

- TG 6** The Eiffel Tower is located in Paris, a city built on a flat floodplain. Three tourists A , B and C are observing the Eiffel Tower from the ground. A is due north of the tower, C is due east of the tower, and B is on the line-of-sight from A to C and between them. The angles of elevation to the top of the Eiffel Tower from A , B and C are 26° , 28° and 30° , respectively. Determine the bearing of B from the Eiffel Tower.

In the diagram let the height of tower $TX = h$.

$$\text{Using } \triangle TAX, \frac{AX}{h} = \tan 64^\circ.$$

$$\text{Hence } AX = h \tan 64^\circ$$

$$\text{Similarly, } CX = h \tan 60^\circ \text{ and } BX = h \tan 62^\circ$$

Redraw diagram for horizontal plane.

Let $\angle XCA = \alpha$, $\angle CBX = \beta$ and $\angle CXB = \theta$.

$$\text{In } \triangle CXA, \tan \alpha = \frac{h \tan 64^\circ}{h \tan 60^\circ}$$

$$\alpha = 49^\circ 49'$$

$$\text{In } \triangle CXB, \frac{\sin \beta}{h \tan 60^\circ} = \frac{\sin 49^\circ 49'}{h \tan 62^\circ}$$

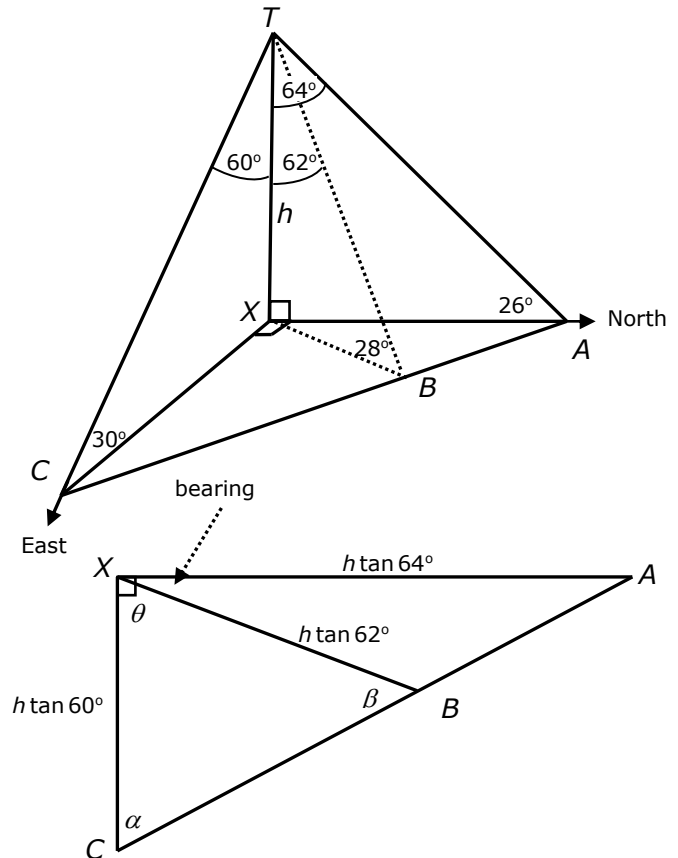
$$\sin \beta = \frac{h \tan 60^\circ \sin 49^\circ 49'}{h \tan 62^\circ}$$

$$\beta = 44^\circ 43'$$

$$\text{Now, } \theta = 180^\circ - (49^\circ 49' + 44^\circ 43')$$

$$= 85^\circ \text{ (nearest degree)}$$

$\therefore \angle AXB = 5^\circ$, hence bearing B from tower is 005° .



* These solutions have been provided by [projectmaths](http://projectmaths.com.au) and are not supplied or endorsed by NESA.

Looking for **Mathematics Advanced** Topic Revision?

Go to our MathsFit page for downloads @ \$2.95 each