Calculate the vergence at positions A, B, and D in Figure 2-5. What is the value for C? (Answers are found in Figure 2-6.)

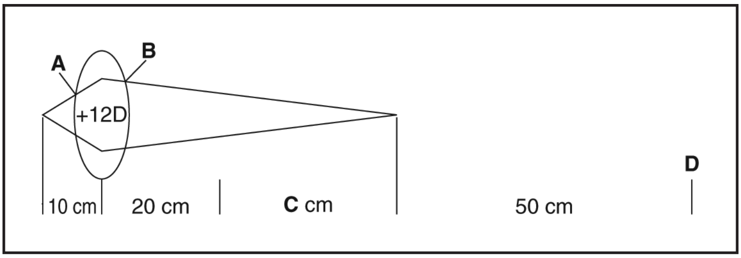

Figure 2-5. Calculate the vergence at positions A, B, and D.

Position A. -10 D. The vergence entering the lens is (1 / 0.1) = -10 (minus for divergent light).

Position B. +2 D. U + D = V. -10 + 12 = +2.

Position C. 30 cm. The light rays emerging from the lens intersect at (1 / 2) = 0.5 m = 50 cm from the lens. Therefore, "C" + 20 = 50 cm, so C is 50 – 20 = 30 cm.

Position D. -2 D. The light rays are diverging (minus vergence) and are located 0.5 m from the point of intersection. (1 / 0.5 = 2.0).

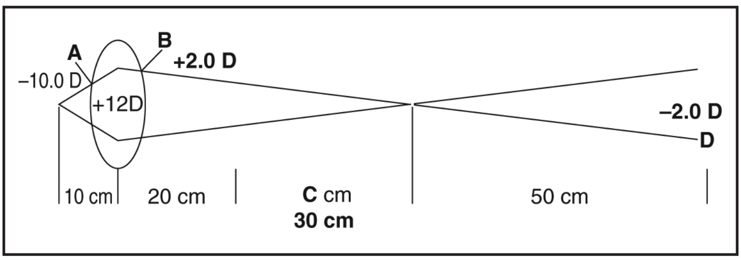

Figure 2-6. Solution to Figure 2-5.

In Figure 2-7, locate the image for the following values of X (answers are found in Figure 2-8).

A. X = 100 cm
B. X = 50 cm
C. X = 250 mm
D. X = 12.5 cm
E. X = 0.011 m

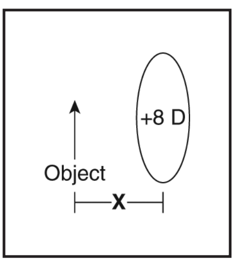

Figure 2-7. Locate the image for the values of X given in the text.

A. 14 cm. U = 1 / 100 cm = 1 / 1 m = -1 D (divergent light). U + D = -1 + 8 = +7.
   1 / V = 1 / 7 = +0.14 m = 14 cm to the right of the lens.

B. 16.7 cm

C. 25 cm

D. Infinity. -1 / 0.125 m = -8. U + D = -8 + 8 = 0. Zero vergence = parallel rays of light.

E. -1.2 cm. 1 / -0.011 = -91. U + D = -91 + 8 = -83. 1 / -83 = -0.012 m = -1.2 cm (1.2 cm to the left of the lens.)