YEAR 09

Physics Homework

Solutions to Revision on Speed, Force and Motion

1. a) the speed of the aircraft will be:

$$1500 \text{ km/h} = \frac{1500\ x\ 1000\ m}{60\ x\ 60\ s} = \textbf{416.67 m/s}.$$

Well, he is telling the truth.

b) 470 miles are 470 x 1609 m = 756,230 m = **756.23 km**.

40 minutes are 2/3 of the hour that is **0.67 hr**.

so his velocity is then $v = \frac{756.23\ km}{0.67\ h} =$ **1128.7 km/h**.

c) From Darlington, he covered 535 km at top speed which is 416.67 m/s. That means that he covered the distance in

$t_1 = \frac{d_1}{v_1} = \frac{535\ x\ 1000\ m}{416.67\ m/s} =$ **1283.99 s**.

1000 km/h are equal to $v_2 = \frac{1000\ x\ 1000\ m}{60\ x\ 60\ s} =$ **277.78 m/s**.

For the second part of the flight, his time was

$t_2 = \frac{d_2}{v_2} = \frac{535\ x\ 1000\ m}{277.78\ m/s} =$ **1925. 98 s**.

total time = $t_1 + t_2$ = 1283.99 s + 1925.98 s = **3209.97 s**

$= \frac{3209.97}{60} =$**53.50 min**

d) **No**, it was 13.5 minutes longer.

2. a) We know that

$F = m\ x\ a$ so $\qquad m = \frac{F}{a} = \frac{138\ N}{2.95\ m/s^2} = 46.78$ kg.

But this is the total mass of the kid and the skate. So the mass of the kid is: 46.78 kg – 1.4 kg = **45.37 kg**.

b) $F = m\ x\ a$ = 14 kg x 4.2 m/s^2 = **58.8 N**.

c) $a = \frac{F}{m} = \frac{38\ N}{7\ kg}$ = **5.43 m/s^2.**

d) The bag accelerates **towards the thief** with 29 -18.5 = 10.5 N this means that it's mass will be:

$$\text{m} = \frac{F}{a} = \frac{10.5\ N}{1.6\ m/s^2} = \textbf{6.56 kg}.$$