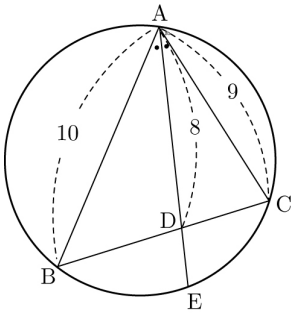
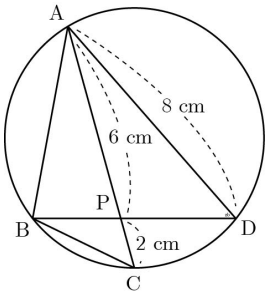
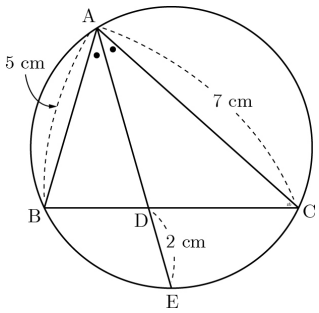
60. 다음 그림에서 $\triangle ABC$는 원에 내접하고 $\overline{AB}=10$, $\overline{AD}=8$, $\overline{AC}=9$이다. $\angle BAD=\angle CAD$일 때, $\overline{DE}$의 길이를 구하여라.



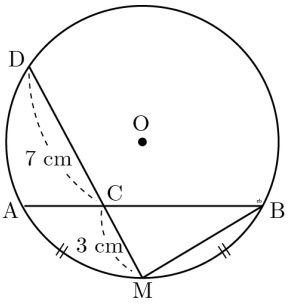
61. 다음 그림에서 $\overset{\frown}{BC}=\overset{\frown}{CD}$이고 $\overline{AD}=8\text{cm}$, $\overline{AP}=6\text{cm}$, $\overline{PC}=2\text{cm}$일 때, $\overline{AB}+2\overline{BC}$의 값은?



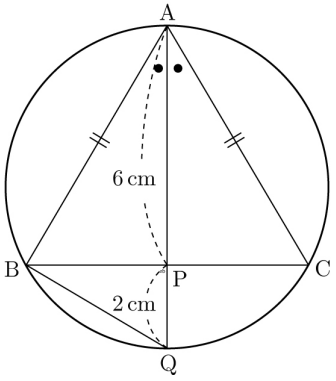
62. 다음 그림에서 $\angle BAD=\angle CAD$이고, $\overline{AB}=5\text{cm}$, $\overline{AC}=7\text{cm}$, $\overline{DE}=2\text{cm}$일 때, $\overline{AD}$의 길이를 구하여라.



63. 다음 그림에서 점 M은 $\overset{\frown}{AB}$의 중점이고 $\overline{MC}$의 연장선이 원 O와 만나는 점을 D라 한다. $\overline{MC}=3\text{cm}$, $\overline{CD}=7\text{cm}$일 때, $\overline{MB}$의 길이를 구하여라.



◪ 원에 내접하는 이등변삼각형 ABC의 꼭짓점 A의 각의 이등분선이 $\overline{BC}$와 만나는 점을 P, 원과 만나는 점을 Q라 하자. $\overline{AP}=6\text{cm}$, $\overline{PQ}=2\text{cm}$일 때, 다음을 구하여라.



64. $\overline{AB}$의 길이를 구하여라.

65. $\overline{BP}$의 길이를 구하여라.

66. $\overline{BQ}$의 길이를 구하여라.

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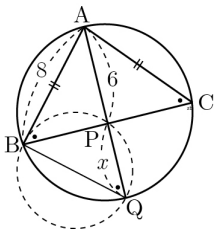
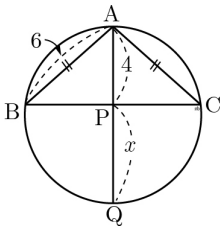
◪ 다음 그림과 같이 원에 내접하는 이등변삼각형 ABC에 대하여 x의 값을 구하여라.

