

GIVEN: Two Compound Tangent Circular Curves. $I_1 = 38^\circ 30' 00''$
REQUIRED: FIND THE RADII OF EACH CURVE (R_1 AND R_2).

SOLUTION: $I_2 = 67^\circ 15' 00''$
 $- 38^\circ 30' 00''$
 $\hline 28^\circ 45' 00''$

CONSIDER THE TRIANGLE $C_1 - BC - PAC$ IS AN ISOSCELES TRIANGLE BECAUSE $R_1 = R_1$. THEREFORE, THE TWO REMAINING ANGLES OF THIS TRIANGLE MUST BE EQUAL. THUS,

$$\frac{180^\circ - 38^\circ 30' 00''}{2} = 70^\circ 45' 00'' \text{ EACH ANGLE}$$

THE SAME CAN BE SAID FOR TRIANGLE $C_2 - PAC - EC$. THUS,

$$\frac{180^\circ - 28^\circ 45' 00''}{2} = 75^\circ 37' 30'' \text{ EACH ANGLE}$$

BECAUSE THE RADII INTERSECT THE TANGENTS AT RIGHT ANGLES, THE FOLLOWING ANGLES CAN ALSO BE DETERMINED:

$$90^\circ - 70^\circ 45' 00'' = 19^\circ 15' 00''$$

$$90^\circ - 75^\circ 37' 30'' = 14^\circ 22' 30''$$

THE REMAINING ANGLES CAN BE DETERMINED BY USING THE SUM OF INTERIOR ANGLES OF A TRIANGLE = 180° . THESE ARE SHOWN ON THE DIAGRAM.

NOW, THE LAW OF SINES CAN BE USED FOR FURTHER CALCULATIONS:

$$\frac{x}{\sin 19^\circ 15' 00''} = \frac{1291.42}{\sin 48^\circ 00' 00''}$$

$$x(0.743145) = 425.769$$

$$x = 572.9287'$$

$$1130.23 - 572.9287 = 557.30'$$

$$\frac{LC_2}{\sin 132^\circ 00' 00''} = \frac{557.50}{\sin 33^\circ 37' 30''}$$

$$LC_2 (0.553705) = 414.1546$$

$$LC_2 = 747.90'$$

$$\frac{747.90}{\sin 28^\circ 45' 00''} = \frac{R_2}{\sin 75^\circ 37' 30''}$$

$$R_2 (0.480988) = 724.484$$

$$R_2 = 1506.24'$$

$$\text{FIND } L_2 : \frac{28^\circ 45' 00''}{360^\circ} (2\pi (1506.24)) = 755.80' > 747.90' \text{ MAKES SENSE}$$

$$\frac{y}{\sin 14^\circ 22' 30''} = \frac{747.90}{\sin 132^\circ 00' 00''}$$

$$y (0.743145) = 185.679$$

$$y = 249.856'$$

$$\frac{z}{\sin 112^\circ 45' 00''} = \frac{1291.42}{\sin 48^\circ 00' 00''}$$

$$z (0.743145) = 1190.948$$

$$z = 1602.58'$$

$$LC_1 = 1602.58 - 249.856 = 1352.72'$$

$$\frac{1352.72}{\sin 38^\circ 30' 00''} = \frac{R_1}{\sin 70^\circ 45' 00''}$$

$$R_1 (0.622515) = 1277.0891$$

$$R_1 = 2051.50'$$

$$\text{FIND } L_1 : \frac{38^\circ 30' 00''}{360^\circ} (2\pi (2051.50)) = 1378.51 > 1352.72 \text{ MAKES SENSE}$$