Sound Pressure Level Vs Distance

Distance (cm)	dB drop
10	0
20	6.02
30	9.54
40	12.04
50	13.98
60	15.56
70	16.90
80	18.06
90	19.08
100	20.00

Sound pressure loss in free space (10 cm starting point reference)

The change in sound pressure can be calculated using the formula:

$$L_2 = L_1 - \left| 20 \times \log\left(\frac{r_1}{r_2}\right) \right|$$

Where L_2 is the sound pressure level at the desired distance, L_1 is the sound pressure level at the reference distance, r_2 is the desired distance, and r_1 is the reference distance.

For example, using a sound level of 78 at 10 cm as the reference and a desired distance of 30 cm, the equation would be:

$$L_2 = 78 - \left| 20 \times \log\left(\frac{10}{30}\right) \right|$$
$$L_2 = 78 - \left| 20 \times -0.477 \right|$$
$$L_2 = 78 - 9.54$$
$$L_2 = 68.46$$

So, the SPL at 30 cm would be 68.46 dB, with a drop of 9.54 dB.