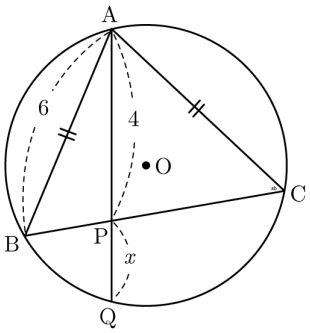
67.



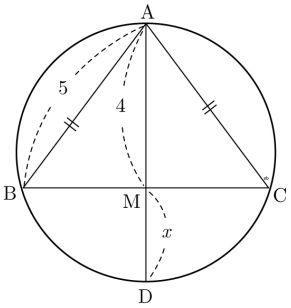
68.



69.

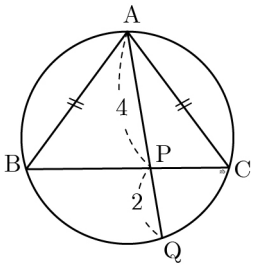


70.

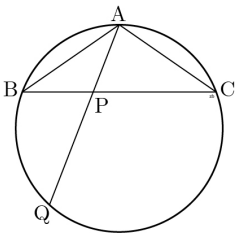


◪ 다음 물음에 답하여라.

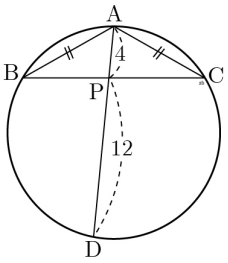
71. 다음 그림과 같이 원에 내접하는 $\triangle \mathrm{ABC}$에서 $\overline{\mathrm{AB}}=\overline{\mathrm{AC}}$이고 $\overline{\mathrm{AP}}=4$, $\overline{\mathrm{PQ}}=2$일 때, $\overline{\mathrm{AB}}$의 길이를 구하여라.



72. 다음 그림과 같이 $\triangle \mathrm{ABC}$는 원에 내접하고, $\overline{\mathrm{AB}}=\overline{\mathrm{AC}}$인 이등변삼각형이다. $\overline{\mathrm{AP}}=4$, $\overline{\mathrm{PQ}}=8$일 때, $\overline{\mathrm{AB}}$의 길이를 구하여라.



73. 다음 그림과 같이 $\triangle \mathrm{ABC}$는 원에 내접하고, $\overline{\mathrm{AB}}=\overline{\mathrm{AC}}$인 이등변삼각형이다. $\overline{\mathrm{AP}}=4$, $\overline{\mathrm{PD}}=12$일 때, $\overline{\mathrm{AC}}$의 길이를 구하여라.



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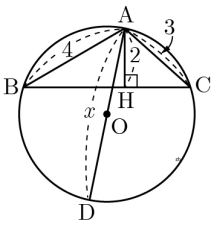
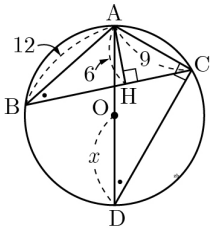
◪ 다음 그림의 원 O에서 x의 값을 구하여라.

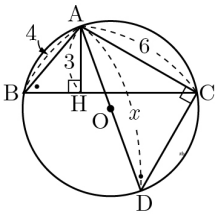
74.



75.

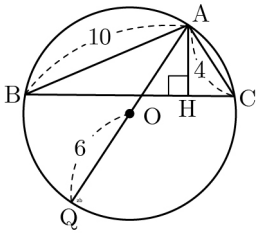


76.



◪ 다음 물음에 답하여라.

77. 다음 그림과 같이 $\triangle ABC$는 반지름의 길이가 6인 원 O에 내접한다. $\overline{AH} \perp \overline{BC}$이고 $\overline{AB} = 10$, $\overline{AC} = 4$일 때, $\overline{AH}$의 길이를 구하여라.



