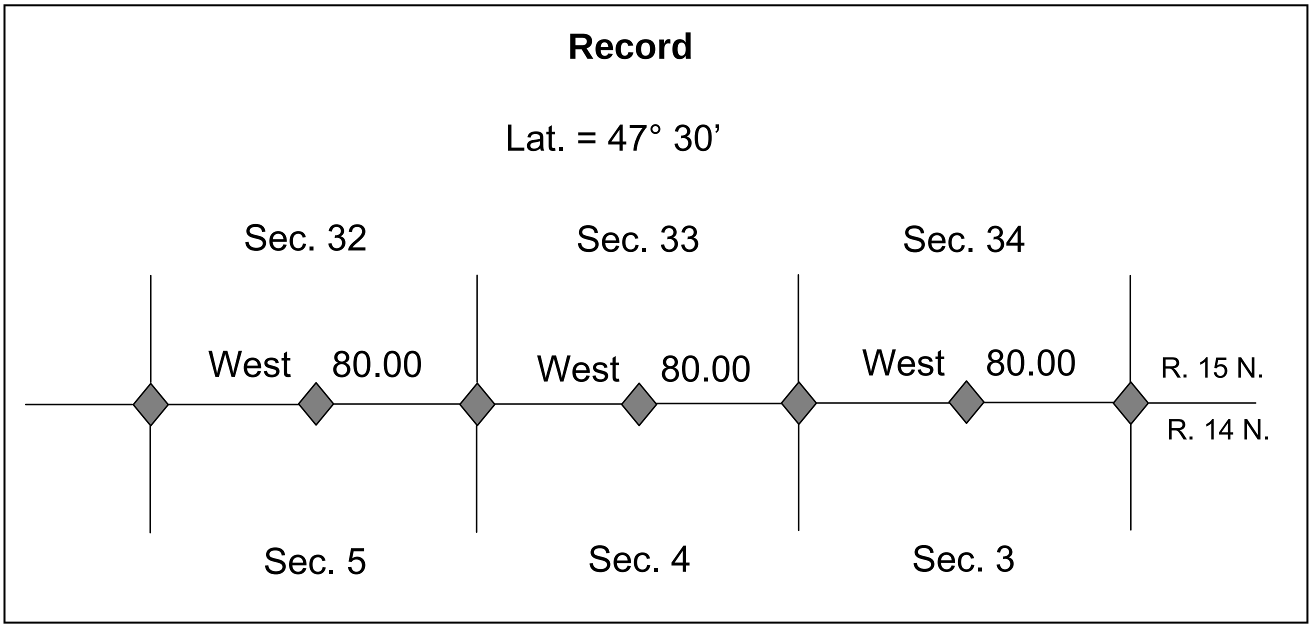
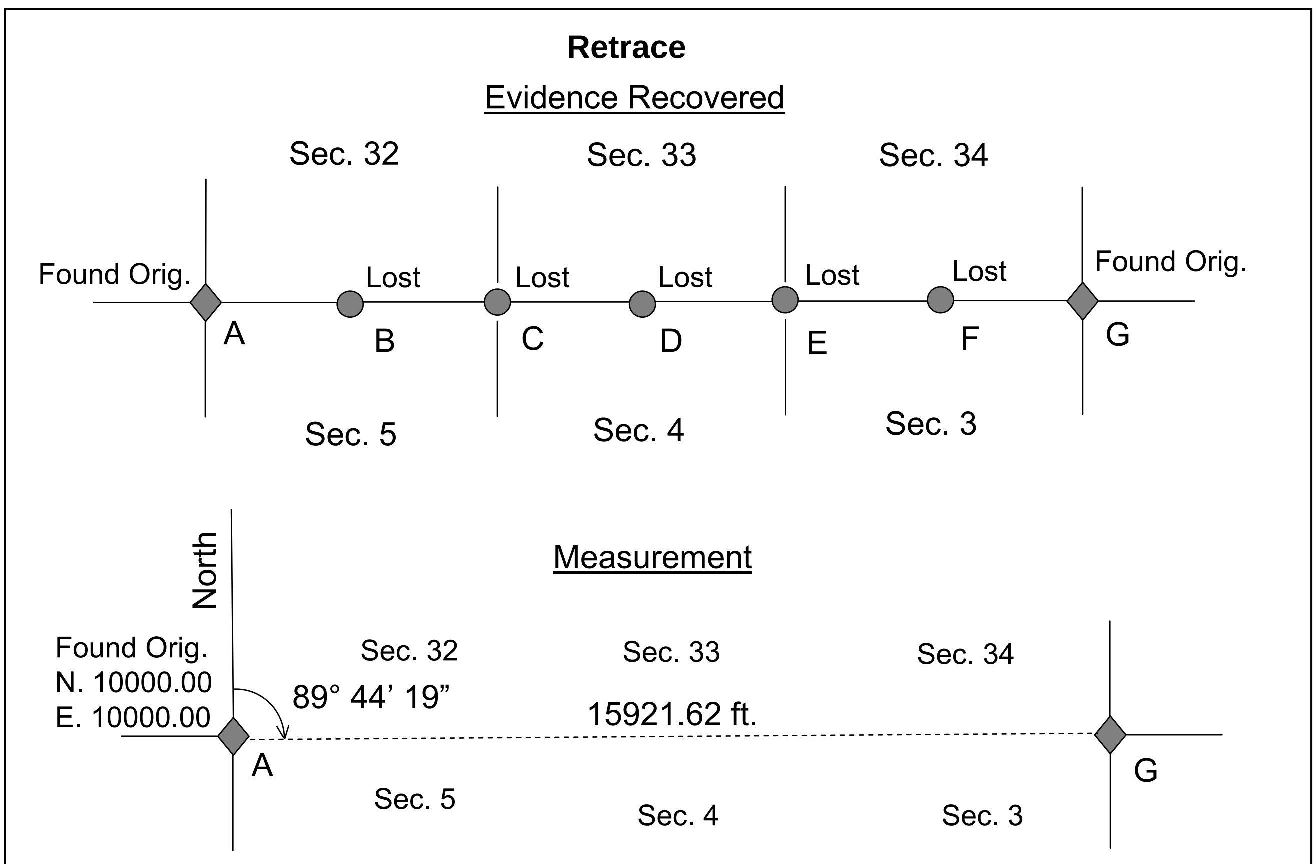
# Single Proportion with Curvature




