

Name: _____ Period: _____ Date: _____

Just Some Average Problems (H)

Average Speed = $\frac{d}{\Delta t}$	Average Velocity = $\frac{\Delta x}{\Delta t}$	Average Velocity = $\frac{v_i + v_f}{2}$	Average Acceleration = $\frac{\Delta v}{\Delta t}$
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d = distance

Δt = change in time

Δx = displacement (change in position)

v_i = initial velocity

v_f = final velocity

Δv = change in velocity = $v_f - v_i$

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1. It took Jim 2 hours to drive from Boston to Springfield, MA. If the distance between Boston and Springfield is 180 km, what was his average speed in m/s?
 2. Bill the Bug jumped onto the 15 cm line of a meter stick at exactly 4:35 pm. Bill crawled his way along the meter stick. By 4:44 pm Bill had reached the 92 cm line on the meter stick.
 - a. What was Bill's average speed in "cm/min" along the meter stick?
 - b. What was Bill's average speed in m/s?
 3. Mark is riding his bike at a speed of 8.5 m/s for 30 minutes.
 - a. How many meters does he travel?
 - b. How many kilometers does he travel?
 - c. How many miles does he travel? (1 mi = 1609 m)
 4. The light turns green and Rodney travels forward it a straight line. It takes Rodney 8 seconds to achieve a velocity of 65 mi/hr in his car. (1 mi = 1609 m)
 - a. What is Rodney's final velocity in m/s?
 - b. What is Rodney's average velocity in m/s?
 - c. What is Rodney's average acceleration in m/s²?
 - d. How far did Rodney travel while he was accelerating?

5. At the top of the ramp a roller coaster is moving at 5 m/s. Seven seconds later at the bottom of the ramp the roller coaster is going 45 m/s.
- What is the roller coaster's average acceleration during the descent?
 - Eight seconds later the roller coaster's speed changes from 45 m/s to 21 m/s as it climbs a hill. What is the average acceleration during this time?
6. A ball starting from rest accelerates at 6 m/s^2 down an inclined plane for 2.5 seconds.
- What is the velocity of the ball at the end of the 2.5 seconds?
 - What is the average velocity of the ball while on the inclined plane?
 - How far does the ball travel during the 2.5 seconds?
7. A motorist uniformly accelerates from 26 m/s to 32 m/s in 4.0 seconds while passing another car.
- What is the acceleration of the car?
 - What is the average speed of the car?
 - What distance does the car travel while passing the other car?
8. Sue jogged 18 m E, then 30 m W, then 3 m E. It took her 17 seconds to do this.
- What was Sue's average speed?
 - What was Sue's average velocity?

BONUS

A model airplane needs to achieve a velocity of 20 m/s before it can take off. It is capable of accelerating at a rate of 0.80 m/s^2 . What is the shortest runway that can be used to operate this plane?

Answers

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| 1. 25 m/s | 5. 5.7 m/s^2 , -3 m/s^2 |
| 2. 8.6 cm/min, 0.0014 m/s | 6. 15 m/s, 7.5 m/s, 18.8 m |
| 3. 15,300 m, 15.3 km, 9.5 mi | 7. 1.5 m/s^2 , 29 m/s, 116 m |
| 4. 29.1 m/s, 14.5 m/s, 3.6 m/s^2 , 116 m | 8. 3 m/s, 0.53 m/s W |