List of “Fun” Formulas

by David Pleacher

1. Formula to determine your speed in miles per hour for a particular race that you ran:

   (A) $MPH = \dfrac{45y}{22t}$ where y = distance run in yards and t is time in seconds

   (B) $MPH = \dfrac{15f}{22t}$ where f = distance run in feet and t is time in seconds

   (C) $MPH = \dfrac{3600m}{1609t}$ where m = distance run in meters and t is time in seconds

2. Formulas for Baseball:

   (A) Pitcher's Earned Run Average:

   $ERA = \dfrac{(ER)(9)}{IP}$ where ER = Earned Runs, IP is the number of innings pitched, and 9 is the number of innings in a regular game (6 or 7 could be substituted for 9 for Little League, Softball, or High School Baseball).

   (B) Batter's Slugging Average:

   $SLA = \dfrac{S + 2 \bullet D + 3 \bullet T + 4 \bullet HR}{AB}$ where S = Singles, D = Doubles, T = Triples, HR = Home Runs, and AB = At Bats.

   (C) Batter's On Base Average:

   $OBA = \dfrac{H + BB + HBP}{AB + BB + HBP + SF}$ where H = Hits, BB = Walks, HBP = Hit By Pitch, and SF = Sacrifice Flies

3. Volleyball Formula

   $HP = \dfrac{K - E}{TA}$ where HP = Hitting Percentage or Attack Percentage, K = Kills, E = Attack Errors, and TA = Total Attack Attempts

4. Body Mass Index:

   (A) $BMI = \dfrac{703W}{H^2}$ where W = weight in pounds and H = height in inches

   (B) $BMI = \dfrac{W}{H^2}$ where W = weight in kilograms and H = height in meters

5. Total Area of your skin:

$$A = \frac{3}{5}h^2$$ where h = your height given in feet

6. Formula to Estimate a person's aerobic capacity based on a one mile walk:

$$V0_2\max = 132.853 - (0.0769WT) - (0.3877AGE) + (6.3150SEX) - (3.2649T) - (0.1565HR)$$

where $V0_2\max$ = person's aerobic capacity measured in (mL/kg/min)

and WT = body weight in pounds, AGE = age in years, SEX: 1 = male, 0 = female,

T = time to walk one mile in minutes and hundredths of minutes, and

HR = average heart rate for the last two minutes of the one mile walk.

The physicians who developed the formula say it will help doctors design safe and effective exercise programs (*Journal of the American Medical Association*, 13 May 1988).

7. Formula to determine the distance that lightning is from you:

$$D = 1130 \bullet t$$ where t = the number of seconds from the time you see lightning flash until you hear the thunder and D is measured in feet

8. Formula to find distance, given the rate and time:

$$D = R \bullet T$$ where T = time and R = Rate

9. Formula to determine the weight of a cube of ice in pounds:

$$W = .033e^3$$ where e = the edge of the cube measured in inches measured in inches

10. Formula to find how long a storm will last:

$$t = \sqrt{\frac{d^3}{216}}$$ where d = the diameter of the storm in miles

and t = time in hours

11. Formula to find the Heat Index

$$
\begin{aligned}
\mathrm{HI} = {} & 16.923 + \left(1.85212x10^{-1} \bullet T\right) + \left(9.41695x10^{-3} \bullet T^2\right) - \left(3.8646x10^{-5} \bullet T^3\right) \\
& + \left(5.37941 \bullet R\right) - \left(1.00254x10^{-1} \bullet T \bullet R\right) + \left(3.45372x10^{-4} \bullet T^2 \bullet R\right) + \left(1.42721x10^{-6} \bullet T^3 \bullet R\right) \\
& + \left(7.28898x10^{-3} \bullet R^2\right) - \left(8.14971x10^{-4} \bullet T \bullet R^2\right) \\
& + \left(1.02102x10^{-5} \bullet T^2 \bullet R^2\right) - \left(2.18429x10^{-8} \bullet T^3 \bullet R^2\right) \\
& + \left(2.91583x10^{-5} \bullet R^3\right) - \left(1.97483x10^{-7} \bullet T \bullet R^3\right) \\
& + \left(8.43296x10^{-10} \bullet T^2 \bullet R^3\right) - \left(4.81975x10^{-11} \bullet T^3 \bullet R^3\right)
\end{aligned}
$$

given the temperature, T, in Fahrenheit degrees and the Relative Humidity, R.