Calculate the proportionate position of the 5 lost corners.

**<u>Calculate the True Mean Bearing of the Line</u>**

**Calculate forward bearing**
Forward bearing at A (cor. of secs. 5, 6, 31 and 3)2: N. 0° 00’ 00” E. + 89° 44’ 19” = **N. 89° 44’ 19” E.**

**Calculate angular convergence:**
Angular convergence for meridians 6 miles apart at Lat. 47° 30’:
From Table 11: Convergence at 47° = 0° 05’ 34”
Convergence at 48° = 0° 05’ 46”
Convergence at 47° 30’: (0° 05’ 34” + 0° 05’ 46”) ÷ 2 = 0° 05’ 40”
0° 05’ 40” = 340”
340” ÷ 31680.00 ft.(6 miles) = 0.010732” per ft. of departure
0.010732” x 7960.73 ft. (1/2 departure of the line) = 0° 1’ 25.44”
Mean bearing: N. 89° 44’ 19” E. (forward bearing) **+** 0° 1’ 25.44” (correction) = **N. 89° 45’ 44.44” E.**
*(The correction is applied clockwise because the bearing is easterly and we are going from forward bearing to true bearing)*

**Calculate departure of the line**
Departure of the line: Sin 89° 44’ 19 x 15921.62 = E. **15921.45 ft.**

**Calculate the single proportion**
The record calls for 6 equal 40 ch. segments, therefore: E. 15921.45 ÷ 6 = **E.2653.58 ft.**

**Calculate the forward bearing from A to each of the lost corners**

**<u>Line A-B:</u>**
E.2653.58 ÷ 2 = 1326.79 ft. (1/2 the departure of line A-B)
E.1326.79 x 0.010732” (angular convergence per ft. of departure) = 0° 00’ 14.24” (angular convergence)
N. 89° 45’ 44.44” E. (mean bearing line A-G) - 0° 00’ 14.24”(angular convergence) = **N. 89° 45’ 30.24” E.**
*(We are going from true bearing to forward bearing therefore the correction is applied counterclockwise for easterly lines and clockwise for westerly line. The opposite is true when going from forward bearing to true bearing.)*
Distance of line A-B: 2653.58 ft. (departure of A-B) ÷ sin 89° 45’ 30.24” = **2653.60 ft.**

**At Pt. A the forward bearing and distance to Pt. B on the curve is:**
**N. 89° 45’ 30.24” E., 2653.60 ft**

**Coordinates of the proportioned point: N.10011.19, E.12653.58**

**<u>Line A-C:</u>**
E.5307.16 ÷ 2 = 2653.58 ft. (1/2 the departure of line A-C)
E.2653.58 x 0.010732” (angular convergence per ft. of departure) = 0° 00’ 28.48” (angular convergence)
N. 89° 45’ 44.44” E. (mean bearing line A-G) - 0° 00’ 28.48”(angular convergence) = **N. 89° 45’ 15.96” E.**

