2010-2011

SAMPLE PROBLEMS

Sponsored by the National Society of Professional Surveyors
TRIG-STAR PROBLEM LOCAL CONTEST

PRINT NAME: ____________________________

KNOWN: DISTANCE AB = 108.81 DISTANCE BC = 188.88

FIND: \( \angle CBA = \) \( \) \( \) (5 POINTS)
DISTANCE AC = \( \) \( \) \( \) (5 POINTS)

REQUIRED ANSWER FORMAT

DISTANCES: NEAREST HUNDREDTH
ANGLES: DEGREES-MINUTES-SECONDS TO THE NEAREST SECOND

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TRIG-STAR PROBLEM LOCAL CONTEST

KNOWN: DISTANCE EF = 101.06 \( \angle EFG = 118^\circ18'18" \) \( \angle FEG = 44^\circ05'06" \)

FIND: \( \angle EGF = \) \( \) \( \) (6 POINTS)
DISTANCE EH = \( \) \( \) \( \) (6 POINTS)
DISTANCE FH = \( \) \( \) \( \) (6 POINTS)
DISTANCE FG = \( \) \( \) \( \) (6 POINTS)
DISTANCE GH = \( \) \( \) \( \) (6 POINTS)

REQUIRED ANSWER FORMAT

DISTANCES: NEAREST HUNDREDTH
ANGLES: DEGREES-MINUTES-SECONDS TO THE NEAREST SECOND

PAGE TOTAL: _______ POINTS

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KNOWN: DISTANCE BC = 363.36  DISTANCE CD = 169.96
\[ \angle BAD = 82^\circ 41' 33'' \]

FIND: DISTANCE AB = _______________ (10 POINTS)
DISTANCE AD = _______________ (10 POINTS)
DISTANCE AC = _______________ (10 POINTS)

REQUIRED ANSWER FORMAT
DISTANCES: NEAREST HUNDREDTH

PAGE TOTAL: ________ POINTS
A local surveyor has been asked to stake out points D and E where a future sidewalk will meet a new handicap curb at the corner of Meridian Road and Elm Street. The surveyor already knows the location of points B, C and F but must make some calculations to establish and verify the points needed.

Find:

- Distance AB = [Distance] (5 points)
- Chord distance CD = [Distance] (5 points)
- Chord distance DE = [Distance] (5 points)
- Chord distance EF = [Distance] (5 points)
- Chord distance CF = [Distance] (5 points)
- Arc distance CF = [Distance] (5 points)

Required answer format:
Distances: nearest hundredth

Page total: [Points] points
TRIG-STAR MISCELLANEOUS DATA

RIGHT TRIANGLE FORMULAS

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

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

TRIGOMETRIC FUNCTIONS:
\[
\begin{align*}
\sin A &= \frac{a}{c} \\
\cos A &= \frac{b}{c} \\
\tan A &= \frac{a}{b}
\end{align*}
\]

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 = \( d \) \quad 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.
TRIG-STAR ANSWER KEY LOCAL CONTEST

PAGE 1

\[ \angle CBA = \frac{54^\circ 49'29''}{\text{DISTANCE } AC = 154.39} \]

\[ \angle EGF = \frac{1736'36''}{\text{DISTANCE } EH = 72.59} \]
\[ \text{DISTANCE } FH = 70.31 \]
\[ \text{DISTANCE } FG = 232.40 \]
\[ \text{DISTANCE } GH = 221.51 \]

PAGE 2

\[ \text{DISTANCE } AB = 217.95 \]
\[ \text{DISTANCE } AD = 388.13 \]
\[ \text{DISTANCE } AC = 423.71 \]

PAGE 3

\[ \text{DISTANCE } AB = 36.24 \]
\[ \text{DISTANCE } CD = 31.62 \]
\[ \text{DISTANCE } DE = 20.05 \]
\[ \text{DISTANCE } EF = 25.88 \]
\[ \text{DISTANCE } CF = 70.71 \]
\[ \text{ARC DISTANCE } CF = 78.54 \]