10/30/2013

S10 Unit B: Scalars, Vectors and Uniform Motion Practice

Name: Key!

Date: Mar 17th 2020

1. A camel walks through the desert 275m east and then turns around and walks 425m west.

a) What is the distance the camel travels? $d = 275m + 425m = 700m$

b) What is the displacement of the camel? $\vec{d} = 275m + -425m = -150m$

2. LD the Tiger walks 100 m in 50.0 s. What is his average speed in m/s?

variables list	formula	substitution (with units) and algebra
$v = ?$ $d = 100m$ $t = 50.0s$	$v = \frac{d}{t}$	$v = \frac{100m}{50s} = 2.00m/s$

don't forget to add zeros to make 2 sig digs.

3. LD rides his bike from Lethbridge to Calgary a distance of 250 km without stopping. The trip takes him 10.0 h. What was his average speed in km/h?

variables list	formula	substitution (with units) and algebra
$v = ?$ $d = 250km$ $t = 10h$	$v = \frac{d}{t}$	$v = \frac{250km}{10h} = 25.0km/h$

4. LD walks at a constant speed of 2.00 m/s for a period of 3.00 min. in search of hamburgers. If he walks in a straight line how far did he travel?

variables list	formula	substitution (with units) and algebra
$v = 2.00m/s$ $t = 3min \times 60 = 180s$ $d = ?$	$v = \frac{d}{t}$	$2.00m/s = \frac{d}{180s}$ $d = 360m$

5. Lightning LD drives from Grand Prairie to Thorhild, a distance of 320 km. If he drives at a constant speed of 80 km/h, how long will it take?

variables list	formula	substitution (with units) and algebra
$d = 320\,m$ $v = 80\,km/h$ $t = ?$	$v = \frac{d}{t}$	$\frac{80\,km}{h} = \frac{320\,m}{t}$ $t = 4.0\,h$

6. A car is stopped at a red light. The light turns green and the car accelerates. After 6.00 s the car is travelling at a rate of 4.25 m/s. Determine the acceleration of the car.

variables list	formula	substitution (with units) and algebra
$\vec{v}_i = 0$ $\vec{v}_f = 4.25\,m/s$ $t = 6.00\,s$ $\vec{a} = ?$	$\vec{a} = \frac{\vec{v}_f - \vec{v}_i}{t}$	$\vec{a} = \frac{4.25\,m/s - 0\,m/s}{6.00\,s} = 0.708\,m/s^2$

7. A track athlete runs at a velocity of 8.1 m/s, then slows down to 4.1 m/s. Her acceleration is at a rate of -0.62 m/s^2. How long did this change in velocity take?

variables list	formula	substitution (with units) and algebra
$\vec{v}_i = 8.1\,m/s$ $\vec{v}_f = 4.1\,m/s$ $\vec{a} = -0.62\,m/s^2$	$\vec{a} = \frac{\vec{v}_f - \vec{v}_i}{t}$	$-0.62\,m/s^2 = \frac{4.1\,m/s - 8.1\,m/s}{t}$ $-0.62 = \frac{-4.0}{t}$
$t = ?$		$t = \frac{-4.0}{-0.62} = 6.55$

8. A cannonball is fired from a cannon with an initial velocity of 150 m/s. It has an acceleration of -2.50 m/s^2 due to air resistance. Determine the final velocity of the ball after 60 s of movement.

variables list	formula	substitution (with units) and algebra
$\vec{v}_i = 150\,m/s$ $\vec{v}_f = ?$ $\vec{a} = -2.5\,m/s^2$ $t = 60\,s$	$\vec{a} = \frac{\vec{v}_f - \vec{v}_i}{t}$	$-2.5\,m/s^2 = \frac{\vec{v}_f - 150\,m/s}{60\,s}$ $\vec{v}_f = 0\,m/s$ (This means the ball comes to rest!)