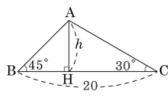


1. 다음 그림과 같은  $\triangle ABC$  에서 높이  $h$  를 구하면?

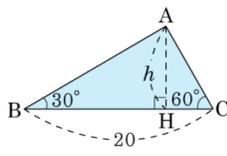


- ①  $10(\sqrt{2}-1)$     ②  $10(\sqrt{3}-1)$     ③  $10(\sqrt{3}-\sqrt{2})$   
 ④  $10(2\sqrt{2}-1)$     ⑤  $10(\sqrt{2}-2)$

해설

$$\begin{aligned} h &= \frac{20}{\tan(90^\circ - 45^\circ) + \tan(90^\circ - 30^\circ)} \\ &= \frac{20}{\tan 45^\circ + \tan 60^\circ} \\ &= \frac{1 + \sqrt{3}}{20(\sqrt{3} - 1)} \\ &= 10 \left( \frac{3-1}{\sqrt{3}-1} \right) \end{aligned}$$

2. 다음 그림의  $\triangle ABC$  에서 높이  $h$  를 구하면?



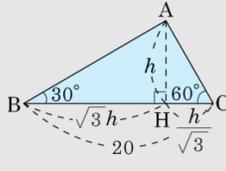
- ①  $2\sqrt{5}$     ②  $4\sqrt{3}$     ③  $5\sqrt{3}$     ④  $3\sqrt{5}$     ⑤  $5\sqrt{2}$

해설

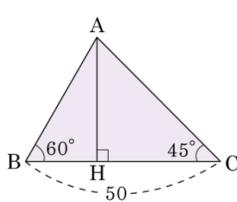
그림에서  $\sqrt{3}h + \frac{h}{\sqrt{3}} =$

$20, \frac{4\sqrt{3}}{3}h = 20$

$\therefore h = 20 \times \frac{3}{4\sqrt{3}} = 5\sqrt{3}$



3. 다음 그림의  $\triangle ABC$  에서  $\overline{AH}$  의 길이는?



- ①  $25(\sqrt{3}-1)$       ②  $25(3-\sqrt{3})$       ③  $25\sqrt{3}-1$   
 ④  $50\sqrt{3}-1$       ⑤  $50\sqrt{3}+1$

해설

$\overline{BH} = a$  라 하면  $a : \overline{AH} = 1 : \sqrt{3}$

이므로

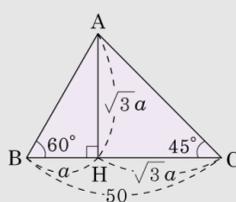
$$\overline{AH} = \sqrt{3}a$$

$$\overline{CH} = \overline{AH} = \sqrt{3}a, \overline{BC} = a + \sqrt{3}a = 50$$

$$(1 + \sqrt{3})a = 50, a = \frac{50}{\sqrt{3} + 1} =$$

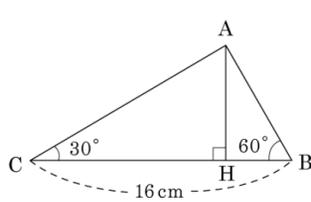
$$25(\sqrt{3}-1)$$

$$\therefore \overline{AH} = \sqrt{3} \times 25(\sqrt{3}-1) = 25(3-\sqrt{3})$$





5. 다음과 같이  $\overline{AH} \perp \overline{BC}$  인  $\triangle ABC$  에서  $\overline{BC} = 16\text{cm}$  일 때,  $\overline{AH}$  의 길이는?

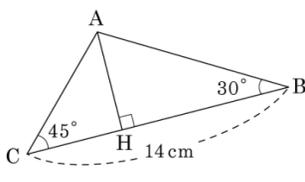


- ①  $3\sqrt{3}\text{cm}$       ②  $4\sqrt{3}\text{cm}$       ③  $5\sqrt{3}\text{cm}$   
 ④  $6\sqrt{2}\text{cm}$       ⑤  $6\sqrt{3}\text{cm}$

해설

$$\begin{aligned} \overline{AH} &= \frac{16}{\tan(90^\circ - 60^\circ) + \tan(90^\circ - 30^\circ)} \\ &= \frac{\tan 30^\circ + \tan 60^\circ}{16} \\ &= \frac{\frac{\sqrt{3}}{3} + \sqrt{3}}{16} = \frac{4\sqrt{3}}{16} \\ &= \frac{1}{4} = 4\sqrt{3}(\text{cm}) \end{aligned}$$

6. 다음과 같은  $\triangle ABC$  에서  $\overline{AH}$  의 길이는?



