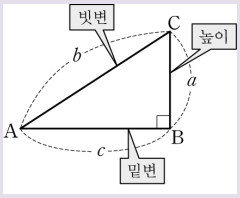
◇「콘텐츠산업 진흥법 시행령」제33조에 의한 표시
1) 제작연월일 : 2016-10-25
2) 제작자 : 교육지대㈜
3) 이 콘텐츠는 「콘텐츠산업 진흥법」에 따라 최초 제작일부터 5년간 보호됩니다.

◇「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. 직각삼각형에서 삼각비의 값 구하기

$\angle B=90^\circ$ 인 직각삼각형 ABC에서 $\angle A$의 삼각비



1) $\sin A=\dfrac{(\text{높이})}{(\text{빗변의 길이})}=\dfrac{a}{b}$

2) $\cos A=\dfrac{(\text{밑변의 길이})}{(\text{빗변의 길이})}=\dfrac{c}{b}$

3) $\tan A=\dfrac{(\text{높이})}{(\text{밑변의 길이})}=\dfrac{a}{c}$

⇨ $\sin A$, $\cos A$, $\tan A$를 $\angle A$의 삼각비라고 한다.

주의
◉ 기준각에 따라 직각삼각형에서 높이와 밑변이 바뀌므로 주의한다.

참고
◉ 닮은 직각삼각형에서 같은 각에 대한 삼각비의 값은 같다.

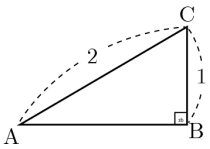
2. 삼각비의 값을 알 때

1) 삼각형의 변의 길이 구하기
직각삼각형에서 한 변의 길이와 삼각비의 값을 알 때, 나머지 두 변의 길이는
(1) 주어진 삼각비의 값을 이용하여 한 변의 길이를 구한다.
(2) 피타고라스 정리를 이용하여 나머지 한 변의 길이를 구한다.

2) 다른 삼각비의 값 구하기
삼각비에서 sin, cos, tan 중 하나의 값을 알 때, 다른 두 삼각비의 값은
(1) 주어진 삼각비를 가지는 간단한 직각삼각형을 그린다.
(2) 피타고라스 정리를 이용하여 나머지 한 변의 길이를 구한다.
(3) 다른 두 삼각비의 값을 구한다.

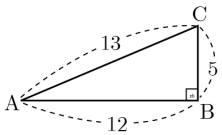
삼각비의 값

◪ 다음 그림과 같은 직각삼각형 ABC에서 다음 삼각비의 값을 구하여라.



1. $\sin A$
2. $\cos A$
3. $\tan A$
4. $\sin C$
5. $\cos C$
6. $\tan C$

◪ 다음 그림과 같은 직각삼각형 ABC에서 다음 삼각비의 값을 구하여라.



7. $\sin A$
8. $\cos A$
9. $\tan A$
10. $\sin C$
11. $\cos C$
12. $\tan C$

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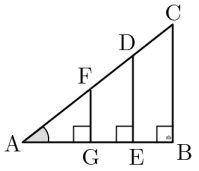
◪ 다음 그림을 보고 □안에 알맞은 선분을 써넣어라.

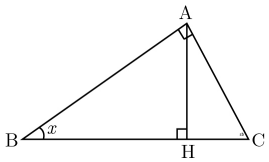


13. $\sin A = \frac{\square}{\overline{AC}} = \frac{\overline{DE}}{\square} = \frac{\square}{\overline{AF}}$

14. $\cos A = \frac{\square}{\overline{AC}} = \frac{\overline{AE}}{\square} = \frac{\square}{\overline{AF}}$

15. $\tan A = \frac{\square}{\overline{AB}} = \frac{\overline{DE}}{\square} = \frac{\square}{\overline{AG}}$

◪ 다음 그림을 보고 □안에 알맞은 선분을 써넣어라.

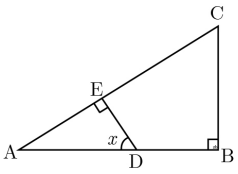


16. $\sin x = \frac{\square}{\overline{BC}} = \frac{\overline{AH}}{\square} = \frac{\square}{\overline{AC}}$

17. $\cos x = \frac{\overline{AB}}{\square} = \frac{\overline{BH}}{\square} = \frac{\square}{\overline{AC}}$

18. $\tan x = \frac{\square}{\overline{AB}} = \frac{\overline{AH}}{\square} = \frac{\square}{\overline{AH}}$

◪ 다음 그림을 보고 □안에 알맞은 선분을 써넣어라.

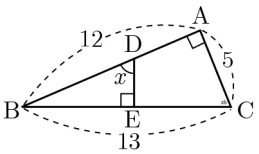


19. $\sin x = \frac{\square}{\overline{AD}} = \frac{\overline{AB}}{\square}$

20. $\cos x = \frac{\overline{DE}}{\square} = \frac{\square}{\overline{AC}}$

21. $\tan x = \frac{\square}{\overline{DE}} = \frac{\square}{\overline{BC}}$

◪ 다음 그림의 직각삼각형 ABC에서 $\overline{DE} \perp \overline{BC}$일 때, 다음을 구하여라.



