If $y = Bx$, where B in known exactly and x has an associated error, σ_x, then the error on y, σ_y is given as

$$\sigma_y = \sqrt{\left(\frac{dy}{dx}\right)^2 \sigma_x^2}$$

$$\frac{dy}{dx} = \frac{d}{dx}Bx \rightarrow B$$

$$\sigma_y = \sqrt{B^2\sigma_x^2}$$

$$\sigma_y = B\sigma_x$$

For multiple variables that have independent error estimates, then you add in quadrature. So, if now $y = Ax+Bz$, where A and B are known exactly but x and z have errors, σ_x and σ_z, respectively, then

$$\sigma_y = \sqrt{\left(\frac{\delta y}{\delta x}\right)^2 \sigma_x^2 + \left(\frac{\delta y}{\delta z}\right)^2 \sigma_z^2} \tag{4}$$

Note that the equation is now using partial derivatives (δ) instead of full derivatives because y is a function of both x and z (y(x,z)). To write it out explicitly,

$$\frac{\delta y}{\delta x} = \frac{\delta}{\delta x}(Ax + Bz) \rightarrow A$$

$$\frac{\delta y}{\delta z} = \frac{\delta}{\delta z}(Ax + Bz) \rightarrow B$$

$$\sigma_y = \sqrt{(A\sigma_x)^2 + (B\sigma_z)^2}$$

In another example, let $y = xz$ where both x and z have independent errors. Following from Equation (4),

$$\sigma_y = \sqrt{\left(\frac{\delta}{\delta x}(xz)\right)^2 \sigma_x^2 + \left(\frac{\delta}{\delta z}(xz)\right)^2 \sigma_z^2}$$

$$\frac{\delta}{\delta x}(xz) \rightarrow z$$

$$\frac{\delta}{\delta z}(xz) \rightarrow x$$

$$\sigma_y = \sqrt{(z\sigma_x)^2 + (x\sigma_z)^2}$$

As long as the errors are independent on each other, then you can keep adding terms to Equation (4). Usually, errors are independent.