TRIG*STAR

2013-2014

SAMPLE PROBLEMS

Sponsored by the National Society of Professional Surveyors
TRIG—STAR PROBLEM 1A  LOCAL CONTEST

REQUIRED ANSWER FORMAT
DISTANCES: NEAREST HUNDREDTH
ANGLES: DEGREES—MINUTES—SECONDS
(TO THE NEAREST SECOND)

PRINT NAME: ____________________________

KNOWN: \( AB = 86.27 \), \( BC = 158.16 \)

FIND:  
\( \text{DISTANCE AC} = \) (5 Points)
\( \angle ABC = \) (5 Points)

---

TRIG—STAR PROBLEM 1B  LOCAL CONTEST

KNOWN: \( EF = 62.25 \), \( \angle EFG = 109°-49'-58" \),
\( \angle FEG = 47°-39'-18" \)

FIND:  
\( \text{DISTANCE EH} = \) (6 Points)
\( \text{DISTANCE FH} = \) (6 Points)
\( \text{DISTANCE FG} = \) (6 Points)
\( \text{DISTANCE GH} = \) (6 Points)
\( \angle EGF = \) (6 Points)

Page Total: _____ Points

Copyright - NSPS
KNOWN:
BC = 363.56, CD = 191.18,
∠ BAD = 76°-47'-50"

FIND:
Distance AB = ___________ (10 Points)
Distance AD = ___________ (10 Points)
Distance AC = ___________ (10 Points)
TRIG–STAR PROBLEM 3  LOCAL CONTEST

REQUIRED ANSWER FORMAT
DISTANCES: NEAREST HUNDREDTH
AREAS: NEAREST WHOLE UNIT

A

C

B

D

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
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
RIGHT TRIANGLE FORMULAS

PYTHAGOREAN THEOREM: \( a^2 + b^2 = c^2 \)

AREA: \( \frac{1}{2}ab \)

TRIGONOMETRIC FUNCTIONS: \( \sin A = \frac{b}{c}, \cos A = \frac{a}{c}, \tan A = \frac{b}{a} \)

OBLIQUE TRIANGLE FORMULAS

LAW OF SINES: \( \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \)

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

AREA: \( \frac{1}{2}bh \)

CIRCLE FORMULAS

DIAMETER = \( d \) \hspace{1cm} RADIUS = \( r \)

CIRCUMFERENCE: \( 2\pi r \) or \( \pi d \)

AREA: \( \pi r^2 \)

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.