AUTOMOTIVE FORMULAS

1/8 Mile - 1/4 Mile ET Conversion
1/4 Mile ET = (1/8 Mile ET + .22) / .655
1/8 Mile ET = (¼ Mile ET * .655) - .22

Estimate 60 foot MPH from 60 foot ET
60foot MPH = (81.8181818181818181 / 60foot time) * 100000.0 + 0.5) / 100000.0)

Horsepower from 1/4 mile MPH or ET Calculation:
HP = vehicle weight *****(¼ Mile speed /234)*(¼ Mile speed /234)*(¼ Mile speed /234)
HP = weight / (ET / 5.825)* (ET / 5.825)* (ET / 5.825)

1/4 Mile ET & MPH from HP and Weight Calculation:
ET = 6.269 * (weight/hp) * (weight/hp) * (weight/hp)
MPH = 230 * (hp/weight) * (hp/weight) * (hp/weight)

Formulas for air capacity & volumetric efficiency
theoretical cfm = rpm x displacement / 3456
volumetric efficiency = actual cfm / theoretical cfm x 100
street carb cfm = rpm x displacement / 3456 x 0.85
racing carb cfm = rpm x displacement / 3456 x 1.1

Liter - Cubic Inches Conversion
Cubic Inches = Liters / 0.01639
Liters = Cubic Inches * 0.01639

Formulas for MPH RPM gears & tires
mph = (rpm x tire diameter) / (gear ratio x 336)
rpm = (mph x gear ratio x 336) / tire diameter
gear ratio = (rpm x tire diameter) / (mph x 336)
tire diameter = (mph x gear ratio x 336) / rpm

Formula for instrument error
actual mph = 3600 / seconds per mile
speedometer error percent = difference between actual and indicated speed / actual speed x 100

Formulas for displacement, bore and stroke
pi/4 = 0.7853982
cylinder volume = pi/4 x bore^2 x stroke
stroke = displacement / (pi/4 x bore^2 x number of cylinders)
Cubic Inches = (bore size/2)*(bore size/2)*3.14159* stroke * # of cylinders

Formulas for compression ratio
(CylVolume + ChamberVolume) / ChamberVolume
cylinder volume = pi/4 x bore^2 x stroke
chamber volume = cylinder volume / compression ratio - 1.0
displacement ratio = cylinder volume / chamber volume
amount to mill = (new disp. ratio - old disp. ratio / new disp. ratio x old disp. ratio) x stroke

Formulas for turning radius
s = wheel base
a = steering wheel angle
n = steering ratio (e.g. for 16:1, n = 16)
r = radius of curvature, in the same units as the wheel base

r = s / (sqrt(2 - 2 * cos(2*a/n))