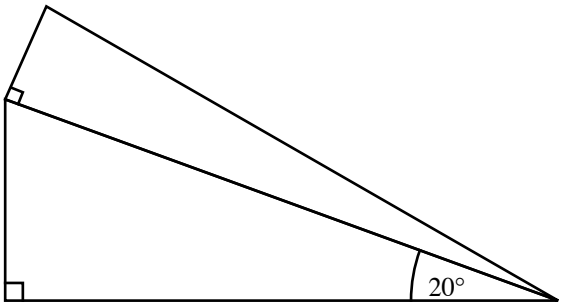
Trigonometry Assignment #7

Covers up to Trigonometry 26: Inverse Functions: Arctangent

1. Island A is 180 miles from island B. A ship captain travels from Island A to Island B. After traveling 240 miles, he realizes he is off course and 100 miles from island B. What angle (in degrees) must the captain turn the ship in order to head straight to Island B?

2. An observer is on top of a lighthouse which is 25 metres high. The radius of the earth is 6367 kilometres. How far from the foot of the lighthouse, measured on the surface of the earth, is the horizon that the observer can see?

3. **[Challenge]** The two right triangles shown below have equal perimeters. What are the angles of the top triangle?



4. **[Challenge]** Is a total eclipse of the sun (where the moon moves in front of the sun) perfect? That is, does the moon look to be exactly the same size of the sun? If not, does the moon appear slightly larger or slightly smaller? You'll need the following data to answer this question:
   - radius of the sun: 695, 500 km
   - radius of the moon: 1, 737 km
   - radius of the earth: 6, 371 km
   - smallest distance between the earth and the sun: 147, 098, 074 km
   - largest distance between the earth and the sun: 152, 097, 701 km
   - smallest distance between the earth and the moon: 356, 375 km
   - largest distance between the earth and the moon: 406, 720km