22. △ABC와 닮음인 삼각형

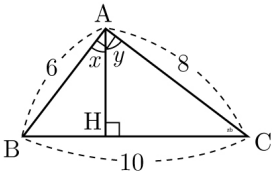
23. △ABC에서 $\angle x$와 크기가 같은 각

24. $\sin x$

25. $\cos x$

26. $\tan x$

◪ 다음 그림의 직각삼각형 ABC에서 다음을 구하여라.



27. △ABC에서 $\angle x$와 크기가 같은 각

28. △ABC에서 $\angle y$와 크기가 같은 각

29. $\sin x$

30. $\cos x$

31. $\tan x$

32. $\sin y$

33. $\cos y$

34. $\tan y$

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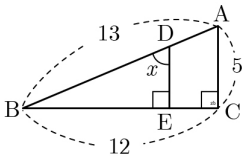
◪ $\angle A=90^\circ$인 다음 그림과 같은 직각삼각형 ABC에서 $\overline{DE}\perp\overline{BC}$일 때, ① $\sin x$, ② $\cos x$, ③ $\tan x$의 값을 구하여라.

35.



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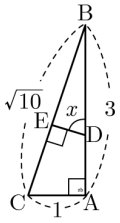
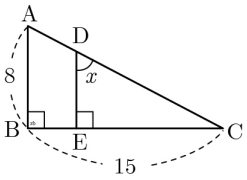


◪ $\angle B=90^\circ$인 다음 그림과 같은 직각삼각형 ABC에서 $\overline{DE}\perp\overline{BC}$일 때, ① $\sin x$, ② $\cos x$, ③ $\tan x$의 값을 구하여라.

37.



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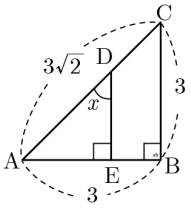
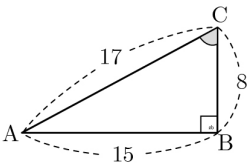


◪ 다음 그림과 같은 직각삼각형 ABC에서 $\sin C$, $\cos C$, $\tan C$의 값을 구하여라.

39.



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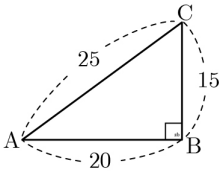

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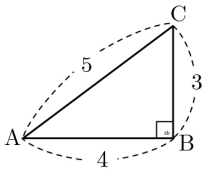

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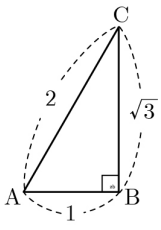
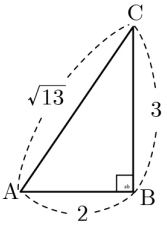


43.



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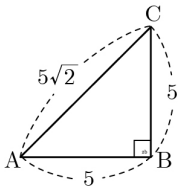
44.



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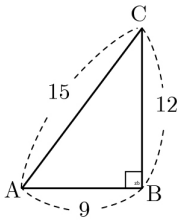
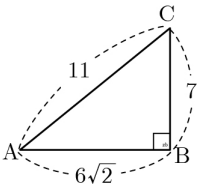
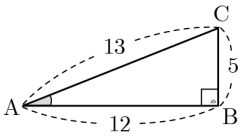


46.



◪ **다음 그림과 같은 직각삼각형 ABC에서 $\sin A$, $\cos A$, $\tan A$ 의 값을 구하여라.**

47.



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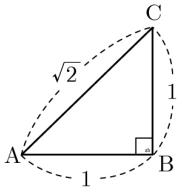

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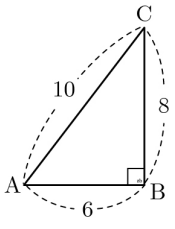

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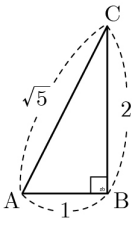

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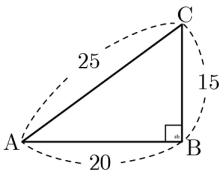

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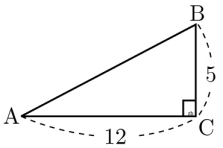

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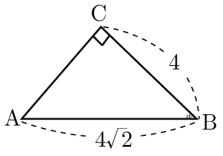

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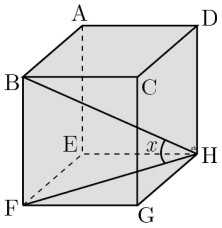
◪ 다음 그림은 한 모서리의 길이가 1인 정육면체이다. $\angle BHF = x$라고 할 때, 다음 물음에 답하여라.



54. $\overline{FH}$의 길이를 구하여라.

55. $\overline{BH}$의 길이를 구하여라.

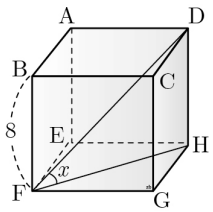
56. $\sin x$의 값을 구하여라.

57. $\cos x$의 값을 구하여라.

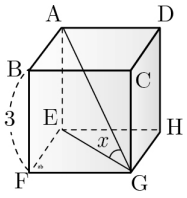
58. $\tan x$의 값을 구하여라.

