

1.  $\tan A = 2$  일 때,  $\sin^2 A - \cos^2 A$  의 값을 구하여라. (단,  $0^\circ \leq A \leq 90^\circ$ )

▶ 답 :

▷ 정답 :  $\frac{3}{5}$

해설

$\tan A = 2$  를 만족하는 직각삼각형

ABC 를 만들면

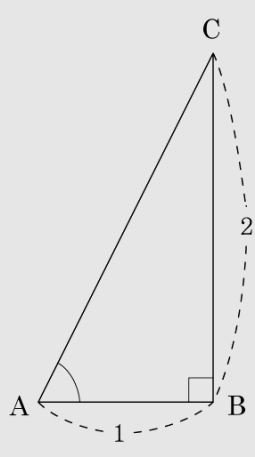
$$\overline{AC} = \sqrt{1^2 + 2^2} = \sqrt{5}$$

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

$$\cos A = \frac{1}{\sqrt{5}}$$

$$\therefore \sin^2 A - \cos^2 A$$

$$= \frac{4}{5} - \frac{1}{5} = \frac{3}{5}$$



2.  $\tan A = \sqrt{3}$  일 때,  $(1 + \sin A)(1 - \cos A)$  의 값은? (단,  $0^\circ < A < 90^\circ$ )

①  $\frac{1 + \sqrt{2}}{4}$

②  $\frac{1 + \sqrt{3}}{4}$

③  $\frac{2 + \sqrt{2}}{4}$

④  $\frac{2 + \sqrt{3}}{4}$

⑤  $\frac{3 + \sqrt{3}}{4}$

해설

$$\tan A = \sqrt{3} \text{ 일 때, } A = 60^\circ$$

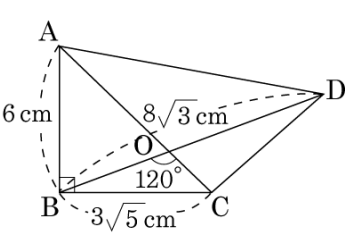
$$(1 + \sin A)(1 - \cos A)$$

$$= (1 + \sin 60^\circ)(1 - \cos 60^\circ)$$

$$= \left(1 + \frac{\sqrt{3}}{2}\right) \left(1 - \frac{1}{2}\right)$$

$$= \frac{1}{2} \left(\frac{2 + \sqrt{3}}{2}\right) = \frac{2 + \sqrt{3}}{4}$$

3. 다음 그림의 □ABCD 에서  $\angle B = 90^\circ$ ,  $\overline{AB} = 6\text{ cm}$ ,  $\overline{BC} = 3\sqrt{5}\text{ cm}$ ,  $\overline{BD} = 8\sqrt{3}\text{ cm}$  일 때, □ABCD 의 넓이를 구하여라.



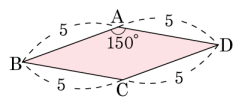
▶ 답 :                       $\text{cm}^2$

▷ 정답 : 54  $\text{cm}^2$

해설

$$\begin{aligned} \overline{AC} &= \sqrt{6^2 + (3\sqrt{5})^2} = \sqrt{81} = 9(\text{cm}) \\ \text{□ABCD의 넓이} &= \frac{1}{2} \times 8\sqrt{3} \times 9 \times \sin(180^\circ - 120^\circ) \\ &= \frac{1}{2} \times 8\sqrt{3} \times 9 \times \sin 60^\circ \\ &= \frac{1}{2} \times 8\sqrt{3} \times 9 \times \frac{\sqrt{3}}{2} = 54(\text{cm}^2) \end{aligned}$$

4. 다음 사각형의 넓이를 구하여라.



▶ 답 :

▷ 정답 :  $\frac{25}{2}$

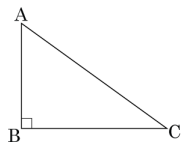
해설

$$\begin{aligned}\text{넓이} &: 5 \times 5 \times \sin 150^\circ \\ &= 5 \times 5 \times \sin 30^\circ \\ &= 5 \times 5 \times \frac{1}{2} \\ &= \frac{25}{2}\end{aligned}$$

$$\therefore \frac{25}{2}$$



5. 다음 그림의 직각삼각형에 대하여 옳은 것은?