12. Formula to determine the Wind Chill:

$$WC = 35.74 + 0.6215T - 35.75V^{.16} + 0.4275TV^{.16}$$

where WC = Wind Chill based on the Fahrenheit scale,

T is the air temperature (measured in °F), and

V is the wind speed measured in mph

13. Formula to convert between Celsius and Fahrenheit degrees:

(A) Celsius to Fahrenheit: $F = \frac{9}{5}C + 32$ where C = Celsius and F = Fahrenheit

(B) Fahrenheit to Celsius: $C = \frac{5}{9}(F - 32)$ where C = Celsius and F = Fahrenheit

14. Formula for the camera's f-stop:

$N = \frac{f}{D}$ where N = the f-stop number, f = the focal length of the lens, and D = the diameter of the aperture

15. Formula to determine the right size TV:

$TV = \frac{D}{2.5}$ where TV = ideal screen size and D = distance in inches from your couch to your TV stand

16. Formula to determine the amount of a tip:

$T = C \bullet R$ where T = amount of the tip, C = cost of the meals,
and R = the tip rate (in decimal form)

17. Formula for the number of gallons in an aquarium:

$G = \frac{L \bullet W \bullet H}{231}$ where G = number of gallons in the aquarium, and
L, W, and H are the dimensions of the aquarium in inches
(231 is the number of cubic inches in a gallon)

18. Formula for Simple Interest:

$I = P \bullet R \bullet T$ where I = amount of interest, P = the principal,
R = the rate (as a decimal), and T = time (in years)

19. Formulas for Compound Interest:

(A) Compound Interest Formula: $A = P\left(1 + \frac{r}{n}\right)^{nt}$

where A = Total Amount (current worth)
P = initial deposit or Principal
r = annual interest rate (expressed as a decimal: eg. 0.06)
n = # of times per year interest is compounded
t = number of years invested

(B) Compound Interest Formula for continuous compounding:

$A = Pe^{rt}$ where $e = 2.718281828$

20. Formula for the Rule of 72:

$T = \frac{72}{R}$ where T = the time (in years) required to double an
investment at R percent compounded annually

21. Formula to determine the speed of a car:

$s = \sqrt{30fd}$ where s = speed in m.p.h. that a car was traveling,
d is the distance in feet that the car skidded,
and f is the coefficient of friction of the road
(dry concrete road $f = .8$; wet concrete $f = .4$)

22. Formula for Horsepower:

$H = 15 - \frac{(n-2000)^2}{150{,}000}$ where H is the horsepower generated
by an automobile engine at n r.p.m.s

23. Formula for the Displacement of an engine:

$D = \frac{\pi}{4}B^2SN$ where D is the displacement of an engine, B = the bore,
S = the stroke, and N = the number of cylinders.
This can be simplified to $D = .7854B^2SN$
D is measured in cubic inches or cubic centimeters (or liters)

24. Formula for total Stopping Distance of a car:

(A) Reaction Distance: $RD = 1.1R$ where R = Rate of car in mph

(B) Braking Distance: $BD = .0515R^2$ where R = Rate of car in mph

(C) Total Stopping Distance: $D = 1.1R + .0515R^2$ where R = Rate

25. Formula to generate Pythagorean Triples:

All Pythagorean triples are of the form $\{a,b,c\}$
where $a = M^2 - N^2$, $b = 2MN$, and $c = M^2 + N^2$
for integers M and N and $M > N$.
For example, if $M = 2$ and $N = 1$,
Then $\{a,b,c\} = \{3,4,5\}$

26. Formula to calculate password entropy:

$$E = \log_2\left(R^L\right)$$

where $E =$ password entropy, $R =$ pool of unique characters, and $L =$ number of characters in your password.

Then $R^L =$ the number of possible passwords and

$\log_2\left(R^L\right) =$ the number of bits of entropy.