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정답 및 해설

1) 3

⇨ $6^2 = x \times (x+9)$에서

$x^2+9x-36=0$, $(x+12)(x-3)=0$

$\therefore x=3(\because x>0)$

2) 9

⇨ $6^2 = 3 \times (3+x)$ $\therefore x=9$

3) 3

⇨ $6^2 = x(x+9)$, $x^2+9x-36=0$

$(x-3)(x+12)=0$ $\therefore x=3$ $(x>0)$

4) 12

⇨ $8^2 = 4 \times (4+x)$ $\therefore x=12$

5) 6

⇨ $4^2 = 2 \times (2+x)$ $\therefore x=6$

6) 4

⇨ $x^2 = 2 \times (2+6)$에서

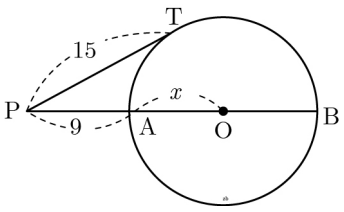
$x^2=16$ $\therefore x=4(\because x>0)$

7) 5

⇨ $6^2 = 4 \times (4+x)$에서 $4+x=9$ $\therefore x=5$

8) 8

⇨ 다음 그림과 같이 $\overline{AO}$의 연장선을 그어 원 O와 만나는 점을 B라 하면



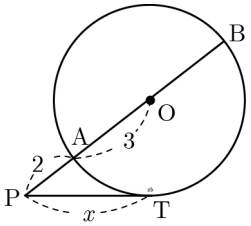
$15^2 = 9 \times (9+2x)$, $9+2x=25$ $\therefore x=8$

9) 4

⇨ $x^2 = 2 \times (2+6)$ $\therefore x=4(x>0)$

10) 4

⇨ 다음 그림과 같이 $\overline{AO}$의 연장선을 그어 원 O와 만나는 점을 B라 하면



$x^2 = 2 \times (2+6), x^2=16$ $\therefore x=4(\because x>0)$

11) 8

⇨ $4^2 = (x-6) \times x$에서

$x^2-6x-16=0$, $(x-8)(x+2)=0$

$\therefore x=8(\because x>0)$

12) 6

⇨ $8^2 = 4 \times (4+2x)$에서 $4+2x=16$ $\therefore x=6$

13) $\frac{15}{2}$

⇨ $10^2 = 5 \times (5+2x)$에서 $5+2x=20$ $\therefore x=\frac{15}{2}$

14) 3

⇨ $4^2 = 2(2+2x)$ $\therefore x=3$

15) $2\sqrt{7}$

⇨ $x^2 = 2 \times (2+12)$ $\therefore x=2\sqrt{7}$ $(x>0)$

16) 5

⇨ $10^2 = x(x+15)$, $x^2+15x-100=0$

$(x-5)(x+20)=0$ $\therefore x=5$ $(x>0)$

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

⇨ $6^2 = 3(3+2x)$ $\therefore x=\frac{9}{2}$

18) 8

⇨ $x^2 = 4 \times (4+6+6)$ $\therefore x=8$ $(x>0)$

19) 4

⇨ $(2\sqrt{14})^2 = x(x+5+5)$, $x^2+10x-56=0$

$(x-4)(x+14)=0$ $\therefore x=4$ $(x>0)$

20) 10

⇨ $x^2 = 5 \times (5+15)$ $\therefore x=10(x>0)$

21) 9

⇨ $6^2 = 3 \times (3+x)$ $\therefore x=9$

22) 9

⇨ $12^2 = x \times (x+7)$, $x^2+7x-144=9$

$(x-9)(x+16)=0$ $\therefore x=9(x>0)$

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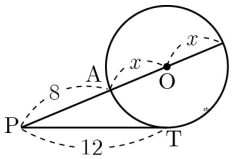
23) 12

⇨ $8^2=4\times(4+x)$ $\therefore\ x=12$

24) 15

⇨ $10^2=5\times(5+x)$ $\therefore\ x=15$

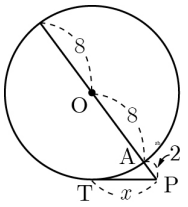
25) 5

⇨ 

$12^2=8\times(8+2x)$

$2x=10$ $\therefore\ x=5$

26) 6

⇨ 

$x^2=2\times(2+2\times8)$ $\therefore\ x=6(x>0)$

27) $\frac{5}{2}$

⇨ $6^2=4\times(4+2x), 2x=5$ $\therefore\ x=\frac{5}{2}$

28) 8

⇨ $\overline{PT}$가 원의 접선이 되어서

$x^2=4\times(4+12)=64$ $\therefore\ x=8\ (x>0)$

29) $\frac{75}{4}\,\mathrm{cm}^2$

⇨ $\overline{PC}$가 접선이 되어서

$\overline{PC}^2=5\times15=75$ $\therefore\ \overline{PC}=\sqrt{75}=5\sqrt{3}\,(\mathrm{cm})\ (\overline{PC}>0)$

