

Exercice 31

$$1. \cos 30^\circ = \frac{\sqrt{3}}{2} ; \sin 30^\circ = \frac{1}{2} \text{ d'où } \tan 30^\circ = \frac{\sin 30^\circ}{\cos 30^\circ} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\cos 45^\circ = \frac{\sqrt{2}}{2} ; \sin 45^\circ = \frac{\sqrt{2}}{2} \text{ d'où } \tan 45^\circ = \frac{\sin 45^\circ}{\cos 45^\circ} = 1$$

$$2. \text{ Dans le triangle rectangle ABH, } \sin \widehat{ABH} = \frac{AH}{AB} \text{ d'où } AH = AB \times \sin \widehat{ABH}$$

$$AH = 6 \sin 45^\circ$$

$$AH = 6 \times \frac{\sqrt{2}}{2} = 3\sqrt{2}$$

Le triangle ABH étant rectangle isocèle, $BH = AH = 3\sqrt{2}$ cm.

Dans le triangle rectangle AHC :

$$\tan \widehat{HAC} = \frac{HC}{AH} \text{ d'où } HC = AH \times \tan \widehat{HAC}$$

$$HC = 3\sqrt{2} \tan 30^\circ$$

$$HC = 3\sqrt{2} \times \frac{\sqrt{3}}{3} = \sqrt{6} \text{ cm.}$$

$$3. \text{ Aire ABC} = \frac{AH \times BC}{2} = \frac{AH \times (BH + HC)}{2}$$

$$= \frac{3\sqrt{2} \times (3\sqrt{2} + \sqrt{6})^2}{2}$$

$$= \frac{18 + 3\sqrt{12}}{2} = \frac{18 + 6\sqrt{3}}{2}$$

$$= 9 + 3\sqrt{3}$$

$$\approx 14,20 \text{ cm}^2.$$