Ratios

I'm an avid hot-rodder. I like putting BIG engines in SMALL cars. One way to compare the performance of a vehicle is the "Power to Weight Ratio."

I built a car a few years ago from scratch. It has a 120hp engine. That doesn't sound like much, but it was plenty quick. The car itself weighed 1275lbs.

$$\text{Power to Weight Ratio} = \frac{1275}{120}$$

$$= 10.625\text{lbs/hp}$$

How can we compare that? Let's look at a modern full size pickup. They weigh around 6000lbs. How much power would I need to be comparable in performance?

Ratios!

Say in your head:

"THIS compares to THIS, in the same way THAT compares to THAT."

In our case, my car's 120hp "compares to" its 1275lbs, "in the same way" the truck's horsepower "compares to" the truck's 6000lbs.

We write it like this:

$$\frac{120\text{hp}}{1275\text{lbs}} = \frac{X}{6000}$$

HANDY TIP: *Always write your ratio with the unknown at the top. That saves a step in moving the X on top in the solving. It works!*

And solve for X:

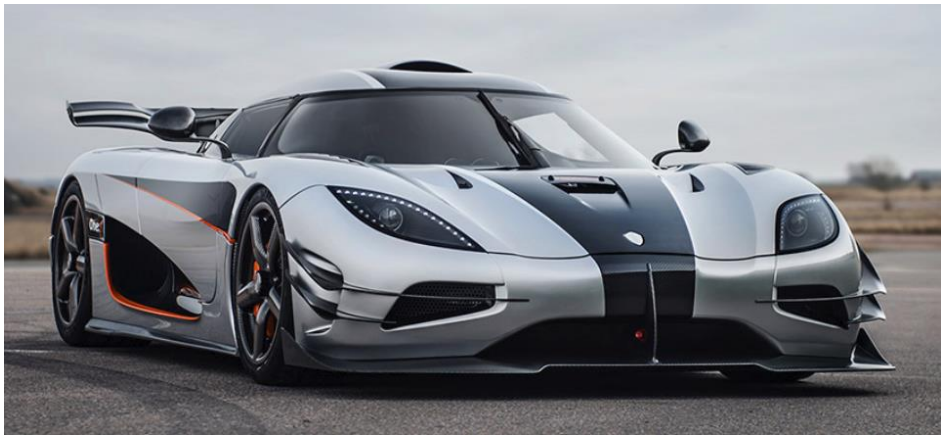
$$6000 \times \frac{120hp}{1275lbs} = \frac{X}{6000} \quad \times 6000$$

$$\frac{720000}{1275lbs} = X$$

$$564.7hp = X$$

Most modern full size pickups are around 325 horsepower.

USELESS FUN FACT: The Koenigsegg "one:1" super car was produced with one kilogram for every horsepower. That's 2.2lbs for every horsepower. The full size pickup would need 2727hp to compare.



Let's try another example.

An $80 pair of shoes typically lasts me a year (12 months). How much would a $350 pair of shoes have to last me?

Note: I'm asking about time, so place the unknown "time" on the top

$$\frac{\textit{Time}}{\textit{Cost}} \qquad \frac{12\text{mo}}{\$80} = \frac{X}{\$350}$$

$$350 \times \frac{12\text{mo}}{\$80} = \frac{X \times 350}{\$350}$$

$$\frac{4200}{\$80} = X$$

$$\frac{52.5}{12 \text{ (months in a year)}} = X$$

4 years 6 months = X