Kinematics with constant acceleration, in 1 dimension.

It’s the stuff that dreams are made of!

1. A car accelerates from rest for 5.0s. Over this time the car travels 120m. Find the final velocity.

2. A bull walrus has a velocity of -6.0m/s **x** and accelerates to -12.0m/s **x** in 4.0s. What is the acceleration and displacement?

3. An aggravated wildebeest has an initial velocity of 52.0km/h west. The wildebeest accelerates for 32.0s and reaches a final velocity of 12.0m/s east. Find the displacement and the average acceleration.

\*Find the distance travelled.

4. A car drives from Cityville to Towsburgh, 85km away. The driver arrives and realizes that she has forgotten her imitation crab smoothie, and immediately drives back. The trip takes 1.70h. Find the average speed and average velocity.

5. A sea cucumber swims at 0.39m/s east. The sea cucumber then accelerates at 0.098m/s2 east, moving 4.0m east. How much time passes?

6. Two cars (Car A and Car B) sit 600.0m apart on a flat straight road. The cars are facing one another, and initially at rest. Simultaneously both cars begin to accelerate toward one another. Car a accelerates with a magnitude of 3.00m/s2, Car B accelerates with a magnitude of 4.00m/s2.

 A B

600.0m

a. How much time passes before the two cars collide in a spectacular explosion?

b. How far from Car A’s starting point is the collision?

c. What is the velocity of each car at the moment of impact?

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7. A transport truck carrying a load of chocolate covered Kalamata olives accelerates to the right at 0.295m/s2 for 20.224s, reaching a final velocity of 16.33m/s right. How far is the truck displaced in this time?

8. An object is dropped from a height of h metres and reaches a speed of v1.  What speed would the same object reach if dropped from a height of 2h? Give the answer in terms of v1.

9. A disgruntled Mr. TubeSteakTM employee drops a sack of rotten smokies from a 17m high bridge, onto his boss’s car moving with constant velocity on level ground below. The employee drops the festering bag of meat when the car is 50.0m from the base of the bridge. Wow! A perfect hit! What a rancid explosion of semi-decayed, hickory-smoked, pig flesh! How fast was the boss travelling before he received his rude employee’s rank surprise?

10. Consider the following. The first one fourth (1/4) of the distance between two points is covered at an average velocity of 18m/s. The remainder of the trip is traveled with vave=51m/s. What is the average velocity for the entire trip? (Assume a straight line path)

11. 12m

 A B

 5.5m/s 4.2m/s

How far will A travel before it catches B?

How much time will elapse?

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