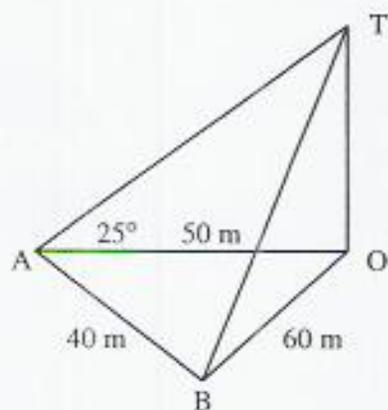


4. In the figure, OT is a vertical tower, and the points O , A and B are on level ground. The lengths AB , OA and OB are 40 m, 50 m and 60 m respectively and the angle of elevation of T from A is 25° .



- Calculate the angle ATB . [6]
5. At a particular point on the earth's surface, the number n of hours of daylight x days after the start of the year is modelled by the formula
- $$n = 12 - 6 \cos\left(\frac{2\pi x}{360}\right)$$
- where the angle is in radians.
- (a) Calculate the length of the day on May 1st, which is day 121. [1]
- (b) Find the value of x for which the length of day is increasing fastest. [4]
- (c) Criticise the model, and indicate how you could improve it. [2]
6. Over the first 2 seconds as it accelerates from rest, the velocity v m/s of an aeroplane is modelled by the equation $v = 10\sqrt{t}$, where t is measured in seconds from the moment that the aeroplane starts to move.
- (a) According to the model, how far does the aeroplane travel in the first two seconds? [4]
- (b) Calculate the acceleration of the aeroplane when $t = 2$. [3]
- (c) Why does this model not give a satisfactory value for the acceleration at $t = 0$? [1]