◪ 다음 그림과 같은 정육면체에서 삼각비
(1) $\tan x$, (2) $\sin x$, (3) $\cos x$의 값을 구하여라.

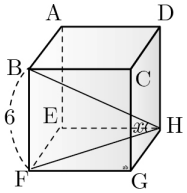
59.



60.



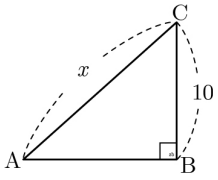
61.



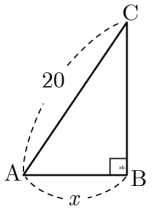
삼각비의 값을 알 때, 변의 길이 구하기

◪ 그림에서 한 변의 길이와 삼각비의 값이 다음과 같이 주어질 때, x의 값을 구하여라.

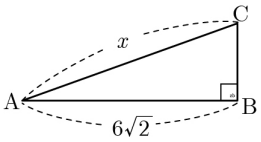
62. $\sin A = \frac{2}{3}$



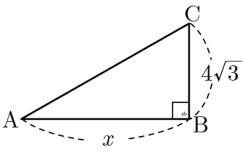
63. $\cos A = \frac{2\sqrt{2}}{5}$



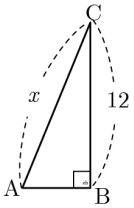
64. $\cos A = \frac{2\sqrt{2}}{3}$



65. $\tan A = \frac{\sqrt{3}}{3}$



66. $\sin A = \frac{12}{13}$



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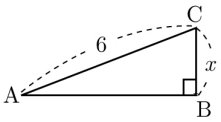
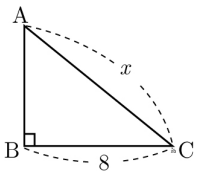
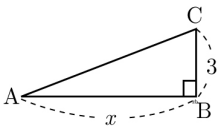
67. $\sin A=\frac{1}{3}$



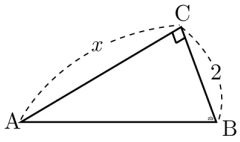
68. $\cos C=\frac{4}{5}$



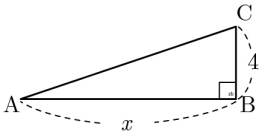
69. $\tan A=\frac{1}{3}$



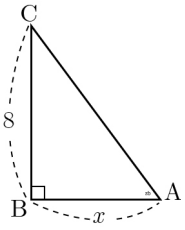
70. $\tan B=2$



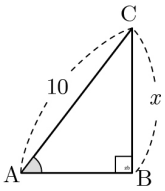
71. $\tan A=\frac{1}{3}$



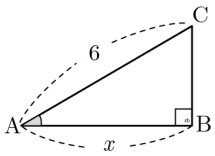
72. $\tan A=\frac{4}{3}$



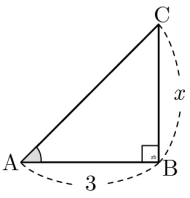
73. $\sin A=\frac{4}{5}$



74. $\cos A=\frac{\sqrt{3}}{2}$

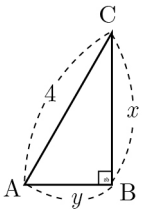


75. $\tan A=1$

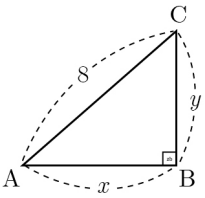


◪ **다음과 같이 삼각비의 값이 주어진 직각삼각형 ABC에서 x, y의 값을 각각 구하여라.**

76. $\sin A=\frac{\sqrt{3}}{2}$



77. $\cos A=\frac{3}{4}$



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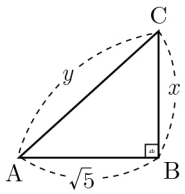
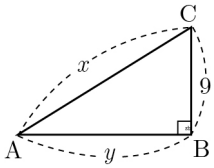
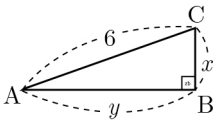
78. $\tan A=\frac{2\sqrt{5}}{5}$



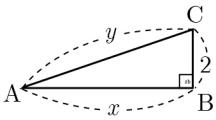
79. $\sin A=\frac{3}{5}$



80. $\cos C=\frac{1}{3}$



81. $\tan C=3$



한 삼각비의 값을 알 때, 다른 삼각비의 값 구하기

◪ $\angle B=90^\circ$ 인 직각삼각형 ABC 에서 다음의 값을 구하여라.

82. $\cos A=\frac{8}{17}$ 일 때, $\sin A,\ \tan A$

83. $\tan A=\frac{1}{2}$ 일 때, $\sin A,\ \cos A$

84. $\tan C=\sqrt{3}$ 일 때, $\sin C,\ \cos C$

85. $\sin C=\frac{2\sqrt{2}}{3}$ 일 때, $\cos C,\ \tan C$

86. $\cos C=\frac{5}{13}$ 일 때, $\sin C,\ \tan C$

87. $\sin A=\frac{1}{3}$ 일 때, $\cos A,\ \tan A$

88. $\cos A=\frac{4}{5}$ 일 때, $\sin A,\ \tan A$

89. $\tan A=\frac{1}{2}$ 일 때, $\sin A,\ \cos A$

90. $\sin C=\frac{5}{7}$ 일 때, $\cos A,\ \tan A$

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◪ $\angle B=90^\circ$인 직각삼각형 ABC에서 삼각비의 값이 다음과 같을 때, 식의 값을 구하여라.

