**Year 8 - Compound Measures**

**Easier Questions**

1. An arctic tern flies a distance of 245km in 9 hours. How fast does it fly?
2. A partridge flies 3 miles in 15 minutes. What is its speed in m.p.h.?
3. A horse runs for 1 hours at a speed of 8 m.p.h. How far does it run?
4. Find the distance travelled:  
   (a) 65 mph for 2 hours  
   (b) 8 cm/day for 5 days  
   (c) 5 m/s for 1 minute [units!]
5. In the 1996 Olympics Donovan Bailey won the 100m in 9.81 seconds and Michael Johnson won the 200m in 19.37 seconds. Who ran at the faster average speed?
6. Find the density of a metal if weighs 800 grams.
7. A silver ring has a volume of 3 cm3 and a mass of 36 grams. Find the density of the silver.
8. Gold plating costs £6 per cm2. How much will it cost to plate a rectangular lid of dimensions 10cm by 24cm?
9. Good farmland is sold at £4000 per hectare (1 hectare = 10 000m2). Bacon farm has a rectangular field measuring 300m by 80m. Find the cost of the field.

**Harder Questions**

1. [JMC 2011 Q21] Gill leave Lille by train at 09:00. The train travels the first 27km at 96 km/h. It then stops at Lens for 3 minutes before travelling the final 29km to Lillers at 96 km/h. At what time does Gill arrive at Lillers?  
   A 09:35 B 09:38 C 09:40 D 09:41 E 09:43
2. [JMO Mentoring Dec2010 A1] You travel the first 48 miles of a journey at an average of 36 mph and the second 48 miles at an average of mph. What must be if you want to average 45 mph over the 96 mile journey?
3. [IMC 1997 Q16] Thirty years ago Mike McNamara cycled 445.0km in 12 hours – a new British men’s record at that time. In the same time trial Beryl Burton (who died last year) completed 446.2km. How much faster was Beryl Burton’s average speed than Mike McNamara’s (in metres per hour)?  
   A 1.2 B 10 C 11 D 100 E 1200
4. [TMC Regional 2009 Q2] Sarah goes up a hill and then down again the same way. On the way up she averages 2 miles per hour. On the way down she averages 4 miles per hour. What is Sarah’s average speed in miles per hour for the whole journey? Give an exact answer.
5. [IMC 2009 Q19] Driving to Birmingham airport, Mary cruised at 55 miles per hour for the first two hours and then flew along at 70 miles per hour for the remainder of the journey. Her average speed for the entire journey was 60 miles per hour. How long did Mary’s journey to Birmingham Airport take?  
   A 6 hours B 4 hours C 4 hours D 3 hours E 3 hours
6. [Kangaroo Pink 2014 Q12] After walking 8 km at a speed of 4 km/h, Ann starts to run at a speed of 8 km/h. For how many minutes will she have to run in order to have an average speed of 5 km/h over her complete journey?  
   A 15 B 20 C 30 D 35 E 40
7. [JMO 2011 B3] Calum and his friend cycle from A to C, passing through B.

During the trip he asks his friend how far they have cycled. His friend replies “one third as far as it is from here to B”. Ten miles later Calum asks him how far they have to cycle to reach C. His friend replies again “one third as far as it is from here to B”.

How far from A will Calum have cycled when he reaches C?

1. [JMO 2009 B3] Tom left a motorway service station and travelled towards Glasgow at a steady speed of 60mph. Tim left the same service station 10 minutes after Tom and travelled in the same direction at a steady speed, overtaking Tom after a further 1 hour 40 minutes. At what speed did Tim travel?
2. [Cayley 2015 Q1] A train travelling at constant speed takes five seconds to pass completely through a tunnel which is 85m long, and eight seconds to pass completely through a second tunnel which is 160m long.  
   What is the speed of the train?
3. [Kangaroo Pink 2013 Q25] Yurko saw a tractor slowly pulling a long pipe down the road. Yurko walked along beside the pipe in the same direction as the tractor, and counted 140 paces to get from one end to the other. He then turned around and walked back to the other end, taking only 20 paces. The tractor and Yurko kept to a uniform speed, and Yurko's paces were all 1 m long. How long was the pipe?  
   A 35m B 40m C 46 m D 80m E 120m