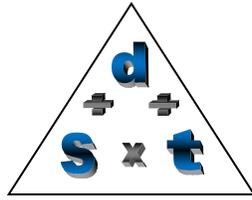


Motion & Graphing Understanding Check Quiz **ANSWERS**

1. From memory, write down the magic triangle for calculating **speed, distance & time**.



2. What is the formula for acceleration?

$$\text{Acceleration} = \frac{V_f - V_i}{T_f - T_i}$$

V_f = Final velocity or speed object is moving when it is done accelerating

V_i = Initial or starting velocity or speed of the object

T_f = Final time or how long it takes to change the velocity or speed

T_i = Initial time or starting time once the velocity or speed started changing

3. What is acceleration? Give **3 examples** of objects that are accelerating.

Change in velocity. An object going faster, slowing down (decelerating) or changing directions (turning)

4. Calculate the following acceleration problems:

- a. A train leaves at exactly **5:00 AM** and reaches a speed of **120 km/h** at exactly **5:02 AM**.

$$\text{Acceleration} = \frac{120 \text{ km/h} - 0 \text{ km/h}}{5:02 \text{ AM} - 5:00 \text{ AM}} = \boxed{60 \text{ km/h/min} \quad \text{or} \quad 1 \text{ km/h/s}}$$

- b. A plane touches down on a runway traveling at **210 km/h** and slows down to a complete stop **30 seconds** later.

$$\text{Acceleration} = \frac{0 \text{ km/h} - 210 \text{ km/h}}{30 \text{ sec} - 0 \text{ sec}} = \boxed{-7 \text{ km/h/s}}$$

5. What is different about the two acceleration problems above? What does the negative tell you about the velocity or speed?

One is negative and one is positive. The negative tells you that the velocity (speed) is decreasing so the object must be slowing down (deceleration).

6. What is the **slope** of a horizontal (flat) line on a distance vs. time graph?

Describe what the object is doing.

0 (zero). It is not moving or is still.

7. What is the **slope** of a **horizontal (flat) line** on a **speed vs. time** graph?

Describe what the object is doing (**hint**: there are 2 possibilities).

0 (zero). It is moving at a constant speed and **NOT** accelerating **or** it is not moving or is still. That can **only** be if the line is a 0 on the y-axis (Speed = 0).

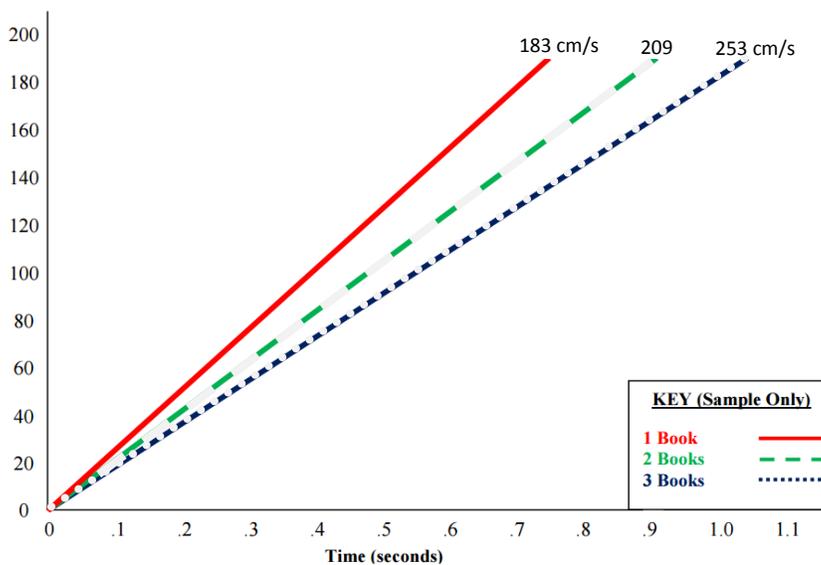
8. What would be a **good title** for a graph that shows an objects **speed**?

Distance vs. Time Graph or Speed Graph

9. **How fast** would an object be going if it accelerated at **10m/s²** for **5 seconds**?

10m/s² X 5 sec = 50 m/s

10. What is wrong (**list all things wrong or missing**) with the following graph?



1. No title

2. No Label for y-axis (should be Distance or Displacement)

3. No units on y-axis (should be cm)

4. Incorrect units used for the slope of the middle line (should be cm/s)

5. The slopes from left to right go from small to bigger. Slope increases as the line goes from horizontal (flat) to vertical (up and down). Biggest slope should be above first line and smallest slope should represent the average speed of the third line.

REQUIRED BONUS: What makes roller coaster rides fun? Explain and **support your claim**.

ACCELERATION: Going fast and not changing your speed or velocity does not make a ride fun. Is it “fun and exciting” sitting on a plane going 600 mph (960 km/h) on your way to Australia for 14 hours? What makes flying on a plane fun is the initial takeoff when you **accelerate very rapidly**. Roller coasters are fun when they **go faster, slower, or change directions rapidly**. Remember, the Earth is spinning at 18 miles/sec (which is pretty fast), but you are not going “WOW, this is amazing” (or maybe you are).