91. $\sin A=\frac{3}{5}$일 때, $\cos A\ \tan A$의 값

92. $\sin A=\frac{4}{5}$일 때, $\cos A+\tan A$

93. $\cos A=\frac{4}{5}$일 때, $\sin A\times\tan A$

94. $\cos A=\frac{12}{13}$일 때, $156(\sin A-\tan A)$의 값

95. $\cos A=\frac{3}{5}$일 때, $\sin A-\tan A$의 값

96. $\tan A=\frac{4}{5}$일 때, $\sin A\times\cos A$

97. $\sin A=\frac{2}{7}$일 때, $\cos A+\tan A$의 값

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정답 및 해설

1) $\frac{1}{2}$

⇨ $\overline{AB}=\sqrt{2^2-1^2}=\sqrt{3}$이므로 $\sin A=\frac{\overline{BC}}{\overline{AC}}=\frac{1}{2}$

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

⇨ $\overline{AB}=\sqrt{2^2-1^2}=\sqrt{3}$이므로 $\cos A=\frac{\overline{AB}}{\overline{AC}}=\frac{\sqrt{3}}{2}$

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

⇨ $\overline{AB}=\sqrt{2^2-1^2}=\sqrt{3}$이므로

$\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{1}{\sqrt{3}}=\frac{\sqrt{3}}{3}$

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

⇨ $\overline{AB}=\sqrt{2^2-1^2}=\sqrt{3}$이므로 $\sin C=\frac{\overline{AB}}{\overline{AC}}=\frac{\sqrt{3}}{2}$

5) $\frac{1}{2}$

⇨ $\overline{AB}=\sqrt{2^2-1^2}=\sqrt{3}$이므로 $\cos C=\frac{\overline{BC}}{\overline{AC}}=\frac{1}{2}$

6) $\sqrt{3}$

⇨ $\overline{AB}=\sqrt{2^2-1^2}=\sqrt{3}$이므로

$\tan A=\frac{\overline{AB}}{\overline{BC}}=\frac{\sqrt{3}}{1}=\sqrt{3}$

7) $\frac{5}{13}$

⇨ $\sin A=\frac{\overline{BC}}{\overline{AC}}=\frac{5}{13}$

8) $\frac{12}{13}$

⇨ $\cos A=\frac{\overline{AB}}{\overline{AC}}=\frac{12}{13}$

9) $\frac{5}{12}$

⇨ $\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{5}{12}$

10) $\frac{12}{13}$

⇨ $\sin C=\frac{\overline{AB}}{\overline{AC}}=\frac{12}{13}$

11) $\frac{5}{13}$

⇨ $\cos C=\frac{\overline{BC}}{\overline{AC}}=\frac{5}{13}$

12) $\frac{12}{5}$

⇨ $\tan C=\frac{\overline{AB}}{\overline{BC}}=\frac{12}{5}$

13) $\overline{BC}$, $\overline{AD}$, $\overline{FG}$

14) $\overline{AB}$, $\overline{AD}$, $\overline{AG}$

15) $\overline{BC}$, $\overline{AE}$, $\overline{FG}$

16) $\overline{AC}$, $\overline{AB}$, $\overline{CH}$

17) $\overline{BC}$, $\overline{AB}$, $\overline{AH}$

18) $\overline{AC}$, $\overline{BH}$, $\overline{CH}$

19) $\overline{AE}$, $\overline{AC}$

20) $\overline{AD}$, $\overline{BC}$

21) $\overline{AE}$, $\overline{AB}$

22) $\triangle EBD$

⇨ $\angle BAC=\angle BED=90^\circ$, $\angle B$는 공통이므로

$\triangle ABC\backsim\triangle EBD$ (AA 닮음)

23) $\angle ACB$

24) $\frac{12}{13}$

⇨ $\sin x=\sin C=\frac{\overline{AB}}{\overline{BC}}=\frac{12}{13}$

25) $\frac{5}{13}$

⇨ $\cos x=\cos C=\frac{\overline{AC}}{\overline{BC}}=\frac{5}{13}$

26) $\frac{12}{5}$

⇨ $\tan x=\tan C=\frac{\overline{AB}}{\overline{AC}}=\frac{12}{5}$

27) $\angle ACB$

28) $\angle ABC$

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29) $\frac{3}{5}$

⇨ $\triangle ABC \backsim \triangle HBA \backsim \triangle HAC$

$\sin x = \sin C = \frac{\overline{AB}}{\overline{BC}} = \frac{6}{10} = \frac{3}{5}$

30) $\frac{4}{5}$

⇨ $\triangle ABC \backsim \triangle HBA \backsim \triangle HAC$

$\cos x = \cos C = \frac{\overline{AC}}{\overline{BC}} = \frac{8}{10} = \frac{4}{5}$

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

⇨ $\triangle ABC \backsim \triangle HBA \backsim \triangle HAC$

$\tan x = \tan C = \frac{\overline{AB}}{\overline{AC}} = \frac{6}{8} = \frac{3}{4}$