$(\triangle APC\text{의 넓이})=\frac{1}{2}\times\sin60^\circ\times5\times5\sqrt{3}=\frac{75}{4}(\mathrm{cm}^2)$

30) $12\sqrt{3}\,\mathrm{cm}^2$

⇨ $\overline{PC}^2=\overline{PA}\times\overline{PB}=6\times16=96$이므로

$\overline{PC}=4\sqrt{6}(\mathrm{cm})\ (\overline{PC}>0)$

이제 $\triangle APC$에서 $\angle APC=45^\circ$이므로 넓이는

$\frac{1}{2}\times6\times4\sqrt{6}\times\sin45^\circ=12\sqrt{6}\times\frac{\sqrt{2}}{2}=12\sqrt{3}\,(\mathrm{cm}^2)$

31) 9

⇨ 원 O에서 $\overline{PA}\times\overline{PB}=\overline{PT}^2$이므로

$4\times(4+5)=\overline{PT}^2$

원 O′에서 $\overline{PC}\times\overline{PD}=\overline{PT}^2$이므로

$3\times(3+x)=\overline{PT}^2$

따라서 $\overline{PA}\times\overline{PB}=\overline{PC}\times\overline{PD}$이므로

$4\times(4+5)=3\times(3+x)$ $\therefore\ x=9$

32) 7

⇨ $8\times(8+10)=9\times(9+x)$ $\therefore\ x=7$

33) 6

⇨ $4\times(4+14)=6\times(6+x)$ $\therefore x=6$

34) 9

⇨ $3\times(3+x)=4\times(4+5)$ $\therefore x=9$

35) 5

⇨ $\overline{PA}\times\overline{PB}=\overline{PC}\times\overline{PD}$이므로

$7\times(7+x)=6\times(6+8)$ $\therefore x=5$

36) 5

⇨ $\overline{PT}=\overline{PT'}$에서 $x=5$

37) 9

⇨ $\overline{PT}=\overline{PT'}$에서 $x=9$

38) 2

⇨ 원 O에서 $\overline{PT}^2=\overline{PA}\times\overline{PB}$이고, 원 O′에서

$\overline{PT'}^2=\overline{PA}\times\overline{PB}$이므로 $\overline{PT}=\overline{PT'}$이다.

$\therefore\ x=2$

39) 3

40) 6

⇨ $x^2=4\times(4+5)$ $\therefore x=6(x>0)$

41) $\frac{29}{4}$

⇨ $(3\sqrt{5})^2=4\times(4+x)$ $\therefore x=\frac{29}{4}$

42) $x=3,\ y=9$

⇨ 한 원 위에 존재 하는 네 점 A, B, C, T에 대해 $\overline{QA}\times\overline{QB}=\overline{QC}\times\overline{QT}$이므로, $4x=2\times6$ $\therefore x=3$

접선과 할선의 관계에 따라 $\overline{PT}^2=\overline{PA}\times\overline{PB}$가 성립하므로,

$12^2=y(y+7)$ $\therefore y=9\ (y>0)$

43) $x=3\sqrt{5}$, $y=12$

44) $x=3\sqrt{5}, y=12$

⇨ $x^2=5\times(5+4)$이므로

$x^2=45$ $\therefore x=3\sqrt{5}\,(\because x>0)$

$x^2=3\times(3+y)$이므로

$45=3\times(3+y), 3y=36$ $\therefore y=12$

45) $x=8, y=12$

⇨ $\overline{PT}=\overline{PT'}$이므로 $x=8$

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$8^2=4\times(4+y)$이므로 $4y=48$ $\therefore y=12$

