Example 2: Convert -2.00 -1.25 x 012 to plus cylinder. The signs are the same, so we add them together an get -3.25 for the sphere. The cylinder sign is changed to plus, and 90 is added to the cylinder axis (since it is <90) to get 102. The plus cylinder format is -3.25 +1.25 x 102.

Example 3: Convert plano +1.50 x 145 to minus cylinder.
Plano is the same as zero. +1.50 added to zero is +1.50 for the sphere. Change the cylinder sign to minus and subtract 90 from the axis (because it is >90). That gives us +1.50 -1.50 x 055.

Spherical Equivalent

Sometimes we need to use only spherical power to provide best vision in someone with astigmatism. This might be the case in fitting contact lenses, determining if the refractive outcome after cataract surgery was on target, or calculating a trial lens for visual field testing. In these situations, we want the "average" of the spherocylindrical prescription, known as the spherical equivalent (SE).

To calculate the spherical equivalent, algebraically add 1/2 of the cylinder power to the sphere power. The cylinder power and axis are then deleted from the equation. Thus, the spherical equivalent is the same whether we use the plus or minus cylinder format.

Example 1: Find the spherical equivalent of -2.00 +3.50 x 095.
Half of the cylinder power (+3.50) = +1.75. Add that to the sphere: -2.00 + 1.75 = -0.25. The original cylinder power and axis are removed from the mix; SE = -0.25.
In minus cylinder, the same prescription is +1.50 -3.50 x 005. Half of the cylinder power (-3.50) = -1.75. Add that to the sphere: -1.75 + 1.50 = -0.25. The original cylinder power and axis are removed from the mix; SE = -0.25.

Example 2: -8.00 -2.00 x 180.
Half the cylinder power = -1.00.
-8.00 + (-1.00) = SE -9.00

Example 3: +1.00 +1.00 x 090.
Half the cylinder power = 0.50.
+1.00 + 0.50 = SE +1.50

Chapter Quiz
1. Which color’s wavelength travels the fastest?
   a. red
   b. violet
   c. green
   d. none of the above

2. The “Law of Reflection” says:
   a. the angle of reflection increases with the index of refraction
   b. the angle of incidence is equal to the angle of reflection
   c. light is reflected proportionate to the power of the lens
   d. none of the above

3. Regarding light traveling through a prism, the following is true:
   a. light is bent toward the apex and the image is displaced toward the base
   b. light is bent toward the base and the image is displaced toward the apex
   c. light is bent toward the apex and the image is displaced toward the apex
   d. light is bent toward the base and the image is displaced toward the base

4. Where is the focal point(s) in a myopic eye?
   a. behind the retina
   b. one focal point is on the retina, the other is behind the retina
   c. one focal point is on the retina, the other is in front of the retina
   d. in front of the retina

5. Which of the following is not true about convex lenses?
   a. they are thickest at the optical center
   b. they can induce prism if the optical center is not aligned with the visual axis
   c. they correct astigmatism
   d. they correct hyperopia

6. Which of the following is not part of the accommodative triad?
   a. accommodation
   b. convergence of the eyes
   c. pupil constriction
   d. increased blinking