TRIG★STAR

2013-2014

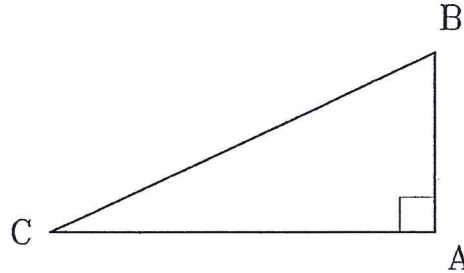# SAMPLE PROBLEMS

Sponsored by the National Society of Professional Surveyors

TRIG-STAR PROBLEM 1A   LOCAL CONTEST

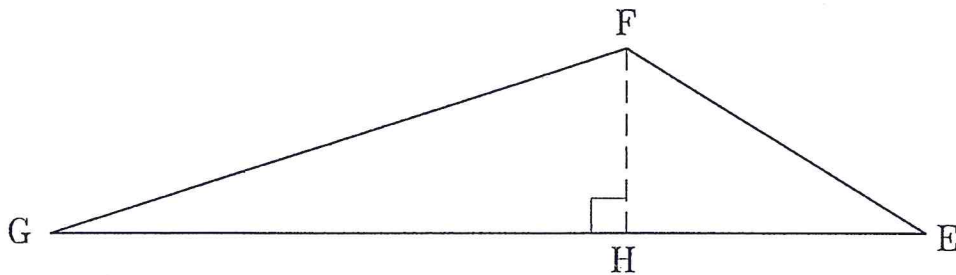PRINT NAME: _

KNOWN: AB = 86.27, BC = 158.16

FIND: DISTANCE AC = _____ (5 Points)

          ∠ ABC = _____ (5 Points)

TRIG-STAR PROBLEM 1B   LOCAL CONTEST

KNOWN: EF = 62.25, ∠ EFG = 109°−49'−58",
          ∠ FEG = 47°−39'−18"

FIND: DISTANCE EH = _____ (6 Points)

          DISTANCE FH = _____ (6 Points)
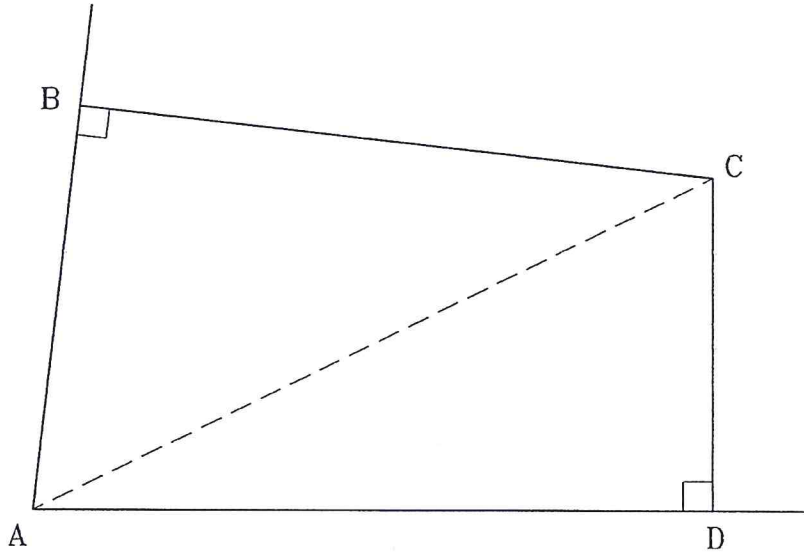
          DISTANCE FG = _____ (6 Points)

          DISTANCE GH = _____ (6 Points)

          ∠ EGF = _____ (6 Points)

Page Total:_____Points

KNOWN:

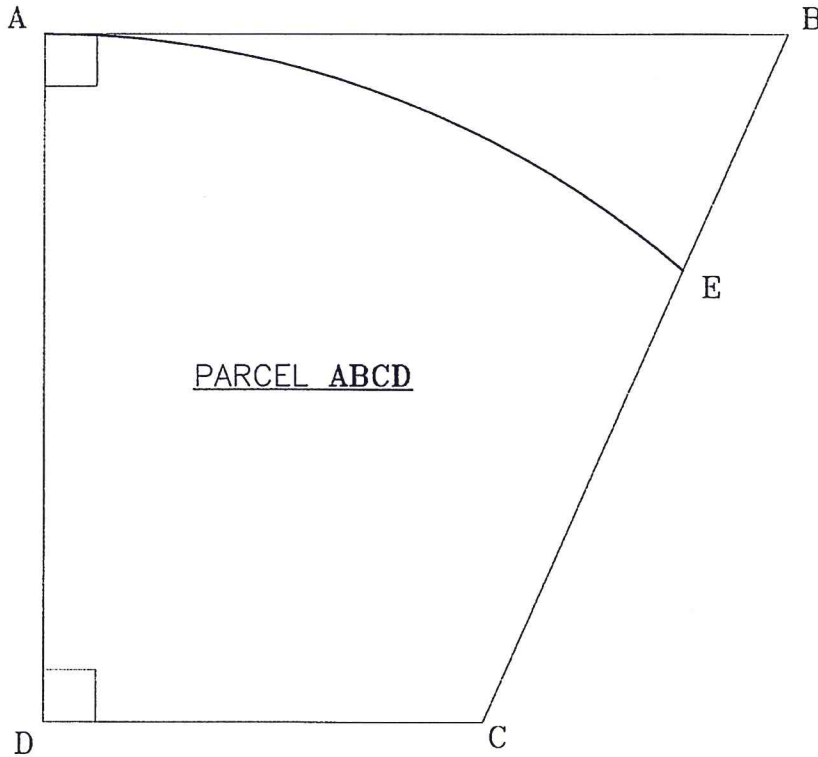BC = 363.56, CD = 191.18,
∠ BAD = 76°—47'—50"