46) $x=6, y=4$

⇨ $\overline{PT}=\overline{PT'}$이므로 $x=6$

$6^2=y\times(y+5)$이므로

$y^2+5y-36=0$, $(y+9)(y-4)=0$

$\therefore y=4(\because y>0)$

47) $x=2\sqrt{10}, y=4$

⇨ $x^2=5\times(5+3)$이므로

$x^2=40$ $\therefore x=2\sqrt{10}(\because x>0)$

$x^2=y\times(y+6)$이므로

$40=y\times(y+6), y^2+6y-40=0$

$(y+10)(y-4)=0$ $\therefore y=4(\because y>0)$

48) ○

49) ×

⇨ $\overline{BQ}^2=\overline{QP}\times\overline{QA}$

50) ○

51) ×

⇨ $\overline{AB}:\overline{AQ}=\overline{AP}:\overline{AC}$

52) ○

53) ○

54) 6

⇨ $\overline{CQ}$를 그으면 △ABP와 △AQC에서

$\angle BAP=\angle QAC$, $\angle ABP=\angle AQC$

$\therefore$ △ABP∽△AQC(AA 닮음)

$\overline{AB}\times\overline{AC}=\overline{AP}\times\overline{AQ}$

$7.5\times8=x(x+4)$, $x^2+4x-60=0$

$(x+10)(x-6)=0$ $\therefore x=6\ (x>0)$

55) 4

⇨ $x^2=2\times(2+6)=16$ $\therefore x=4\ (x>0)$

56) 5

⇨ $4\times6=3\times(3+x), 3+x=8$ $\therefore x=5$

57) 6

⇨ △ABP와 △ADC에서 $\angle BAP=\angle DAC$이고 $\angle ABP=\angle ADC$이므로 두 삼각형은 서로 닮음이다.

$\overline{AB}:\overline{AP}=\overline{AD}:\overline{AC}$

$\Rightarrow 8:x=x+2:6$

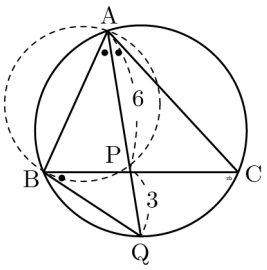
$\Rightarrow x(x+2)=48$

$\Rightarrow x^2+2x-48=0$ $\therefore x=6(x>0)$

58) [정답] $3\sqrt{3}$

⇨ $\angle QBC=\angle QAC$ ($\overset{\frown}{QC}$에 대한 원주각)이므로

$\angle QBC=\angle BAP$



따라서 $\overline{BQ}$는 세 점 A, B, P를 지나는 원의 접선이다.

$\overline{BQ}^2=\overline{QP}\cdot\overline{QA}$이므로

$\overline{BQ}^2=3\times(3+6)=27$ $\therefore \overline{BQ}=3\sqrt{3}(\overline{BQ}>0)$

59) 14cm

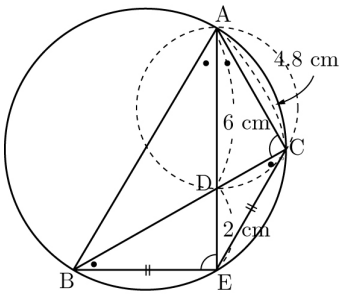
⇨ △ABE와 △ADC에서 $\angle BAE=\angle DAC$,

$\angle AEB=\angle ACD(\because \overset{\frown}{AB}$에 대한 원주각)이므로

△ABE∽△ADC(AA 닮음)

$\overline{AB}:\overline{AD}=\overline{AE}:\overline{AC}$이므로

$\overline{AB}:6=8:4.8$ $\therefore \overline{AB}=10(\text{cm})$



또 $\angle DCE=\angle DAC$이므로 $\overline{EC}$를 세 점 A, C, D를 지나는 원의 접선이라고 할 수 있다.

