

Useful Astronomical Formulas (Eyepiece related)

Telescope Focal Length: Convert inches to mm, with 25.4mm per inch.

Formula: Mirror diameter in inches x focal ratio x 25.4mm= focal length in mm

Example: An 8 inch f/10 telescope would be 80 x 25.4 or 2032mm focal length

Your scope: _____ inches x ____focal ratio x 25.4mm = _____ mm focal length

Eyepiece Magnification:

Formula: Focal length of scope in mm

----- = magnification

eyepiece focal length in mm

Example: An 8 inch f/10 telescope with a 26mm eyepiece would yield

2032mm telescope

----- = approx. 78x (power) magnification

26mm eyepiece

Your scope: _____ mm telescope

----- = _____ x (magnification)

_____ mm eyepiece

Apparent Field of View:

The apparent field of view is expressed in degrees and is published by the manufacturer of the eyepiece. The greater the apparent field the better for easy viewing, but also the more expensive the eyepiece. Meade's Superwide series have apparent fields of 67 degrees, while their Ultrawide series have 84 degrees. Many standard eyepieces have 40-50 degree apparent fields.

Real (True) Field of View:

This refers to the angle, in degrees, of the sky you are viewing thru a particular eyepiece/telescope combination.

Formula: Real Field = Apparent field of View

Magnification

Example: Assume you are using an 8 inch, f/10 telescope with a 40mm eyepiece, that has an advertised Apparent Field of View of 45 degrees. After calculating the magnification using the formula above, you find it is 50x. Dividing 45 degrees by 50x yields a Real Field of View of 0.9 degrees. This would be enough to get about two full moons in side by side. Sky charts usually list an objects size, in degrees. You can figure which eyepiece would be best for viewing, knowing it's Real Field of View.

Degrees:

One degree = 60 minutes of arc (60')

=3,600 seconds of arc (3,600'')

(compiled by Tim Barnwell; please direct corrections to him)