NEWSLETTER

Easy dB Math in 5 Minutes

By **Keith Parsons, CWNE #3** · 2026-07-03 · originally on LinkedIn

You can do dB math in your head, with no calculator, faster than you can find the calculator. Three building blocks and two rules cover every decibel value you will ever meet on a survey, in a link budget, or staring at an Access Point spec sheet. Learn them once and you will never reach for a log button again.

Here is the whole trick before I show you a single example: +3 dB doubles the power, +10 dB multiplies it by 10. Minus does the opposite. Everything else is adding and subtracting those two numbers. That is it. Five minutes, and I will throw in the one extra step the handout used to leave you hanging on.

The two rules

The decibel scares people because it looks like higher math. It is not. A decibel is just a ratio written on a log scale, and you only need to understand two things about it to work it in your head.

Rule #1: Left side is decibel, right side is normal. Picture two columns. On the left you have dB values, the numbers your tools report and your specs are written in. On the right you have "normal" values, the actual linear multipliers, the real power ratios. dB math is nothing more than moving between those two columns.

Rule #2: Memorize the anchor table. This is the entire memorization load. Four lines:

Read it like this. On the dB side you *add and subtract*. On the normal side those same moves become *multiply and divide*. A plus on the left is a times on the right. A minus on the left is a divide on the right. And the two anchor values you carry in your head are 10 and 3: +10 dB means times 10, +3 dB means times 2.

Why does +3 dB double the power? Because the decibel is $10 \cdot \log_{10}$ of the ratio, and $10 \cdot \log_{10}(2)$ works out to 3.0103 dB. The field rounds that to 3, and that single rounding is

accurate to about three parts in a thousand. You will never measure the difference. +3 dB doubles, −3 dB halves, and that approximation is the most useful one in all of RF.

Working the easy ones

Start with the values that fall straight out of the table.

What is 10 dB? The table tells you directly. 10 on the dB side is ×10 on the normal side. 10 dB means 10 times the power. Done.

What is 3 dB? Again straight from the table. 3 dB is ×2. Double the power. Done.

Now combine them. This is where the method earns its keep.

What is 13 dB? Break 13 into anchors you know: 13 = 10 + 3. A plus on the dB side is a multiply on the normal side, so:

- 10 dB → ×10
- 3 dB → ×2
- 13 dB → ×10 × 2 = **×20**

13 dB is 20 times the power. You did that without a calculator, and you will do the next one the same way.

What is 36 dB? Decompose into anchors: 36 = 10 + 10 + 10 + 3 + 3.

- Three 10s → ×10 × 10 × 10 = ×1,000
- Two 3s → ×2 × 2 = ×4
- 36 dB → 1,000 × 4 = **×4,000**

The exact value is 3,981. The method gives 4,000. That is half a percent off, from stacking the 3 dB rounding a couple of times, and it is close enough for any field decision you will ever make.

Working with dBm

Everything above is a pure ratio. The moment you see that little "m" on the end, dBm, you have a reference point: 0 dBm = 1 mW. That is a definition, not a measurement, and it never changes. dBm is simply dB relative to 1 milliwatt. So 0 dBm is 1 mW, and from there you climb the same anchor table.

What is 27 dBm? Anchor it off a round number. 27 = 30 − 3.

- 30 dB → ×10 × 10 × 10 = ×1,000, so 30 dBm = 1,000 mW
- The −3 is a minus on the dB side, which is a *divide* on the normal side: ÷2
- 27 dBm → 1,000 ÷ 2 = **500 mW**

The exact value is 501 mW. Half a milliwatt off. Nobody cares.

The building block the handout left blank

The original handout ends with three questions and no answers: 15 dBm, 45 dBm, and 1 dBm. That was on purpose. Those three cannot be built from 10s and 3s alone, and leaving them blank was the nudge to make you find the missing piece yourself. Here is the piece.

The 1-dB step: +1 dB ≈ ×1.26. One more anchor and the whole table is complete. $10 \cdot \log_{10}(1.259) = 1$ dB, so a single decibel multiplies the power by about 1.26. For mental math, round it: **+1 dB ≈ ×1.25, −1 dB ≈ ÷1.25.** Now you can reach any value by getting close with 10s and 3s, then nudging by a dB.

What is 1 dBm? Start at the reference. 0 dBm = 1 mW. Add 1 dB:

- 1 dBm → 1 × 1.26 = **~1.26 mW**

The exact value is 1.259 mW. The cliffhanger resolves.

What is 15 dBm? Get close, then nudge. 16 is easy: 16 = 10 + 3 + 3.

- 16 dB → ×10 × 2 × 2 = ×40, so 16 dBm = 40 mW
- 15 is one dB *below* 16, so divide by 1.26
- 15 dBm → 40 ÷ 1.26 = **~32 mW**

Exact value: 31.6 mW. You nailed it from memory.

What is 45 dBm? Same move at a bigger scale. 46 is easy: 46 = 10 + 10 + 10 + 10 + 3 + 3.

- 46 dB → ×10,000 × 4 = ×40,000, so 46 dBm = 40,000 mW = 40 W
- 45 is one dB below 46, so divide by 1.26
- 45 dBm → 40 ÷ 1.26 = **~32 W**

Exact value: 31.6 W. The big number bends to the same three anchors as the small one.

Why this matters in the field

Link budgets, fade margins, antenna gain, cable loss, the difference between a 23 dBm and a 26 dBm radio. All of it is dB arithmetic. When you can run it in your head you stop treating the numbers as magic and start reading them for what they say. A 3 dB swing is a doubling or a halving of power. A 10 dB swing is a factor of 10. Once those two facts live in your fingertips, you read a spec sheet the way a musician reads a chord.

So here is the whole method again, the bookend. Left side decibel, right side normal. Add and subtract on the dB side, multiply and divide on the normal side. Carry three anchors: 10 is ×10, 3 is ×2, 1 is ×1.26. Add the dBm reference, 0 dBm = 1 mW, and you can convert any power figure in Wi-Fi without a calculator.

Five minutes. No log button. Why would you ever do it the hard way again?

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