32) $\frac{4}{5}$

⇨ $\triangle ABC \backsim \triangle HBA \backsim \triangle HAC$

$\sin y = \sin B = \frac{\overline{AC}}{\overline{BC}} = \frac{8}{10} = \frac{4}{5}$

33) $\frac{3}{5}$

⇨ $\triangle ABC \backsim \triangle HBA \backsim \triangle HAC$

$\cos y = \cos B = \frac{\overline{AB}}{\overline{BC}} = \frac{6}{10} = \frac{3}{5}$

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

⇨ $\triangle ABC \backsim \triangle HBA \backsim \triangle HAC$

$\tan y = \tan B = \frac{\overline{AC}}{\overline{AB}} = \frac{8}{6} = \frac{4}{3}$

35) ① $\frac{12}{13}$ ② $\frac{5}{13}$ ③ $\frac{12}{5}$

⇨ $\triangle ABC \backsim \triangle DBE$이므로 $\angle x = \angle A$

① $\sin x = \sin A = \frac{12}{13}$

② $\cos x = \cos A = \frac{5}{13}$

③ $\tan x = \tan A = \frac{12}{5}$

36) ① $\frac{3\sqrt{10}}{10}$ ② $\frac{\sqrt{10}}{10}$ ③ 3

⇨ $\triangle ABC \backsim \triangle EBD$이므로 $\angle x = \angle C$

① $\sin x = \sin C = \frac{3}{\sqrt{10}} = \frac{3\sqrt{10}}{10}$

② $\cos x = \cos C = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$

③ $\tan x = \tan C = 3$

37) ① $\frac{15}{17}$ ② $\frac{8}{17}$ ③ $\frac{15}{8}$

⇨ $\overline{AB} = \sqrt{8^2 + 15^2} = 17$

$\triangle ABC \backsim \triangle DEC$이므로 $\angle x = \angle A$이므로

① $\sin x = \sin A = \frac{15}{17}$

② $\cos x = \cos A = \frac{8}{17}$

③ $\tan x = \tan A = \frac{15}{8}$

38) ① $\frac{\sqrt{2}}{2}$ ② $\frac{\sqrt{2}}{2}$ ③ 1

⇨ $\triangle ABC \backsim \triangle AED$이므로 $\angle x = \angle A$

① $\sin x = \sin A = \frac{3}{3\sqrt{2}} = \frac{\sqrt{2}}{2}$

② $\cos x = \cos A = \frac{3}{3\sqrt{2}} = \frac{\sqrt{2}}{2}$

③ $\tan x = \tan A = \frac{3}{3} = 1$

39) $\sin C = \frac{15}{17}$, $\cos C = \frac{8}{17}$, $\tan C = \frac{15}{8}$

40) $\sin C = \frac{20}{25} = \frac{4}{5}$, $\cos C = \frac{15}{25} = \frac{3}{5}$

$\tan C = \frac{20}{15} = \frac{4}{3}$

41) $\sin C = \frac{4}{5}$, $\cos C = \frac{3}{5}$, $\tan C = \frac{4}{3}$

42) $\sin C = \frac{1}{2}$, $\cos C = \frac{\sqrt{3}}{2}$, $\tan C = \frac{\sqrt{3}}{3}$

43) $\sin C = \frac{2}{\sqrt{13}} = \frac{2\sqrt{13}}{13}$, $\cos C = \frac{3}{\sqrt{13}} = \frac{3\sqrt{13}}{13}$

$\tan C = \frac{2}{3}$

44) $\sin C = \frac{5}{5\sqrt{2}} = \frac{\sqrt{2}}{2}$, $\cos C = \frac{5}{5\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\tan C = \frac{5}{5} = 1$

45) $\sin C = \frac{9}{15} = \frac{3}{5}$, $\cos C = \frac{12}{15} = \frac{4}{5}$, $\tan C = \frac{9}{12} = \frac{3}{4}$

46) $\sin C = \frac{6\sqrt{2}}{11}$, $\cos C = \frac{7}{11}$, $\tan C = \frac{6\sqrt{2}}{7}$

47) $\sin A = \frac{\overline{BC}}{\overline{AC}} = \frac{5}{13}$, $\cos A = \frac{\overline{AB}}{\overline{AC}} = \frac{12}{13}$

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$\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{5}{12}$

48) $\sin A=\frac{1}{\sqrt{2}}=\frac{\sqrt{2}}{2}$, $\cos A=\frac{1}{\sqrt{2}}=\frac{\sqrt{2}}{2}$, $\tan A=1$

49) $\sin A=\frac{8}{10}=\frac{4}{5}$, $\cos A=\frac{6}{10}=\frac{3}{5}$, $\tan A=\frac{8}{6}=\frac{4}{3}$

50) $\sin A=\frac{2}{\sqrt{5}}=\frac{2\sqrt{5}}{5}$, $\cos A=\frac{1}{\sqrt{5}}=\frac{\sqrt{5}}{5}$, $\tan A=\frac{2}{1}=2$