*(We are going from true bearing to forward bearing therefore the correction is applied counterclockwise for easterly lines and clockwise for westerly line. The opposite is true when going from forward bearing to true bearing.)*
Distance of line A-C: 5307.16 ft. (departure of A-C) ÷ sin 89° 45’ 15.96” = **5307.21 ft.**

**At Pt. A the forward bearing and distance to Pt. C on the curve is:**
**N. 89° 45’ 15.96” E., 5307.21 ft**

**Coordinates of the proportioned point: N.10022.75, E.15307.16**

**<u>Line A-D:</u>**
E.7960.74 ÷ 2 = 3980.37 ft. (1/2 the departure of line A-D)
E.3980.37 x 0.010732” (angular convergence per ft. of departure) = 0° 00’ 42.72” (angular convergence)
N. 89° 45’ 44.44” E. (mean bearing line A-G) - 0° 00’ 42.72”(angular convergence) = **N. 89° 45’ 01.72” E.**
*(We are going from true bearing to forward bearing therefore the correction is applied counterclockwise for easterly lines and clockwise for westerly line. The opposite is true when going from forward bearing to true bearing.)*
Distance of line A-D: 7960.74 ft. (departure of A-D) ÷ sin 89° 45’ 01.72” = **7960.81 ft.**

**At Pt. A, the forward bearing and distance to Pt. D on the curve is:**
**N. 89° 45’ 01.72” E., 7960.81 ft.**

**Coordinates of the proportioned point: N.10034.67, E.17960.74**

**<u>Line A-E:</u>**
E.10614.32 ÷ 2 = 5307.16 ft. (1/2 the departure of line A-E)
E.5307.16 x 0.010732” (angular convergence per ft. of departure) = 0° 00’ 56.96” (angular convergence)
N. 89° 45’ 44.44” E. (mean bearing line A-G) - 0° 00’ 56.96”(angular convergence) = **N. 89° 44’ 47.48” E.**
*(We are going from true bearing to forward bearing therefore the correction is applied counterclockwise for easterly lines and clockwise for westerly line. The opposite is true when going from forward bearing to true bearing.)*
Distance of line A-E: 10614.32 ft. (departure of A-E) ÷ sin 89° 44’ 47.48” = **10614.42 ft.**

**At Pt. A, the forward bearing and distance to Pt. E on the curve is:**
**N. 89° 44’ 47.48” E., 10614.42 ft.**

**Coordinates of the proportioned point: N.10046.96, E.20614.32**

**<u>Line A-F:</u>**
E.13267.90 ÷ 2 = 6633.95 ft. (1/2 the departure of line A-F)
E.6633.95 x 0.010732” (angular convergence per ft. of departure) = 0° 01’ 11.20” (angular convergence)
N. 89° 45’ 44.44” E. (mean bearing line A-G) - 0° 01’ 11.2”(angular convergence) = **N. 89° 44’ 33.24” E.**
*(We are going from true bearing to forward bearing therefore the correction is applied counterclockwise for easterly lines and clockwise for westerly line. The opposite is true when going from forward bearing to true bearing.)*

Distance of line A-F: 13267.90 ft. (departure of A-F) ÷ sin 89° 44' 33.24" = **13268.03 ft.**

**At Pt. A, the forward bearing and distance to Pt. F on the curve is:**
**N. 89° 44' 33.24" E., 13268.03 ft.**

**Coordinates of the proportioned point: N.10059.61, E.23267.90**

**Line A-G:**
E.15921.48 ÷ 2 = 7960.74 ft. (1/2 the departure of line A-G)
E.7960.74 x 0.010732" (angular convergence per ft. of departure) = 0° 01' 25.43" (angular convergence)
N. 89° 45' 44.44" E. (mean bearing line A-G) - 0° 01' 25.43"(angular convergence) = **N. 89° 44' 19.01" E.**
*(We are going from true bearing to forward bearing therefore the correction is applied counterclockwise for easterly lines and clockwise for westerly line. The opposite is true when going from forward bearing to true bearing.)*
Distance of line A-G: 15921.48 ft. (departure of A-G) ÷ sin 89° 44' 19.01" = **15921.65 ft.**

**At Pt. A, the forward bearing and distance to Pt. F on the curve is:**
**N. 89° 44' 19.01" E., 15921.65 ft** *(notice this agrees with the measured forward bearing and distance of line A-G. The minor difference in distance is the result of rounding)*

**Coordinates of the proportioned point: N.10072.64, E.25921.48**