$\overline{EC}^2=2\times(2+6)=16$ $\therefore \overline{EC}=4(\text{cm})\ (\overline{EC}>0)$

$\therefore \overline{BE}=\overline{EC}=4\text{cm}$

$\therefore \overline{AB}+\overline{BE}=14$

60) $\frac{13}{4}$

⇨ $\overline{DE}=x$라고 할 때, $\overline{AB}\times\overline{AC}=\overline{AD}\times\overline{AE}$이므로

$10\times9=8\times(8+x)$, $x=\frac{13}{4}$이다.

61) 14

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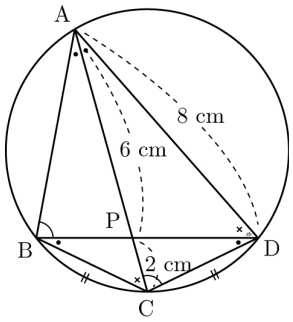


⇨

$\widehat{BC}=\widehat{CD}$이므로 $\angle BAC=\angle CAD$

$\therefore \angle BAC=\angle BDC=\angle CAD=\angle CBD$

또 원주각의 성질에 의해

$\angle ABD=\angle ACD,\ \angle ADB=\angle ACB$

$\triangle ABP$와 $\triangle ACD$는 서로 닮음이므로 ($\because$ AA 닮음)

$\overline{AB}:6=8:8 \qquad \therefore \overline{AB}=6$

그림에서 $\angle PBC=\angle BAP$이므로

점 A, B, P를 지나는 원을 그릴 수 있다. 이때 $\overline{BC}$는 그 원의 접선이므로

$\overline{BC}^2=\overline{CP}\times\overline{CA}$

$\overline{BC}^2=2\times 8 \qquad \therefore \overline{BC}=4\ (\overline{BC}>0)$

$\therefore \overline{AB}+2\overline{BC}=14$

62) 5cm

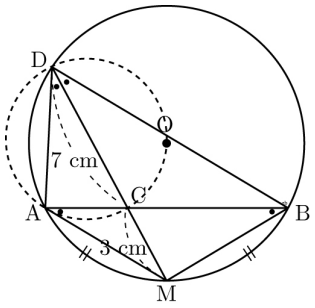
⇨ $\overline{AD}=x$ 라고 하자.

원과 비례의 성질에 의해서 $5\times 7=x\times(x+2)$

$x^2+2x-35=0,\ (x+7)(x-5)=0,\ x=5\ (x>0)$

따라서 $\overline{AD}=5$ 가 된다.

63) $\sqrt{30}$ cm



⇨

$\widehat{AM}=\widehat{BM}$이므로 $\angle ADM=\angle ABM=\angle BDM=\angle BAM$

$\therefore \angle CAM=\angle ADM$

$\overline{AM}$을 세 점 A, C, D를 지나는 원의 접선으로 볼 수 있으므로 $\overline{AM}=x$cm라 하면

$x^2=3\times(3+7)=30 \qquad \therefore x=\sqrt{30}$

$\therefore \overline{MB}=\overline{AM}=\sqrt{30}$ cm

64) $4\sqrt{3}$ cm

⇨ 직각삼각형 ABP에서 $\overline{AB}=\sqrt{(2\sqrt{3})^2+6^2}=4\sqrt{3}\,(\text{cm})$

65) $2\sqrt{3}$ cm

⇨ 이등변삼각형 ABC의 꼭지각 A의 이등분선은 $\overline{BC}$를 수직이등분하므로 $\overline{BP}=\overline{CP}$이다.

$\overline{BP}\times\overline{CP}=6\times 2 \qquad \therefore \overline{BP}=\overline{CP}=2\sqrt{3}\,(\text{cm})$

66) 4cm

⇨ 직각삼각형 BPQ에서

$\overline{BQ}=\sqrt{2^2+(2\sqrt{3})^2}=\sqrt{16}=4(\text{cm})$

67) $\frac{14}{3}$

⇨ $8^2=6\times(6+x) \qquad \therefore x=\frac{14}{3}$

68) 5

⇨ $\overline{BQ}$를 그으면 $\angle AQB=\angle ACB=\angle ABC$이므로

$\overline{AB}$는 세 점 B, P, Q를 지나는 원의 접선이다.

