17. An oil tanker is 100 km due north of a cruise liner. The tanker sails SE at a speed of 20 kilometres per hour and the liner sails NW at a speed of 10 kilometres per hour. What is the shortest distance between the two boats during the subsequent motion?

A 100km B 80km C $50\sqrt{2}$km D 60km E $33\frac{1}{3}$km

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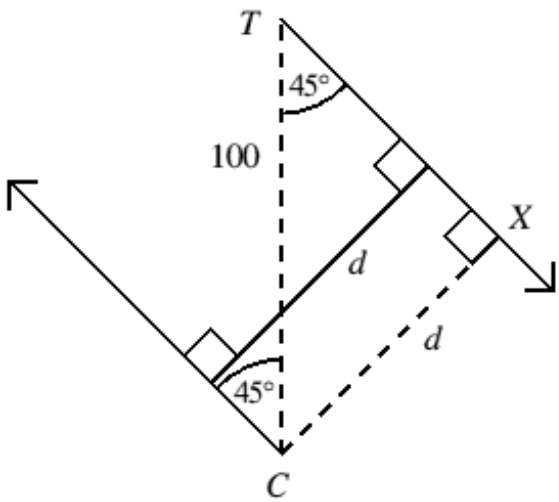
17. C



The tanker and the cruise liner are travelling in parallel and opposite directions, each making an angle of 45° with the line joining their starting positions. The shortest distance between the ships is d, the perpendicular distance between the parallel lines. This is independent of the speeds of the ships.

Considering triangle TCX gives $\sin 45° = \frac{d}{100}$

so $d = \frac{1}{\sqrt{2}} \times 100 = 50\sqrt{2}$.