Relative Strength of Earthquakes
Per Richter Scale

Table 1

Exponent E	10^E
0.1	1.2589
0.2	1.5849
0.3	1.9953
0.4	2.5119
0.5	3.1623
0.6	3.9811
0.7	5.0119
0.8	6.3096
0.9	7.9433

Table 2

Exponent E	10^E
0.00000000	1.0000000
0.30103000	2.0000000
0.47712125	3.0000000
0.60205999	4.0000000
0.69897000	5.0000000
0.77815125	6.0000000
0.84509804	7.0000000
0.90308999	8.0000001
0.95424251	9.0000000

Examples below demonstrate how to use the tables to answer questions about relative strength of earthquakes with different Richter-scale values.
Of course, "exact" values should be rounded since the measurements are subject to large rouding error.

Question: How many times stronger is earthquake measuring 5.9 (on Richter scale) than quake of 5.0?
Answer: 7.9433
Subtract 5.0 from 5.9 to get 0.9.
Look in Table 1 to get the value of 10^E for E of 0.9.
The same result is obtained by dividing 10^5.9 by 10^5.0

Question: How many times stronger is earthquake measuring 5.9 than quake of 4.2?
Answer: 50.12
Subtract 4.2 from 5.9 to get 1.7. Then separate 1.7 into 1.0 plus 0.7.
Multiply 10^1 (which is simply 10) times 10^0.7, which is 5.012 (from Table 1).

Question: How many times stronger is earthquake measuring 6.2 than quake of 4.2?
Answer: 100 exact
Subtract 4.2 from 6.2 to get 2.0. Raise 10 to the power of 2.0 to get 100 (10^2 = 100)

Question: How many times stronger is earthquake measuring 6.5 than quake of 4.2?
Answer: 199.53
Subtract 4.2 from 6.5 to get 2.3. Then separate 2.3 into 2.0 plus 0.3. Multiply 10^2 (which is 100) times 10^0.3, which is 1.9953 (from Table 1).
The same result is obtained by raising 10 to the power of 2.3 (10^2.3 = 199.53).

Question: What power of earthquake results in a quake that is 4.00 times stronger than quake measuring 5.9?
Answer: 6.50 rounded
From Table 2, select exponent of 0.60206 that results in 10^E of 4.00. Then add 0.60206 to 5.9 to get 6.50206, or 6.50 rounded.
The same result is obtained by dividing 10^6.50206 by 10^5.9.

Question: What power of earthquake results in a quake that is 300 times stronger than quake measuring 5.9?
Answer: 8.38 rounded
Divide 300 by 100 to get 3. Find the two separate exponents (of 10) that will result in 100 and 3.
The exponent to get 100 is of course 2.00 (10^2 = 100).
From Table 2, select exponent of 0.47712 that results in 10^E of 3.00. Then add 2.00 and 0.47712 to 5.9 to get 8.37712, or 8.38 rounded.
This same result is obtained by dividing 10^8.37712 by 10^5.9.

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