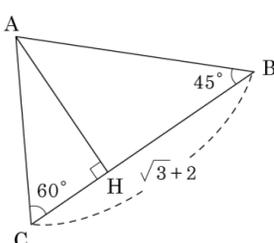
- ①  $4(\sqrt{3}-1)\text{cm}$     ②  $5(\sqrt{3}-1)\text{cm}$     ③  $6(\sqrt{3}-1)\text{cm}$   
 ④  $7(\sqrt{3}-1)\text{cm}$     ⑤  $8(\sqrt{3}-1)\text{cm}$

해설

$$\begin{aligned} \overline{AH} &= \frac{14}{\tan(90^\circ - 30^\circ) + \tan(90^\circ - 45^\circ)} \\ &= \frac{14}{\tan 60^\circ + \tan 45^\circ} \\ &= \frac{\sqrt{3} + 1}{14} \\ &= \frac{14(\sqrt{3} - 1)}{3 - 1} = 7(\sqrt{3} - 1)(\text{cm}) \end{aligned}$$

7. 다음 그림과 같은 삼각형에서  $\overline{AH}$ 의 길이는?

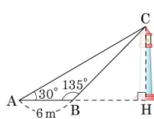
- ①  $\frac{\sqrt{3} - \sqrt{6} - 9}{2}$   
 ②  $\frac{3 + \sqrt{3}}{2}$   
 ③  $\frac{3\sqrt{3}}{2}$   
 ④  $\frac{3 + 5\sqrt{3}}{2}$   
 ⑤  $\frac{\sqrt{3} - \sqrt{6}}{3}$



해설

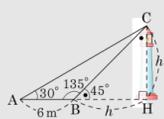
$$\begin{aligned} \overline{AH} &= \frac{\sqrt{3} + 2}{\tan(90^\circ - 45^\circ) + \tan(90^\circ - 60^\circ)} \\ &= \frac{\sqrt{3} + 2}{\tan 45^\circ + \tan 30^\circ} \\ &= \frac{\sqrt{3} + 2}{1 + \frac{\sqrt{3}}{3}} \\ &= \frac{3(\sqrt{3} + 2)}{3 + \sqrt{3}} \\ &= \frac{(\sqrt{3} + 2)(3 - \sqrt{3})}{(3 + \sqrt{3})(3 - \sqrt{3})} \\ &= \frac{3 + \sqrt{3}}{2} \end{aligned}$$

8. 다음 그림은 등대의 높이를 알아보기 위해 측정한 결과이다. 등대의 높이는?



- ①  $(3 - \sqrt{3})\text{m}$       ②  $(3\sqrt{3} - 3)\text{m}$       ③  $(4\sqrt{3} - 1)\text{m}$   
 ④  $(4\sqrt{3} + 1)\text{m}$       ⑤  $(3\sqrt{3} + 3)\text{m}$

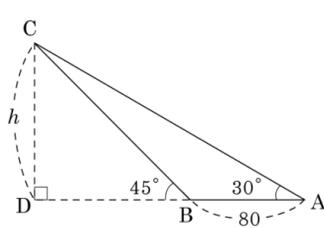
해설



등대의 높이를  $h$  라 하면  
 $\angle CBH = 45^\circ$  이므로  $BH = h$   
 $\angle CAH = 30^\circ$  이므로  
 $6 + h : h = \sqrt{3} : 1$ ,  $\sqrt{3}h = 6 + h$   
 $(\sqrt{3} - 1)h = 6$   
 $\therefore h = \frac{6}{\sqrt{3} - 1} = 3(\sqrt{3} + 1) = 3\sqrt{3} + 3(\text{m})$

9. 다음 그림의 삼각형 ABC에서  $\triangle ABC$ 의 높이  $h$ 는?

- ①  $30(\sqrt{3} + 1)$   
 ②  $40(\sqrt{3} + 1)$   
 ③  $50(\sqrt{3} + 1)$   
 ④  $60(\sqrt{3} + 1)$   
 ⑤  $80(\sqrt{3} + 1)$

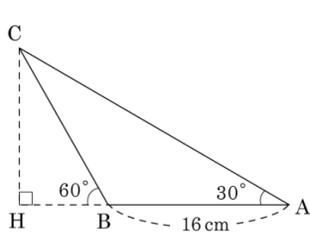


해설

$$\begin{aligned}
 h &= \frac{80}{\tan(90^\circ - 30^\circ) - \tan(90^\circ - 45^\circ)} \\
 &= \frac{80}{\tan 60^\circ - \tan 45^\circ} = \frac{80}{\sqrt{3} - 1} = \frac{80(\sqrt{3} + 1)}{3 - 1} \\
 &= 40(\sqrt{3} + 1)
 \end{aligned}$$

10. 다음 그림과 같은 삼각형 ABC가 있다.  $\overline{CH}$ 의 길이는?

