

**Driver's Ed. Education**  
**A Series of Specifics for Success**  
**by John Hajny**  
**Central NY Region Chief Instructor,**  
**Zone 1 Instructor**

**Article #16 – “Tire Math”**

Were you thinking of changing tire and/or rim sizes, but hit the numbers game wall?

I know... who ever thought they'd get a math lesson from me?! Well, if I can do this stuff believe me... *anybody can!* We won't talk about how many calculators I burned out making sure I had it right (?). Anyway, why bang your head when I can do it for you in this handy little primer on tire sizing and “Plus” conversions.

As you may already know, or will soon discover, upgrading to larger tires is a little tricky. Changing rim diameters is even more so! Upgrading rim diameter is called “Plus Sizing.” A 1" increase in rim diameter is called a “Plus 1” upgrade. A 2" increase is a “Plus 2”, and so on. Let's do some math before the smoke from my brain gets too thick.



O.K., a common Porsche tire size is 225/50/16. The first number is the tire's **Section Width** in millimeters, the second is the **Aspect Ratio**, which says in this case that the tire is 50% tall as it is wide. The third number is obviously the rim diameter. That means this tire is 225mm in **Section Width**, the **Section Height** is 50% of that, or 112.5mm, and the rim is 16" in diameter, which would be 400mm. The overall wheel/tire diameter here is 25" or 625mm.

Now, if one were looking to get a little more “rubber on the road”, but stay with the same rims, one could not simply buy a wider tire because that would also make it taller, eh? Remember the **Aspect Ratio!** Not changing the Aspect Ratio accordingly would obviously foul up the gearing and speedometer readings. Now, if you're building a track car and are a pretty serious driver, you likely don't care what the speedo reads. You likely have also found that the stock gearing runs a little short in some spots on the track, forcing you close to the rev limiter just shy of your braking point. Well, now you can play the tire size game to “tune out” those annoying instances where you have to back out or shift.

Going to a wider tire requires going with a smaller Aspect Ratio. So, if you wanted to upgrade to a wider tire that maintained the same relative height, you would look for a 245/45/16, which has a width of 245mm and would give you a height of 110.25mm... about as close as you can get. The 2.5mm difference will not effect things noticeably. To do this stuff requires searching the tire charts for the right combination of numbers.

So, let's build an equation for this problem.

**Given: 1" = 25mm**

Where: **W** = Width.

**A** = Aspect Ratio.

**H** = Height.

**R** = Rim diameter. (A 16" rim is equal to 400mm)

We could then write the equation: **W** divided by **A** =

**H** (or **W** times the decimal equivalent of **A**) to solve

for our tire section height. Plugging in the numbers

from the example would give us:  $225 \times 0.5 = 112.5$ .

Got it? Now, to figure the overall diameter of our wheel and tire we would write:

**W / A = H x 2 + R = Overall Diameter -or-**

**$225 \times 0.5 = 112.5 \times 2 = 225\text{mm} + 400\text{mm} = 625\text{mm}$**   
**or 25"**.

For our bigger tire, we would write:

**$245 \times 0.45 = 110.25 \times 2 = 220.5\text{mm} + 400 =$**

**$620.5\text{mm}$  or 24.82"**. Yeah baby... this is *easy!*

Well, now it gets trickier. When you look to upgrade to larger diameter rims, you must obviously look for a tire that is commensurately shorter to make up for this increase in diameter and still keep the same overall wheel/tire diameter. 1" is equivalent to 25mm. So, if you took our example above, and upgraded to 17" rims, you would need a tire that was approximately 25mm shorter overall to keep the same overall wheel/tire diameter. The tire that would give you this would be a 255/40/17. Using our formulas from above we would write:  **$255 \times 0.4 = 102 \times 2 + 425 = 629\text{mm}$  or 25.16"**. Again, about as close as you can get. So there you have it. Simple eh? Damn... the smoke detector just went off!

**All Text and Graphics herein are Copyrighted (C)**  
**1995-2003**

**by John L. Hajny**

**I have striven to make this an extremely well written and accurate series on a subject that is not to be taken lightly and can obviously be dangerous.**

**To maintain the accuracy and proper presentation of that message, I would ask that absolutely no use whatsoever of any text herein be made without my express written consent.**

**I ask you to please abide by this request.**

**Thank you.**