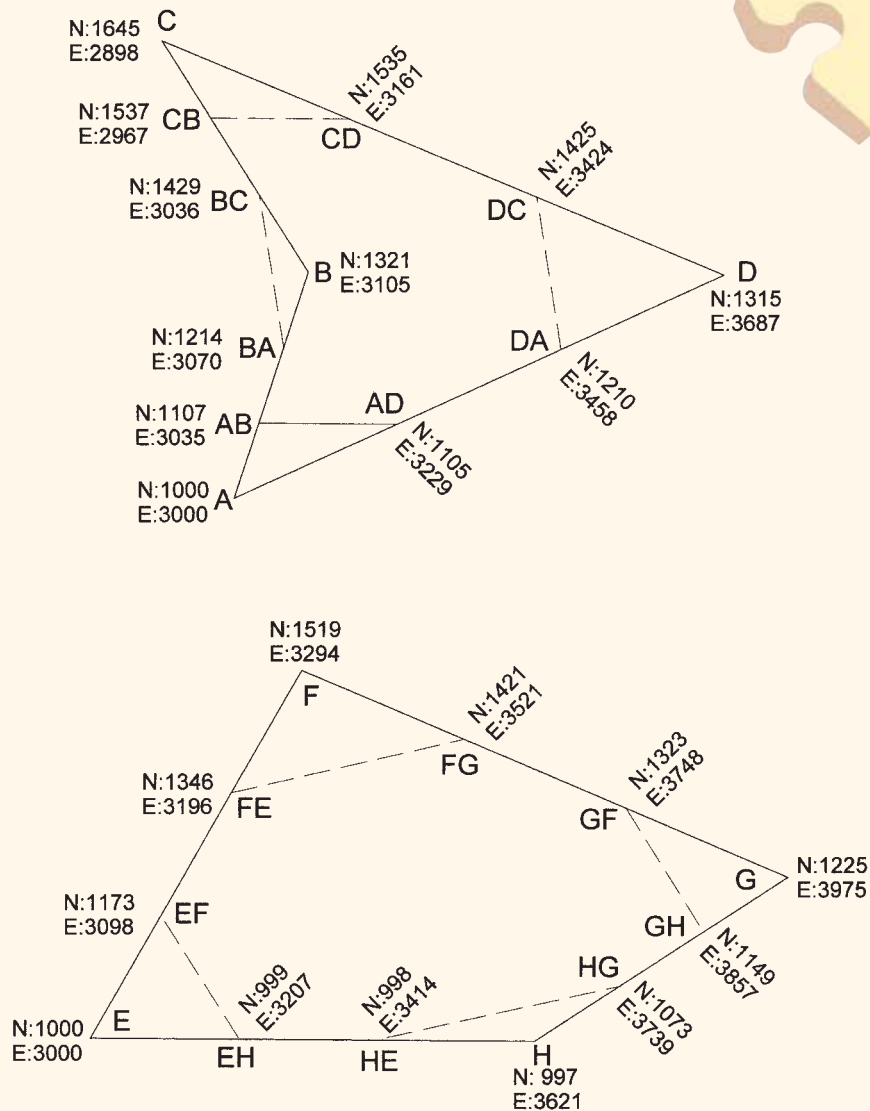




PROBLEM CORNER

Solution to Problem 121



CALCULATE THE COORDINATES FOR THE ONE-THIRD POINTS. (THIS CAN BE DONE BY SUBTRACTION, DIVISION AND ADDITION ONLY)

IN THE "DART" TYPE, INVERSE BETWEEN AB & AD, AND CB & CD TO GET SOUTH 89°24'34" EAST (NO DISTANCES ARE NEEDED). THEN INVERSE BETWEEN BA & BC AND DA & DC TO GET NORTH 8°59'11" WEST.

INTERSECTION OF THESE LINES GIVES FOUR POINTS, AND INVERSING BETWEEN THE INTERSECTIONS YIELDS PARALLEL LINES WITH OPPOSITE SIDES OF 435.344' AND 388.021', A PARALLELOGRAM. IT IS KNOWN AS WITTENBAUER'S PARALLELOGRAM.

DOING THE SAME FOR THE "KITE" TYPE, INVERSE BETWEEN EH & EF AND GH & GF YIELDS NORTH 32°03'52" WEST AND INVERSE BETWEEN HE & HG AND FE & FG YIELDS NORTH 77°00'19" EAST.

AGAIN, A PARALLELOGRAM IS FORMED WITH SIDES OF 410.643' AND 667.083'.

