

CURVE FORMULAS

1. Radius:
$$R = \frac{5729.578}{D}$$
2. Degree of Curve:
$$D = \frac{5729.578}{R}$$
3. Tangent:
$$T = R * \tan\left(\frac{I}{2}\right); \text{ Also, } T = \frac{E}{\tan\left(\frac{I}{4}\right)}$$
4. Length of Curve:
$$L = 100 * \frac{I}{D}$$
5. Long Chord:
$$L. C. = 2R * \sin\left(\frac{I}{2}\right)$$
6. Middle Ordinate:
$$M = R * \left(1 - \cos\left(\frac{I}{2}\right)\right)$$
7. External:
$$E = \left(\frac{R}{\cos\left(\frac{I}{2}\right)} - R \right); \text{ Also, } E = T * \tan\left(\frac{I}{4}\right)$$

Trigonometric Formulas

Right Triangles:

$$\sin A = \frac{a}{c}$$

$$\cos A = \frac{b}{c}$$

$$\tan A = \frac{a}{b}$$

$$c^2 = a^2 + b^2$$

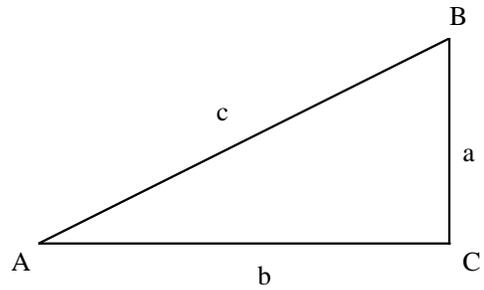


Figure A-2 Right Triangle

Oblique Triangles:

Sine Law:

$$\frac{a}{\sin A} = \frac{b}{\sin b} = \frac{c}{\sin c}$$

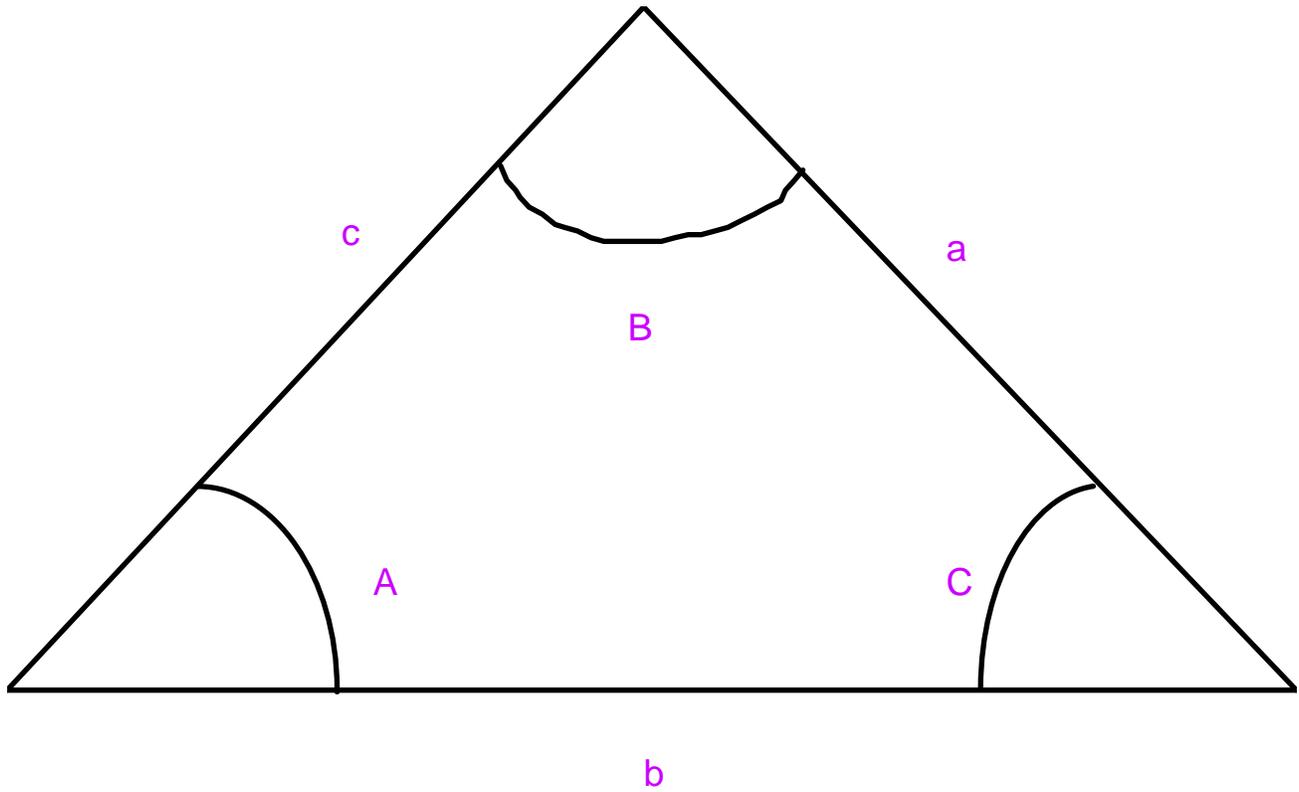


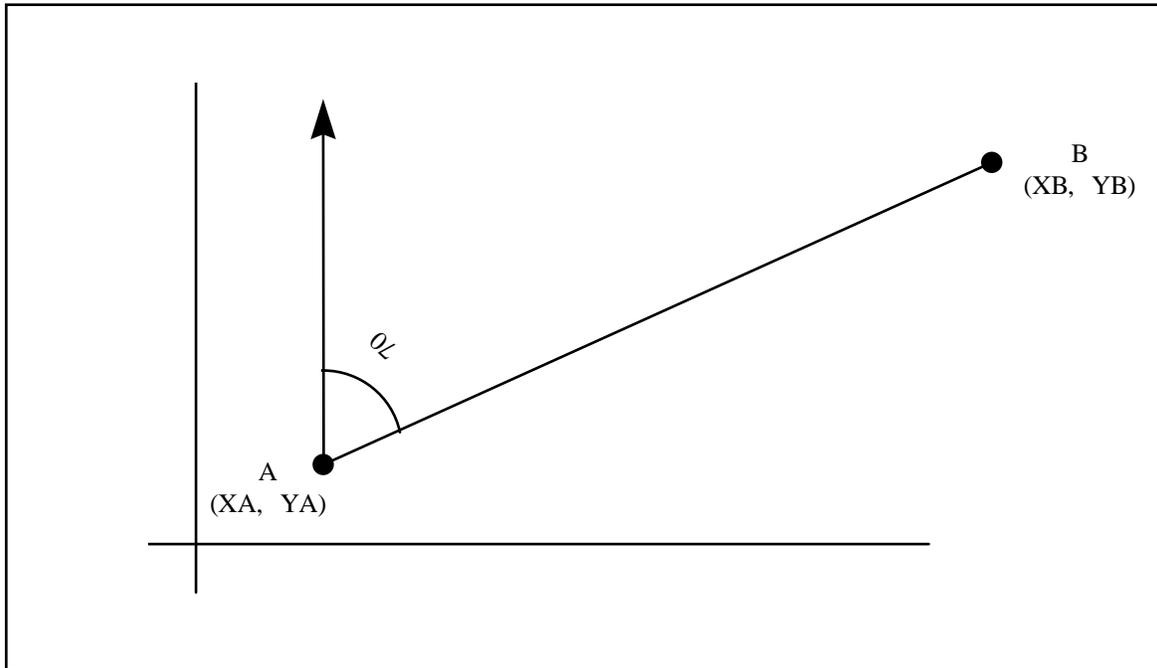
Figure A-3 Oblique Triangle

Cosine Law:

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$



Given the X and Y coordinates of points A and B above, the length (L_{AB}) and azimuth (a_{AB}) of line AB can be computed with the following formulas:

$$L_{AB} = \sqrt{(XB - XA)^2 + (YB - YA)^2}$$

$$a_{AB} = \text{TAN}^{-1} \frac{XB - XA}{YB - YA}$$

There are many other equations for coordinate geometry calculations but those given above are used most often.