例題演練

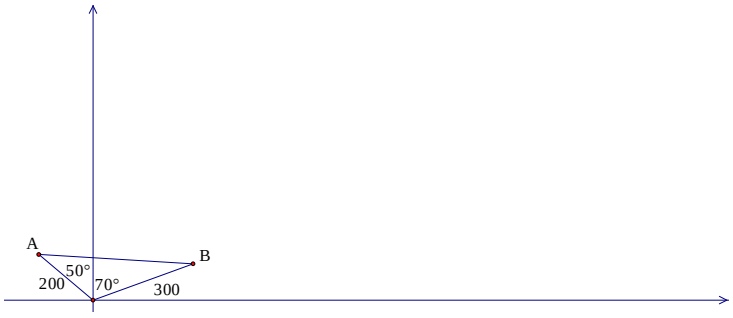
例題 $10.25(\sqrt{3}+1)$

課後練習

9.4.5

$10.100\sqrt{19}$

解：$\cos 120^\circ = \dfrac{200^2+300^2-\overline{AB}^2}{2\cdot 200\cdot 300}$



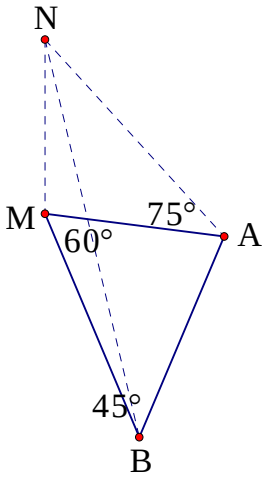
$\overline{AB}^2 = 200^2+300^2+200\cdot 300 = 190000$

$\therefore \overline{AB} = 100\sqrt{19}$

11.600

$12.150\sqrt{6-3\sqrt{3}}$

解：1.由圖知：$\overline{BM} = 150$



2. $\tan 75^\circ = \dfrac{150}{\overline{AM}} \Rightarrow \overline{AM} = 150\cot 75^\circ$

$= 150\tan 75^\circ = 150(2-\sqrt{3})$

3. $\cos 60^\circ = \dfrac{[150(2-\sqrt{3})]^2+150^2-\overline{AB}^2}{2\cdot 150(2-\sqrt{3})\cdot 150}$

$\overline{AB} = 150\sqrt{6-3\sqrt{3}}$

$13.\dfrac{3(3\sqrt{3}+2)}{23}$

14.(1) $3\sqrt{7}$（浬/時） (2) $\dfrac{\sqrt{21}}{7}$ 浬

解：(1)由 $\overline{AB}^2 = \overline{OA}^2+\overline{OB}^2-2\overline{OA}\,\overline{OB}\cos 120^\circ$

$= 2^2+1^2-2\cdot 2\cdot 1\left(-\dfrac{1}{2}\right) = 7$

$\therefore \overline{AB} = \sqrt{7}$

$\therefore$ 漁船之時速為 $\dfrac{\sqrt{7}}{\frac{1}{3}} = 3\sqrt{7}$（浬/時）

(2)設漁船離觀測點O之最近距離為x

$$\because \Delta AOB=\frac{1}{2}\cdot 2\cdot 1\sin 120^\circ=\frac{1}{2}\overline{AB}x\Rightarrow \sqrt{3}=\sqrt{7}x\Rightarrow x=\frac{\sqrt{3}}{\sqrt{7}}=\frac{\sqrt{21}}{7}$$

15. $\frac{15\sqrt{2}}{2}, -1+\frac{2\sqrt{3}}{3}$

解：(1)由題意作圖如右，令塔高$\overline{CH}=h$

ΔACH 中：$\tan 75^\circ=\frac{h}{\overline{AC}}$

$\Rightarrow \overline{AC}=\underset{\uparrow \tan 75^\circ=2+\sqrt{3}}{(2-\sqrt{3})}\ h$

ΔBCH 中：$\tan 30^\circ=\frac{h}{\overline{BC}}\Rightarrow \overline{BC}=\sqrt{3}h$，又$\overline{AB}=\frac{30}{\sqrt{\sqrt{3}+1}}$

(2)在ΔABC(直角Δ)，由商高定理

$$\overline{BC}^2=\overline{AC}^2+\overline{AB}^2\Rightarrow 3h^2=(7-4\sqrt{3})h^2+\frac{900}{\sqrt{3}+1}\Rightarrow \text{塔高}\ h=\frac{15\sqrt{2}}{2}$$

(3)直角ΔABC中，$\cos(\angle ACB)=\frac{\overline{AC}}{\overline{BC}}=\frac{(2-\sqrt{3})h}{\sqrt{3}h}=\frac{2\sqrt{3}-3}{3}=-1+\frac{2\sqrt{3}}{3}$