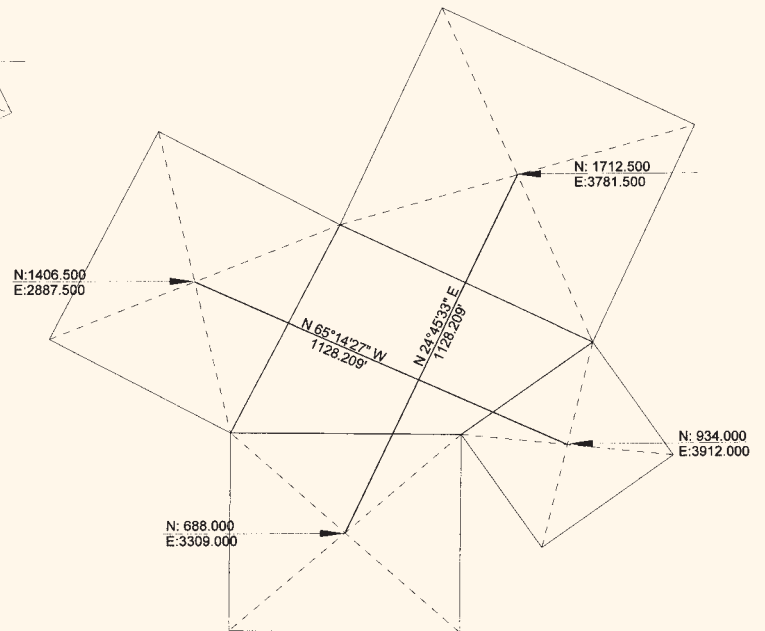
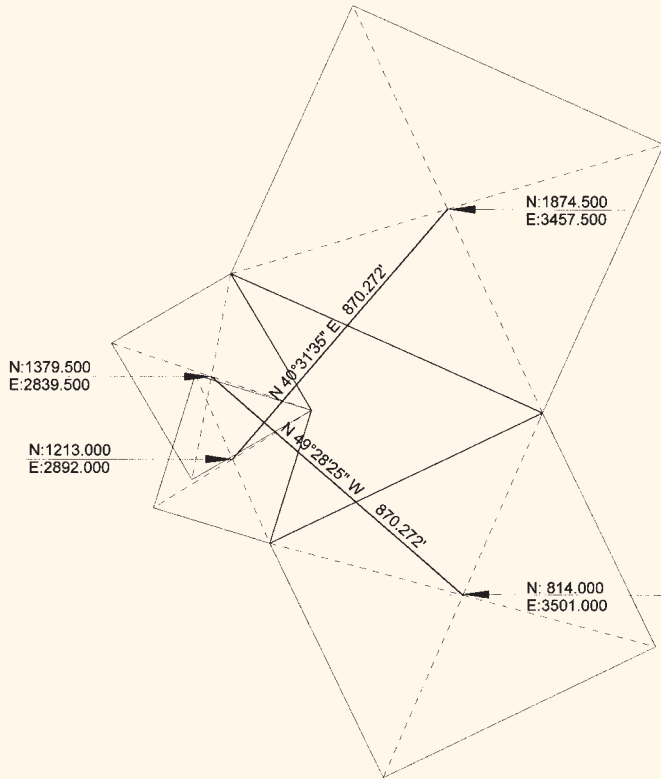
THIS WILL WORK FOR ANY PARALLELOGRAM, EVEN ONE WITH CROSSED SIDES.





PROBLEMCORNER

Solution to Problem 122



FOR THE "DART" QUADRILATERAL, STARTING AT THE LOWER LEFT CORNER AND PROCEEDING CLOCKWISE, THE BEARINGS AND DISTANCES ARE NORTH $18^{\circ}06'47''$ EAST $337.737'$, NORTH $32^{\circ}34'27''$ WEST $384.480'$, SOUTH $67^{\circ}18'10''$ EAST $855.232'$ AND SOUTH $65^{\circ}22'04''$ WEST $755.774'$.

THE METHODS OF CALCULATING A CENTER COORDINATE FOR EACH SQUARE ARE NUMEROUS: A PERPENDICULAR AT THE MIDPOINT OF EACH SIDE AT A LENGTH OF HALF THE SIDE; 45° FROM EITHER CORNER WITH A LENGTH OF $(\sqrt{2} / 2)$ TIMES THE SIDE; TRAVERSE AROUND THE SQUARE AND INTERSECT THE DIAGONALS, ETC.

THE SQUARE CENTERS ARE: N:1213.000, E:2892.000; N:1379.500, E:2839.500; N:1874.500, E:3457.500; N:814.000, E:3501.000.

INVERSING BETWEEN OPPOSITES SQUARE CENTERS GIVES NORTH $40^{\circ}31'35''$ EAST $870.272'$ AND NORTH $49^{\circ}28'25''$ WEST $870.272'$, OR TWO LINES OF EQUAL LENGTH THAT ARE AT RIGHT ANGLES TO ONE ANOTHER.

THIS IS KNOWN AS van AUBEL'S THEOREM.