51) $\sin A=\frac{3}{5}$, $\cos A=\frac{4}{5}$, $\tan A=\frac{3}{4}$

52) $\sin A=\frac{5}{13}$, $\cos A=\frac{12}{13}$, $\tan A=\frac{5}{12}$

⇨ $\overline{AB}=\sqrt{12^2+5^2}=13$

53) $\sin A=\frac{\sqrt{2}}{2}$, $\cos A=\frac{\sqrt{2}}{2}$, $\tan A=1$

⇨ $\overline{AC}=\sqrt{(4\sqrt{2})^2-4^2}=4$

54) $\sqrt{2}$

⇨ $\overline{FH}=\sqrt{1^2+1^2}=\sqrt{2}$

55) $\sqrt{3}$

⇨ $\overline{BH}=\sqrt{1^2+1^2+1^2}=\sqrt{3}$

56) $\frac{\sqrt{3}}{3}$

⇨ $\sin x=\frac{1}{\sqrt{3}}=\frac{\sqrt{3}}{3}$

57) $\frac{\sqrt{6}}{3}$

⇨ $\cos x=\frac{\sqrt{2}}{\sqrt{3}}=\frac{\sqrt{6}}{3}$

58) $\frac{\sqrt{2}}{2}$

⇨ $\tan x=\frac{1}{\sqrt{2}}=\frac{\sqrt{2}}{2}$

59) (1) $\frac{\sqrt{2}}{2}$ (2) $\frac{\sqrt{3}}{3}$ (3) $\frac{\sqrt{6}}{3}$

⇨ (1) □EFGH는 정사각형이므로 대각선 $FH=8\sqrt{2}$ 이다.
△DFH는 $\angle H=90^\circ$ 인 직각삼각형이므로

$\tan x=\frac{\overline{DH}}{\overline{FH}}=\frac{8}{8\sqrt{2}}=\frac{\sqrt{2}}{2}$

(2) 정육면체이므로 대각선 $DF=8\sqrt{3}$
△DFH는 $\angle H=90^\circ$ 인 직각삼각형이므로

$\sin x=\frac{\overline{DH}}{\overline{DF}}=\frac{8}{8\sqrt{3}}=\frac{\sqrt{3}}{3}$

(3) △DFH는 $\angle H=90^\circ$ 인 직각삼각형이므로

$\cos x=\frac{\overline{FH}}{\overline{DF}}=\frac{\sqrt{6}}{3}$

60) (1) $\frac{\sqrt{2}}{2}$ (2) $\frac{\sqrt{3}}{3}$ (3) $\frac{\sqrt{6}}{3}$

⇨ (1) □EFGH는 정사각형이므로 대각선 $EG=3\sqrt{2}$ 이고,
△AEG는 $\angle E=90^\circ$ 인 직각삼각형이므로

$\tan x=\frac{\overline{AE}}{\overline{EG}}=\frac{3}{3\sqrt{2}}=\frac{1}{\sqrt{2}}=\frac{\sqrt{2}}{2}$

(2) 정육면체이므로 대각선 $AG=3\sqrt{3}$ 이고,
△AGE는 $\angle E=90^\circ$ 인 직각삼각형이므로

$\sin x=\frac{\overline{AE}}{\overline{AG}}=\frac{3}{3\sqrt{3}}=\frac{\sqrt{3}}{3}$

(3) △AGE는 $\angle E=90^\circ$ 인 직각삼각형이므로

$\cos x=\frac{\overline{EG}}{\overline{AG}}=\frac{3\sqrt{2}}{3\sqrt{3}}=\frac{\sqrt{6}}{3}$

61) (1) $\frac{\sqrt{2}}{2}$ (2) $\frac{\sqrt{3}}{3}$ (3) $\frac{\sqrt{6}}{3}$

⇨ (1) □EFGH는 정사각형이므로 대각선 $EG=6\sqrt{2}$ 이고,
△BHF는 $\angle F=90^\circ$ 인 직각삼각형이므로

$\tan x=\frac{\overline{BF}}{\overline{FH}}=\frac{6}{6\sqrt{2}}=\frac{\sqrt{2}}{2}$

(2) 정육면체이므로 대각선 $BH=6\sqrt{3}$ 이고,
△BHF는 $\angle F=90^\circ$ 인 직각삼각형이므로

$\sin x=\frac{\overline{BF}}{\overline{BH}}=\frac{6}{6\sqrt{3}}=\frac{\sqrt{3}}{3}$

(3) △BHF는 $\angle F=90^\circ$ 인 직각삼각형이므로

$\cos x=\frac{\overline{FH}}{\overline{BH}}=\frac{6\sqrt{2}}{6\sqrt{3}}=\frac{\sqrt{6}}{3}$

62) 15

⇨ $\sin A=\frac{\overline{BC}}{\overline{AC}}=\frac{10}{x}=\frac{2}{3}$ $\therefore x=15$

63) $8\sqrt{2}$

⇨ $\cos A=\frac{\overline{AB}}{\overline{AC}}=\frac{x}{20}=\frac{2\sqrt{2}}{5}$ $\therefore x=8\sqrt{2}$

64) 9

⇨ $\cos A=\frac{\overline{AB}}{\overline{AC}}=\frac{6\sqrt{2}}{x}=\frac{2\sqrt{2}}{3}$ $\therefore x=9$