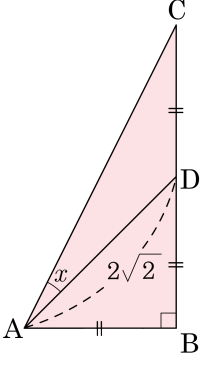
- ①  $\cos A = \cos C$       ②  $\tan C = \frac{1}{\tan C}$       ③  $\tan C = \frac{1}{\tan A}$   
④  $\sin A = \cos A$       ⑤  $\cos C = \frac{1}{\cos A}$

해설

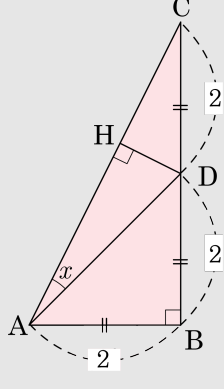
$\tan C = \frac{\overline{AB}}{\overline{CB}}$ ,  $\tan A = \frac{\overline{CB}}{\overline{AB}}$  이므로  $\tan C = \frac{1}{\tan A}$  이다.

6. 다음 직각삼각형에서  $\overline{AB} = \overline{BD} = \overline{DC}$ ,  $\overline{AD} = 2\sqrt{2}$  일 때,  $\cos x$  의 값을 구하면?

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



해설



$$\cos x = \frac{\overline{AH}}{\overline{AD}}$$

$$\overline{AB} = \overline{BD} = \overline{CD} = 2$$

$$\overline{AC} = \sqrt{4 + 16} = \sqrt{20} = 2\sqrt{5}$$

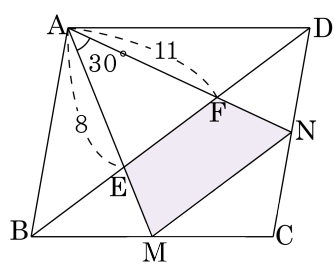
$$\triangle ACD = \triangle ABC - \triangle ABD = 2$$

$$\triangle ACD = \frac{1}{2} \cdot \overline{AC} \cdot \overline{DH} = \frac{1}{2} \cdot 2\sqrt{5} \cdot \overline{DH} = 2$$

$$\Rightarrow \overline{DH} = \frac{2}{\sqrt{5}}, \quad \overline{AH} = \sqrt{\overline{AD}^2 - \overline{DH}^2} = \frac{6}{\sqrt{5}}$$

$$\text{따라서 } \cos x = \frac{\overline{AH}}{\overline{AD}} = \frac{\frac{6}{\sqrt{5}}}{2\sqrt{2}} = \frac{3}{\sqrt{10}} = \frac{3\sqrt{10}}{10} \text{ 이다.}$$

7. 다음 그림과 같이 평행사변형 ABCD의 두 변 BC, CD의 중점을 각각 M, N이라 하고  $\overline{AM}$ ,  $\overline{AN}$ 과 대각선 BD와의 교점을 E, F라 하자.  $\overline{AE} = 8$ ,  $\overline{AF} = 11$ ,  $\angle EAF = 30^\circ$ 일 때,  $\square EMNF$ 의 넓이를 구하여라.



▶ 답 :

▶ 정답 :  $\frac{55}{2}$

해설

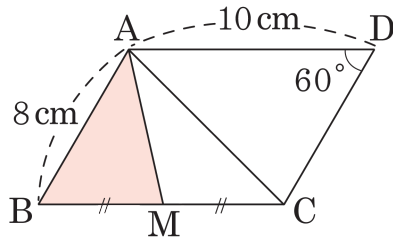
점 E와 F는  $\triangle ABC$ 와  $\triangle ACD$ 의 무게중심이므로

$$\overline{AM} = 8 \times \frac{3}{2} = 12$$

$$\overline{AN} = 11 \times \frac{3}{2} = \frac{33}{2}$$

$$\begin{aligned} \square EMNF &= \triangle AMN - \triangle AEF \\ &= \frac{1}{2} \times 12 \times \frac{33}{2} \times \sin 30^\circ \\ &\quad - \frac{1}{2} \times 8 \times 11 \times \sin 30^\circ \\ &= \frac{55}{2} \end{aligned}$$

8. 다음 그림과 같은 평행사변형 ABCD 에서  $\overline{BC}$  의 중점을 M 이라 할 때,  $\triangle ABM$  의 넓이를 구하여라.



▶ 답 :            $\text{cm}^2$           

▷ 정답 :  $10\sqrt{3}$             $\text{cm}^2$           

해설

$$\square ABCD = 10 \times 8 \times \sin 60^\circ$$

$$= 10 \times 8 \times \frac{\sqrt{3}}{2} = 40\sqrt{3} \text{ (cm}^2\text{)}$$

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

$$= \frac{1}{4} \times 40\sqrt{3}$$

$$= 10\sqrt{3} \text{ (cm}^2\text{)}$$