$\overline{AB}^2=\overline{AP}\times\overline{AQ}$이므로

$6^2=4\times(4+x) \qquad \therefore x=5$

69) 5

70) $\frac{9}{4}$

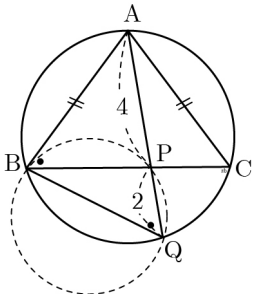
⇨ 원과 비례의 성질에 의해서

$5^2=4\times(4+x),\ 25=16+4x,\ 4x=9,\ x=\frac{9}{4}$ 가 된다.

71) $2\sqrt{6}$

⇨ 다음 그림과 같이 $\overline{BQ}$를 그으면

$\angle AQB=\angle ACB$ ($\widehat{AB}$에 대한 원주각)



$\overline{AB}=\overline{AC}$이므로 $\angle ABC=\angle ACB$

$\therefore \angle PQB=\angle ABP$

따라서 $\overline{AB}$는 세 점 B, P, Q를 지나는 원의 접선이다.

$\overline{AB}^2=\overline{AP}\cdot\overline{AQ}$이므로

$\overline{AB}^2=4\times(4+2)=24 \qquad \therefore \overline{AB}=2\sqrt{6}$

72) $4\sqrt{3}$

⇨ $\overline{AB}=\overline{AC}$이므로 $\angle ACB=\angle ABC$

원주각의 성질에 의해

$\angle ACB=\angle AQB=\angle ABC=\angle AQC$

이때 $\angle ABP=\angle AQB$이므로 $\triangle BPQ$의 외접원과 그 접선 $\overline{AB}$에 대하여

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$\overline{AB}^2 = \overline{AP} \times \overline{AQ}$ 이므로

$\overline{AB}^2 = 4 \times 12 = 48$ $\therefore \overline{AB} = 4\sqrt{3}$

73) 8

⇨ $\overline{AB} = \overline{AC}$ 이므로 $\angle ABC = \angle ACB$

$\angle ABC = \angle ADC$, $\angle ACB = \angle ADB$

즉 $\angle ACP = \angle ADC$ 이므로 $\triangle CPD$의 외접원과 그 원의 접선 $\overline{AC}$에 대하여

$\overline{AC}^2 = \overline{AP} \times \overline{AD} = 4 \times 16 = 64$ $\therefore \overline{AC} = 8 (\overline{AC} > 0)$

74) 6

⇨ $\triangle ABH$와 $\triangle ADC$에서

$\angle ABH = \angle ADC$, $\angle AHB = \angle ACD = 90^\circ$

$\therefore$ $\triangle ABH \backsim \triangle ADC$ (AA 닮음)

$\overline{AB} : \overline{AD} = \overline{AH} : \overline{AC}$ 이므로 $\overline{AB} \times \overline{AC} = \overline{AD} \times \overline{AH}$

$4 \times 3 = x \times 2$ $\therefore$ $x = 6$

75) 9

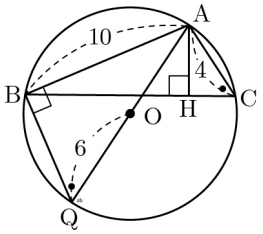
⇨ $12 \times 9 = 2x \times 6$ $\therefore$ $x = 9$

76) 8

⇨ $4 \times 6 = x \times 3$ $\therefore$ $x = 8$

77) $\frac{10}{3}$

⇨ 다음 그림과 같이 $\overline{BQ}$를 그으면



$\angle ABQ = \angle AHC = 90^\circ$

$\angle AQB = \angle ACH$ ($\widehat{AB}$에 대한 원주각)

$\therefore$ $\triangle AQB \backsim \triangle ACH$ (AA닮음)

$\overline{AB} : \overline{AH} = \overline{AQ} : \overline{AC}$ 이므로

$10 : \overline{AH} = (6+6) : 4$ $\therefore \overline{AH} = \frac{10}{3}$

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