



## Problem of the Week

### Problem B and Solution

#### A Whale of a Shark!

### Problem

Whale-sharks are relatively friendly fish on whom divers have been known to hitch rides. They are ‘filter-feeders’ with some 300 rows of teeth, and travel long distances at a leisurely 5 km per hour, or 120 km per day. The website <http://www.conservation.org/projects/Pages/Track-Whale-Sharks.aspx> contains much information about tagged whale-sharks.

When they are tagged, their lengths are measured and they are fitted with an electronic tracking device. It transmits their locations each time they surface, and records the distance from where they last surfaced.

In the table are the names of eleven of the whale-sharks being tracked (these may change over time, so replace any that are no longer available). The entries for Susi have been completed for you.



| Name       | Length | Distance | Days   |
|------------|--------|----------|--------|
| Susi       | 6.2 m  | 85.1 km  |        |
| Hula       | 7.2 m  | 5 km     |        |
| Nexus      | 3.93 m | 69.5 km  |        |
| Mr. Casper | 4.65 m | 16.1 km  |        |
| Barack     | 7.51 m | 5.1 km   |        |
| Yoda       | 4.83 m | 1 km     |        |
| Cheggers   | 5.64 m | 3.6 km   |        |
| Dipsy      | 4.57 m | 4 km     |        |
| Kaimana    | 4.46 m | 329.6 km | 2.747  |
| Sebastian  | 4.37 m | 3.6 km   |        |
| Giti       | 4.75 m | 107.7 km | 0.8975 |

Go to the website and fill in the lengths and most recent distances for the whale-sharks in the table.

- Find the mean, median, mode, and range of the lengths of the 11 fish.
- Find the mean, median, mode, and range of the distances travelled by the 11 whale-sharks since their previous transmissions.
- Why do you think the distances travelled vary so much, whereas the lengths of the whale-sharks do not?
- Determine the number of days of travel for each whale-shark which travelled more than 100 km since its previous transmission. (Recall the average speed of 120 km/day.)

### Solution

The table has been completed with data given as of April 30, 2017, including the calculated days of travel for those whale-sharks with distances greater than 100 km in part d).

- The mean of the lengths is approximately 5.28 m; the median is 4.75 m; there is no mode; the range of lengths from 3.93 m to 7.51 m is 3.58 m.
- The mean of the distances travelled is 57.3 km; the median is 5.1 km; the mode is 3.6 km; the range of distances from 1 km to 329.6 km is 328.6 km.
- The distances measured depend on how often the fish surfaces, so they can vary a lot, whereas the length of a mature whale-shark will naturally be much more consistent from fish to fish.
- Kaimana’s transmissions were 2.747 days apart. This is approximately 2 days and 18 hours. Giti’s transmissions were 0.8975 days apart. This is approximately 21.5 hours.

