Name: Key

Physics Average Velocity/Acceleration Worksheet B

Show all of your work for the following problems. No work=No credit (even if the answer is correct)

1. A family has 4 hours to complete a 265 mile trip. How fast must they travel in order to complete the trip on time?

$\Delta d = 265 mi$
$\Delta t = 4 hrs$
$V_A = ?$

$V_A = \frac{\Delta d}{\Delta t} = \frac{265 mi}{4 hr} = \boxed{66.3 mi/hr}$

2. Your average velocity to the store was 40 mph. The store is 15 miles away. How long does it take you to get to the store?

$V_A = 40 mi/hr$
$\Delta d = 15 mi$
$\Delta t = ?$

$\Delta t = \frac{\Delta d}{V_A} = \frac{15 mi}{40 mi/hr} = \boxed{.375 hr}$

3. How far will you travel in 3.5 hours if you average 90 km/hr?

$\Delta t = 3.5 hrs$
$V_A = 90 km/hr$
$\Delta D = ?$

$\Delta D = V_A \cdot \Delta t = (90 km/hr)(3.5 hrs) = \boxed{315 mi}$

4. In the 1988 Summer Olympics, Florence Griffith Joyner set the then women's world record in the 100 meter dash. She completed the race in 9.79 seconds. What was her average velocity?

$V_A = ?$
$\Delta D = 100 m$
$\Delta t = 9.79 s$

$V_A = \frac{\Delta D}{\Delta t} = \frac{100 m}{9.79 s} = \boxed{10.2 m/s}$

5. How far will you travel if you walk for 150 minutes at an average velocity of 3 mph?

$\Delta D = ?$
$V_A = 3 mi/hr$
$t = 2.5 hr$

$\Delta D = V_A \cdot \Delta t = (3 mi/hr)(2.5 hr) = \boxed{7.5 mi}$

6. A Nolan Ryan fastball is thrown at a speed of 40.5 m/s. How long does it take to reach home plate 18.44 meters away?

$V_A = 40.5 m/s$
$\Delta D = 18.44 m$
$\Delta t = ?$

$\Delta t = \frac{\Delta D}{V_A} = \frac{18.44 m}{40.5 m/s} = \boxed{.455 s}$

7. A bicyclist has an average velocity of 25 km/hr. How far will she travel in 2.5 hours?

$V_A = 25 km/hr$
$\Delta t = 2.5 hr$
$\Delta D = ?$

$\Delta D = V_A \cdot \Delta t = (25 km/hr)(2.5 hr) = \boxed{62.5 km}$

8. A dog accelerates from 2 m/s to 5 m/s in 1.3 seconds. If the rate of acceleration is constant, what is the dog's acceleration?

$V_i = 2\,m/s$
$V_f = 5\,m/s$
$t = 1.3\,s$
$A = ?$

$A = \frac{V_f - V_i}{\Delta t} = \frac{5\,m/s - 2\,m/s}{1.3\,s} = \boxed{2.31\,m/s^2}$

9. Dale Earnhardt Jr. finishes his pit stop and leaves the pits with an acceleration of 10 m/s/s for 4 seconds. How fast is he going after his acceleration from the pits?

$V_i = 0\,m/s$
$A = 10\,m/s/s$
$\Delta t = 4\,s$
$V_f = ?$

$V_f = V_i + A\Delta t = 0 + (10\,m/s/s)(4\,s) = \boxed{40\,m/s}$

10. What is the average velocity of a lab cart that goes 164 cm in .754 seconds?

$\Delta D = 164\,cm$
$\Delta t = .754\,s$
$V_A = ?$

$V_A = \frac{\Delta D}{\Delta t} = \frac{164\,cm}{.754\,s} = \boxed{218\,cm/s}$

11. A ball starts from rest and rolls down a ramp with an acceleration of 40 cm/s/s. How many seconds will it take to reach a speed of 500 cm/s?

$V_i = 0\,m/s$
$V_f = 500\,cm/s$
$A = 40\,cm/s^2$
$\Delta t = ?$

$\Delta t = \frac{V_f - V_i}{A} = \frac{500\,cm/s - 0}{40\,cm/s^2} = \boxed{12.5\,s}$

12. A car is able to accelerate from 25 mi/hr to 55 mi/hr in 4.25 seconds. What is its acceleration?

$V_i = 25\,mi/hr$
$V_f = 55\,mi/hr$
$\Delta t = 4.25\,s$
$A = ?$

$A = \frac{V_f - V_i}{\Delta t} = \frac{55\,mi/hr - 25\,mi/hr}{4.25\,s} = \boxed{7.06\,mi/hr/s}$

13. A car accelerates from 10 m/s to 25 m/s at a rate of 3 m/s². How long did this take?

$V_i = 10\,m/s$
$V_f = 25\,m/s$
$A = 3\,m/s^2$
$\Delta t = ?$

$\Delta t = \frac{V_f - V_i}{A} = \frac{25\,m/s - 10\,m/s}{3\,m/s^2} = \boxed{5\,s}$

14. A horse is walking at 1 m/s. It then accelerates at a rate of 2 m/s² for 5 seconds. How fast is it traveling now?

$V_i = 1\,m/s$
$A = 2\,m/s^2$
$\Delta t = 5\,s$
$V_f = ?$

$V_f = V_i + A\Delta t = 1\,m/s + (2\,m/s^2)(5\,s) = \boxed{11\,m/s}$

15. It takes 4 seconds for a car to slow down from 20 m/s to 2 m/s. What was its rate of acceleration?

$V_f = 2\,m/s$
$V_i = 20\,m/s$
$\Delta t = 4\,s$
$A = ?$

$A = \frac{V_f - V_i}{\Delta t} = \frac{2 - 20\,m/s}{4\,s} = \boxed{-4.5\,m/s^2}$