Calculate the total area (by coordinate geometry, DMDs, triangles, or whatever you are best at doing) = 185,626.47 sq. ft. Half of that area = 92,813.24 square feet.

Calculate the area ABCDG (G being the midpoint of AF): 109,628.46 sq. ft.

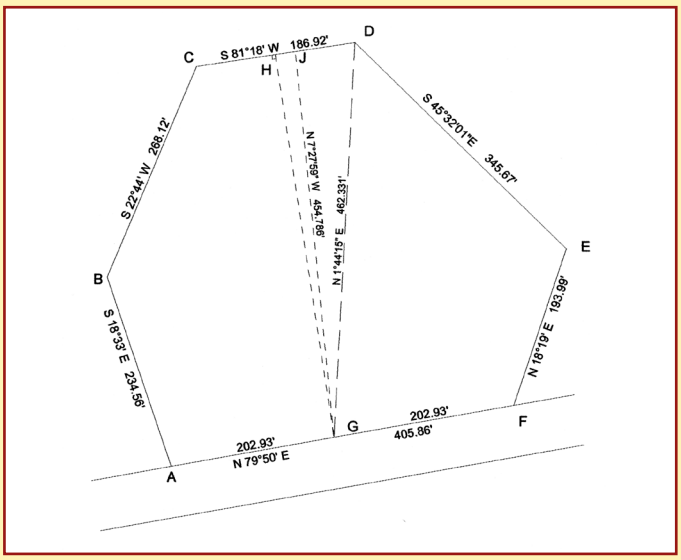
Since that's too large by 16,815.22 sq. ft., construct a perpendicular to line CD from G at H, and calculate the area of GHD = 19,041.36 sq. ft.

That's still off by 2,226.13 sq. ft., so draw line GJ and find HJ such that GHJ = 2,226.13 sq. ft. : HJ = 9.792', DJ = 73.965'

The dividing line is then N 7°27'59" W 454.786'

Note that area JDG = ½ DJ x 462.331' x sin 79°33'45" = 16,815.22 sq. ft., from which DJ = 73.965' directly.

Solution to Problem Number 19



This is known as a two point resection or an inaccessible baseline (like a church steeple and a radio tower with known coordinates).
Angle ABD = 180° - 50°09'35" – 22°58'44" – 32°04'52" = 74°46'49"
Angle ACD = 180° - 22°58'44" – 32°04'52" – 43°07'10" = 81°49'14"

$$\frac{BD}{\sin(50°09'35" - 22°58'44")} = \frac{AD}{\sin 74°46'49"}$$

BD = 0.991795312 AD

$$\frac{CD}{\sin 22°58'44"} = \frac{AD}{\sin 81°49'14"}$$

CD = 0.394404074 AD
$BC^2 = 464.400^2 = BD^2 + CD^2 - 2 \times BD \times CD \times \cos 43°07'10"$
$464.400^2 = 0.983657941\ AD^2 + 0.155554574\ AD^2 - 0.571050955\ AD^2$
AD = 616.107'
Alternately, assume a value for AD and solve for BC. AD is directly proportional to BC, so your solution will be proportional to 464.400

Solution to Problem Number 20