**Acceleration**

Directions: Show the solutions (i.e. your work) to these on a separate sheet of paper.

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| +9 m/s/s | 1. A car in front of the school goes from rest to 27 m/s in 3.0 seconds. What is its acceleration? |
| 396 s | 2. A train can speed up at a rate of .053 m/s/s. What time will it take for it to reach a speed of 21 m/s from a standing stop? |
| 456 m/s | 3. A rocket accelerates at a rate of 190 m/s/s for 2.4 seconds from rest. What is its final speed? |
| 32.5 m/s | 4. A car has a velocity of +15 m/s. It then accelerates at a rate of +3.5 m/s/s for the next 5 seconds. What is its final velocity? |
| 27 s | 5. A train car is moving at +32 m/s when the brakeman applies the brakes, slowing it at a rate of -.75 m/s/s. What time will it take for the train to reach a slower velocity of 12 m/s? |
| 44 m/s | 6. A car involved in an 14 m/s collision with a parked car is determined to have skidded for a time of 3.7 seconds before the impact. If that particular car can brake at -8.2 m/s/s with the tires locked, how fast was the car going before it hit its brakes? |
| 254 m/s | 7. A spaceship with a velocity of +320 m/s fires its retro rockets to slow it at a rate of -22 m/s/s for 3 seconds. How fast is the rocket ship going after that? |
| 3.75 s | 8. What time will it take a car that can accelerate from 0 m/s to 20 m/s in 5 seconds to speed up from 12 m/s to 27 m/s? (Find the acceleration) |
| -6500 m/s/s  Rounded | 9. A baseball can change its velocity from +45 m/s to -52 m/s in the .015 seconds that it takes to hit a line drive. What is the acceleration of the ball? |
| -0.87 m/s/s | 10. What must be your acceleration if you change your velocity from 34 m/s to 21 m/s in 15 seconds? |
| 2.75 s  Convert! | 11. Objects accelerate downwards at 32 f/s/s near the surface of the earth. For how much time must you fall to reach 60 miles/hour? |
| 66 f/s/s  2.1 "g"s  Convert! | 12. A fast car can accelerate from 0 mph to 180 mph in 4 seconds. What is that acceleration in f/s/s? divide this by 32 f/s/s to get "g"s of acceleration. (This car is not quite street legal) |
| -77 m/s/s  -7.9 "g"s | 13. A car going 27 m/s is brought to rest in .35 seconds by an overturned semi-trailer. What is the acceleration in m/s/s, and what is that in "g"s (Divide that by 9.8 m/s/s in metric units) |
| 55 m/s | 14. A train pulls into the station with a velocity of 5 m/s. It had applied its brakes (which slow it at -.35 m/s/s) for 143 seconds prior to that. What was its velocity before it hit its brakes? |
| 4.4 minutes  Convert! | 15. An oil tanker can slow at a rate of -.055 m/s/s. For how much time before reaching port must the tanker reverse its screws if it cruises at a speed of 14.5 m/s? |