- ①  $6\sqrt{3}\text{cm}$
- ②  $7\sqrt{2}\text{cm}$
- ③  $7\sqrt{3}\text{cm}$
- ④  $8\sqrt{2}\text{cm}$
- ⑤  $8\sqrt{3}\text{cm}$

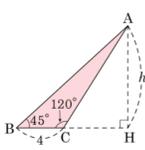


해설

$$\overline{AB} = \overline{BC} = 16(\text{cm})$$

$$\overline{CH} = 16 \sin 60^\circ = 16 \times \frac{\sqrt{3}}{2} = 8\sqrt{3}(\text{cm})$$

11. 다음 그림에서  $\overline{AH} = h$  라 할 때,  $\overline{CH}$  의 길이를  $h$  로 나타낸 것은?

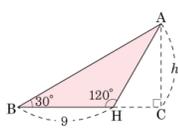


- ①  $\frac{h}{\sin 45^\circ}$                       ②  $h \cos 30^\circ$   
 ③  $h \tan 60^\circ - h \tan 45^\circ$                       ④  $h \tan 30^\circ$   
 ⑤  $h$

**해설**

$\angle ACB = 120^\circ$  이므로  $\angle ACH = 60^\circ$ ,  $\angle CAH = 30^\circ$   
 $\therefore \overline{CH} = h \tan 30^\circ$

12. 다음  $\triangle ABC$  에서 높이  $h$ 는?



- ①  $3\sqrt{3}$     ②  $\frac{7\sqrt{3}}{2}$     ③  $4\sqrt{3}$     ④  $\frac{9\sqrt{3}}{2}$     ⑤  $5\sqrt{3}$

해설

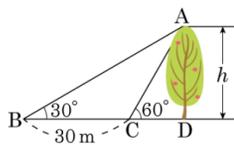
$$\angle BAH = 30^\circ \text{ 이므로 } \overline{BH} = \overline{AH} = 9$$

$$h = \overline{AH} \cdot \sin 60^\circ$$

$$= 9 \times \frac{\sqrt{3}}{2}$$

$$= \frac{9\sqrt{3}}{2}$$

13. 다음 그림에서 나무의 높이  $h$ 는? (단,  $\sqrt{3} = 1.7$ 로 계산한다.)

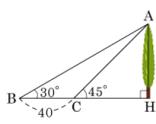


- ① 21.5m                      ② 22.5m                      ③ 23.5m  
④ 24.5m                      ⑤ 25.5m

해설

$\angle BAC = 30^\circ$  이므로  
 $\overline{BC} = \overline{AC} = 30(\text{m})$   
 $\triangle ACD$  에서  
 $h = 30 \sin 60^\circ$   
 $= 30 \times \frac{\sqrt{3}}{2}$   
 $= 15\sqrt{3}$   
 $= 15 \times 1.7 = 25.5(\text{m})$   
 $\therefore h = 25.5\text{m}$

14. 다음 그림에서 나무의 높이는?

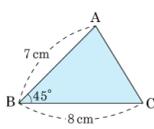


- ①  $10(\sqrt{3}-1)$       ②  $10(\sqrt{3}+1)$       ③  $10(3+\sqrt{3})$   
④  $20(\sqrt{3}-1)$       ⑤  $20(\sqrt{3}+1)$

해설

나무의 높이  $\overline{AH}$  를  $x$  라 하면  
 $\overline{CH} = x, \overline{BH} = x + 40$   
 $\overline{AH} : \overline{BH} = x : x + 40 = 1 : \sqrt{3}$   
 $\sqrt{3}x = x + 40 \Leftrightarrow (\sqrt{3} - 1)x = 40$   
 $\therefore x = \frac{40}{\sqrt{3}-1} = 20(\sqrt{3}+1)$

15. 다음 그림의  $\triangle ABC$ 의 넓이는?



- ①  $7\sqrt{2}\text{ cm}^2$       ②  $14\sqrt{2}\text{ cm}^2$       ③  $21\sqrt{2}\text{ cm}^2$   
④  $28\sqrt{2}\text{ cm}^2$       ⑤  $56\sqrt{2}\text{ cm}^2$

해설

$$\frac{1}{2} \times 7 \times 8 \times \sin 45^\circ = 28 \times \frac{\sqrt{2}}{2} = 14\sqrt{2}(\text{cm}^2)$$