**Speed and Density Puzzles**

**Easier:**

1. I run around Claygate across 5km of woodland. I run at 2.5m/s. How much time does it take me in minutes and seconds?
2. I have a cube of Solid Awesome with side length 2cm. Its mass is 4kg. What is the density of Solid Awesome? (in g/cm3)

**Medium:**

1. A cylinder of Kryponite is bought by Lex Luther to defeat Superman. The cylinder has radius 10cm and length 30cm. The density of the Kryponite is 3.5g/cm3. What is its mass in kg?
2. An athletics track consists of 2 straight lengths of 100m and two semicircular arcs at either end of radius 31m. How many laps can Mo Farah run round the track if he runs for 43 minutes 13 seconds at 5.78m/s? (to the nearest lap)

**Difficult:**

1. [From a JMO paper] I walk each day to school. By what percentage would I need to increase my usual average speed in order for the journey to take 20% less time than usual?
2. [From a JMO paper] Jack and Jill went up the hill. They started at the same time, but Jack arrived at the top one-and-a-half hours before Jill. On the way down, Jill calculated that, if she had walked 50% faster and Jack had walked 50% slower, then they would have arrived at the top of the hill at the same time. How long did Jill actually take to walk up to the top of the hill?

**Speed and Density Puzzle Answers**

Easier:

1. 33 minutes 20 seconds.
2. 500g/cm3

Medium:

1. 3.3kg
2. 38 laps (37.9644 to be more precise)

Difficult:

1. 25%
2. 2 ¼ hours