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교육지대(주) 서울특별시 강남구 논현동 학동로 130 한주빌딩 7층 대표전화 : 1544-5633 FAX : 02-521-0331

65) 12

⇨ $\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{4\sqrt{3}}{x}=\frac{\sqrt{3}}{3}$ $\therefore\ x=12$

66) 13

⇨ $\sin A=\frac{\overline{BC}}{\overline{AC}}=\frac{12}{x}=\frac{12}{13}$ $\therefore\ x=13$

67) 2

⇨ $\sin A=\frac{x}{6}=\frac{1}{3}$ $\therefore x=2$

68) 10

⇨ $\cos C=\frac{8}{x}=\frac{4}{5}$ $\therefore x=10$

69) 9

⇨ $\tan A=\frac{3}{x}=\frac{1}{3}$ $\therefore x=9$

70) 4

⇨ $\tan B=\frac{x}{2}=2$ $\therefore x=4$

71) 12

⇨ $\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{4}{x}=\frac{1}{3}$ $\therefore\ x=12$

72) 6

⇨ $\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{8}{x}=\frac{4}{3}$이므로 $x=8\times\frac{3}{4}=6$

73) 8

74) $3\sqrt{3}$

75) 3

76) $x=2\sqrt{3}, y=2$

⇨ $\sin A=\frac{\overline{BC}}{\overline{AC}}=\frac{x}{4}=\frac{\sqrt{3}}{2}$이므로

$x=\frac{\sqrt{3}}{2}\times 4=2\sqrt{3}$

$\therefore y=\sqrt{4^2-(2\sqrt{3})^2}=\sqrt{4}=2$

77) $x=6, y=2\sqrt{7}$

⇨ $\cos A=\frac{\overline{AB}}{\overline{AC}}=\frac{x}{8}=\frac{3}{4}$이므로 $x=\frac{3}{4}\times 8=6$

$\therefore y=\sqrt{8^2-6^2}=\sqrt{28}=2\sqrt{7}$

78) $x=2, y=3$

⇨ $\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{x}{\sqrt{5}}=\frac{2\sqrt{5}}{5}$이므로

$x=\frac{2\sqrt{5}}{5}\times\sqrt{5}=2$

$\therefore y=\sqrt{(\sqrt{5})^2+2^2}=\sqrt{9}=3$

79) $x=15, y=12$

⇨ $\sin A=\frac{\overline{BC}}{\overline{AC}}=\frac{9}{x}=\frac{3}{5}$이므로

$x=9\times\frac{5}{3}=15$

$\therefore y=\sqrt{15^2-9^2}=\sqrt{144}=12$

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

⇨ $\cos C=\frac{\overline{BC}}{\overline{AC}}=\frac{x}{6}=\frac{1}{3}$이므로 $x=\frac{1}{3}\times 6=2$

$\therefore y=\sqrt{6^2-2^2}=\sqrt{32}=4\sqrt{2}$

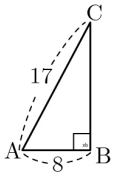
81) $x=6, y=2\sqrt{10}$

⇨ $\tan C=\frac{\overline{AB}}{\overline{BC}}=\frac{x}{2}=3$이므로 $x=3\times 2=6$

$\therefore y=\sqrt{6^2+2^2}=\sqrt{40}=2\sqrt{10}$

82) $\sin A=\frac{15}{17}$, $\tan A=\frac{15}{8}$

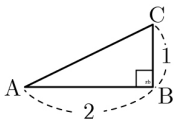
⇨ 그림을 그려 나타내면 다음과 같다.



$\overline{BC}=\sqrt{17^2-8^2}=15$이므로 $\sin A=\frac{15}{17}$, $\tan A=\frac{15}{8}$

83) $\sin A=\frac{\sqrt{5}}{5}$, $\cos A=\frac{2\sqrt{5}}{5}$

⇨ 그림을 그려 나타내면 다음과 같다.



$\overline{AC}=\sqrt{2^2+1^2}=\sqrt{5}$ 이므로

$\sin A=\frac{1}{\sqrt{5}}=\frac{\sqrt{5}}{5}$, $\cos A=\frac{2}{\sqrt{5}}=\frac{2\sqrt{5}}{5}$

84) $\sin C=\frac{\sqrt{3}}{2}$, $\cos C=\frac{1}{2}$

⇨ $\overline{AC}=\sqrt{(\sqrt{3})^2+1^2}=2$

$\therefore\ \sin C=\frac{\sqrt{3}}{2}$, $\cos C=\frac{1}{2}$

85) $\cos C=\frac{1}{3}$, $\tan C=2\sqrt{2}$

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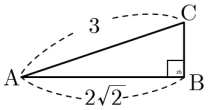
⇨ 그림을 그려 나타내면 다음과 같다.

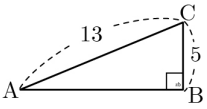


$\overline{BC}=\sqrt{3^2-(2\sqrt{2})^2)}=1$ 이므로

$\cos C=\frac{1}{3}$, $\tan C=2\sqrt{2}$

86) $\sin C=\frac{12}{13}$, $\tan C=\frac{12}{5}$

⇨ 그림을 그려 나타내면 다음과 같다.

