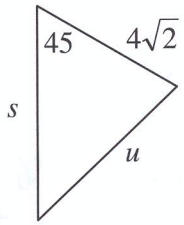
2 (b) The speed of an aeroplane in still air is u km/h.
The aeroplane flies a straight-line course from P to Q, where Q is north of P.

If there is no wind blowing the time for the journey from P to Q is T hours.

Find, in terms of u and T, the time to fly from P to Q if there is a wind blowing from the south-east with a speed of $4\sqrt{2}$ km/h.



$s = uT$

$$\frac{\sin\alpha}{4\sqrt{2}} = \frac{\sin 45}{u}$$

$$\sin\alpha = \frac{4}{u} \quad \text{or} \quad u\sin\alpha = 4$$

$$\Rightarrow \cos\alpha = \frac{\sqrt{u^2 - 16}}{u}$$

$$\text{time} = \frac{s}{u\cos\alpha + 4\sqrt{2}\cos 45}$$

$$= \frac{uT}{\sqrt{u^2 - 16} + 4}$$

5 5 5 5 | 20