Important Calculations and Formulas

Sensor Crop Factor (Page 30)

Focal length x crop factor = effective focal length

For Example: 100mm lens on a camera with a 1.6 crop factor has an effective focal length of a 160mm lens. (100 x 1.6 = 160)

Bellows Factor (Page 62)

Bellows Factor = Bellows Extension^2 / Focal length^2 **($BF = BE^2 / FL^2$)**
To calculate the BE of a bellows extended out to 100mm using a 50mm lens:

$$BF = (100mm)^2 / (50mm)^2$$

$$BF = 10,000/2500$$

$$BF = 4$$

The resulting BF of "4" translates into two stops.

Or, here is an easy trick:

Substitute **F-stops** in place of **BE and FL** and determine difference

For example, instead of BE as 100mm, think of it as F11 (F10.0 is rounded up to F11). Think of the FL at 50mm as F5.6 (F5.0 rounded up to F5.6).

The difference between F11 and F5.6 = **Two Stops**

Filter Factors (Page 63)

2X = 1 stop increase
3X = 1 1/3 stop increase
4X = 2 stop increase
8X = 3 stop increase
6X = 4 stop increase

Sunny 16 (Page 105)

Lighting Pattern	Starting Exposure
Sunny	F16 @ 1/ISO
Partly Cloudy	F11 @ 1/ISO
Overcast	F8 @ 1/ISO
Heavy Overcast	F5.6 @ 1/ISO

Angle of Incidence (Page 117)

The angle of incidence = the angle of reflectance

Inverse Square Law (Page 118)

Intensity of the light (f-stop) is inversely proportional to the square of the distance from the subject.

In plain English, if you cut the distance (of the light source from the subject) in half – you gain two stops.

If you double the distance – you lose two stops.

For Example, Intensity = F11 at distance D

If we double the Distance (2D), then the inverse is 1/2D.

One-half squared ($1/2^{2)}$ = ¼)

Now the Intensity at 2D = ¼ what is was at D

¼ intensity = 2 stops less, or F5.6

or

If we cut the distance in half 1/2D, then the inverse is 2.

Two squared $2^2 = 4$

Now the intensity at ½ D = 4X what is was at D

4X intensity = 2 stops more, or F22