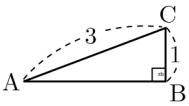


$\overline{AB}=\sqrt{13^2-5^2}=12$이므로

$\sin C=\frac{12}{13}$, $\tan C=\frac{12}{5}$

87) $\cos A=\frac{2\sqrt{2}}{3}$, $\tan A=\frac{\sqrt{2}}{4}$

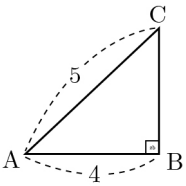
⇨ $\sin A=\frac{1}{3}$이므로 다음 그림과 같은 직각삼각형 ABC를 생각하면 $\overline{AB}=\sqrt{3^2-1^2}=2\sqrt{2}$



$\cos A=\frac{\overline{AB}}{\overline{AC}}=\frac{2\sqrt{2}}{3}$, $\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{1}{2\sqrt{2}}=\frac{\sqrt{2}}{4}$

88) $\sin A=\frac{3}{5}$, $\tan A=\frac{3}{4}$

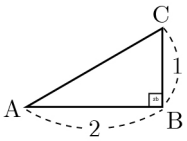
⇨ $\cos A=\frac{4}{5}$이므로 다음 그림과 같은 직각삼각형 ABC를 생각하면 $\overline{BC}=\sqrt{5^2-4^2}=3$



$\sin A=\frac{\overline{BC}}{\overline{AC}}=\frac{3}{5}$, $\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{3}{4}$

89) $\sin A=\frac{\sqrt{5}}{5}$, $\cos A=\frac{2\sqrt{5}}{5}$

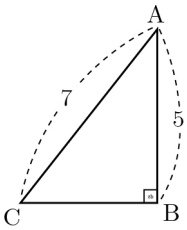
⇨ $\tan A=\frac{1}{2}$이므로 다음 그림과 같은 직각삼각형 ABC를 생각하면 $\overline{AC}=\sqrt{2^2+1^2}=\sqrt{5}$



$\sin A=\frac{\overline{BC}}{\overline{AC}}=\frac{1}{\sqrt{5}}=\frac{\sqrt{5}}{5}$, $\cos A=\frac{\overline{AB}}{\overline{AC}}=\frac{2}{\sqrt{5}}=\frac{2\sqrt{5}}{5}$

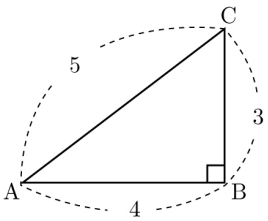
90) $\cos A=\frac{5}{7}$, $\tan A=\frac{2\sqrt{6}}{5}$

⇨ $\sin C=\frac{5}{7}$이므로 다음 그림과 같은 직각삼각형 ABC를 생각하면 $\overline{BC}=\sqrt{7^2-5^2}=2\sqrt{6}$



$\cos A=\frac{\overline{AB}}{\overline{AC}}=\frac{5}{7}$, $\tan A=\frac{\overline{BC}}{\overline{AB}}=\frac{2\sqrt{6}}{5}$

91) $\frac{3}{5}$



⇨ $\cos A\ \tan A=\frac{4}{5}\times\frac{3}{4}=\frac{3}{5}$

92) $\frac{29}{15}$

⇨ $\sin A=\frac{4}{5}$일 때, $\cos A=\frac{3}{5}$, $\tan A=\frac{4}{3}$이므로

$\therefore\ \cos A+\tan A=\frac{3}{5}+\frac{4}{3}=\frac{29}{15}$

93) $\frac{9}{20}$

⇨ $\cos A=\frac{4}{5}$일 때, $\sin A=\frac{3}{5}$, $\tan A=\frac{3}{4}$

$\therefore\ \sin A\times\tan A=\frac{3}{5}\times\frac{3}{4}=\frac{9}{20}$

94) -5

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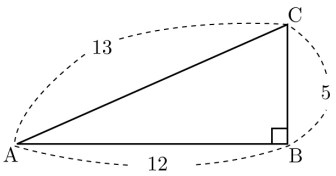

$156(\sin A-\tan A)=156\times\left(\frac{5}{13}-\frac{5}{12}\right)=60-65=-5$

95) $-\frac{8}{15}$

⇨ $\cos A=\frac{3}{5}$이므로 $\sin A=\frac{4}{5},\tan A=\frac{4}{3}$이다. 따라서 $\sin A-\tan A=\frac{4}{5}-\frac{4}{3}=-\frac{8}{15}$이다.

96) $\frac{20}{41}$

⇨ $\tan A=\frac{4}{5}$일 때, $\sin A=\frac{4}{\sqrt{41}}$, $\cos A=\frac{5}{\sqrt{41}}$

$\therefore\ \sin A\times\cos A=\frac{4}{\sqrt{41}}\times\frac{5}{\sqrt{41}}=\frac{20}{41}$

97) $\frac{59\sqrt{5}}{105}$

⇨ $\overline{AC}=7$, $\overline{BC}=2$라 하면 피타고라스 정리에 의해 $\overline{AB}=3\sqrt{5}$이다.

$\therefore\ \cos A+\tan A=\frac{3\sqrt{5}}{7}+\frac{2}{3\sqrt{5}}=\frac{59\sqrt{5}}{105}$

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