FIND:

Distance AB = _____ (10 Points)

Distance AD = _____ (10 Points)

Distance AC = _____ (10 Points)

Page Total:_____ Points

TRIG—STAR PROBLEM 3   LOCAL CONTEST

PARCEL ABCD

PROBLEM:

THE NORTH SIDE OF PARCEL ABCD IS BOUNDED BY A LOCAL HIGHWAY. DUE TO A NEW HIGHWAY ALIGNMENT, THE NORTH SIDE OF PARCEL ABCD IS TO BE ROUNDED OUT WITH A CIRCULAR ARC AE. THE RADIUS OF THE ARC IS 500.00 AND IS TANGENT TO LINE AB AT POINT A. FIND THE NEW BOUNDARY DIMENSIONS OF PARCEL ABCD, SUCH AS THE ARC LENGTH OF AE AND THE LENGTH OF LINE CE.

KNOWN:

AB = 300.00, BC = 412.31, CD = 200.00, DA = 400.00,
∠BCD = 104°—02'—10", ∠CDA & ∠DAB = 90°—00'—00",
& RADIUS OF ARC AE = 500.00

FIND:

ARC LENGTH AE _____ (6 Points)   AREA ABCD _____ (6 Points)

LENGTH EC _____ (6 Points)   AREA AECD _____ (6 Points)

LENGTH BE _____ (6 Points)

Page Total:_____ Points

TRIG—STAR ANSWER KEY   LOCAL CONTEST

PROBLEM 1—A

DISTANCE AC = | 132.56 |

ANGLE ABC = | 56°—56'—38" |

PROBLEM 1—B

DISTANCE EH = | 41.93 |

DISTANCE FH = | 46.01 |

DISTANCE FG = | 120.17 |

DISTANCE GH = | 111.01 |

∠ ABC = | 22°—30'—44" |

PROBLEM 2

DISTANCE AB = | 281.66 |

DISTANCE AD = | 418.28 |

DISTANCE AC = | 459.90 |

PROBLEM 3

LENGTH AE = | 295.71 |

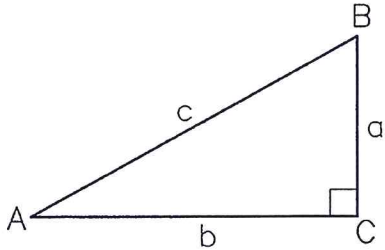LENGTH EC = | 324.77 |

LENGTH BE = | 87.54 |

AREA ABCD = | 100,000 |

AREA AECD = | 91,496 |

TRIG—STAR MISCELLANEOUS DATA
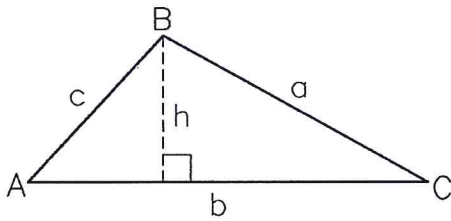
RIGHT TRIANGLE FORMULAS

PYTHAGOREAN THEOREM: $a^2 + b^2 = c^2$

AREA: $\frac{1}{2}ab$

TRIGONOMETRIC FUNCTIONS: $\sin A = \frac{a}{c}$, $\cos A = \frac{b}{c}$,

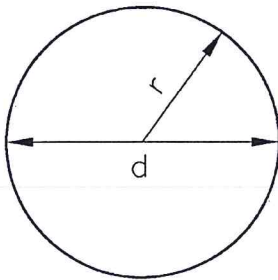$\tan A = \frac{a}{b}$

OBLIQUE TRIANGLE FORMULAS

LAW OF SINES: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

LAW OF COSINES: $a^2 = b^2 + c^2 - 2bc\cos A$

AREA: $\frac{1}{2}bh$

CIRCLE FORMULAS

DIAMETER = d   RADIUS = r

CIRCUMFERENCE: $2\pi r$ or πd

AREA: πr^2

ONE DEGREE (1°) OF ARC = 60 MINUTES (60') OF ARC

ONE MINUTE (1') OF ARC = 60 SECONDS (60") OF ARC

THEREFORE ONE DEGREE OF ARC (1°) = 3600 SECONDS OF ARC.