



NATIONAL SOCIETY OF PROFESSIONAL SURVEYORS
Trig-Star Contest Test Cover Sheet - Local Contest

CONTESTANT INFORMATION (PLEASE PRINT)

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ Email _____

Parent / Guardian Names _____

Math/Trigonometry Teacher's Full Name _____

Phone _____ Email _____

Sponsor's Name or Company _____

High School _____ Graduation Year _____

City _____ State _____ Zip _____

I HEREBY STATE THAT THE WORK PERFORMED ON THIS EXAM IS MY OWN WORK DONE WITHOUT THE AID OF COMPUTER / CALCULATOR SOFTWARE PROGRAMS.

Signature _____ Date _____

Check here if you want more information about careers and scholarships

CONTEST RULES

1. One (1) hour maximum for completion of the competition.
2. Place answers in the spaces provided - answers shown elsewhere will not count. Be sure to give answers in the format requested.
3. All competition materials will be collected when you are finished.
4. Raise both hands when you finish - your time will be noted to the nearest second.
5. After your competition paper is collected you may leave the room, unless instructed otherwise.
6. First place is awarded to the highest score. In the event of a tie score, the student that completed the competition first will win.

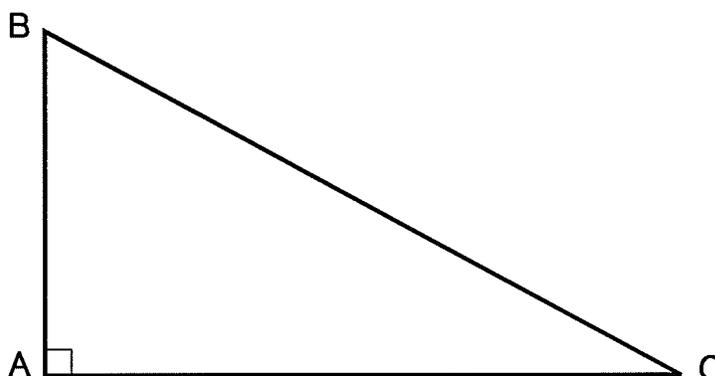
**PLEASE PLACE YOUR NAME ON THE FIRST PAGE OF THE TEST
(THIS COVER PAGE WILL NOT BE RETURNED TO YOU)
DO NOT BEGIN THE TEST UNTIL INSTRUCTED TO DO SO
GOOD LUCK!**

FOR INSTRUCTORS USE

Time _____ (nearest second) Point Total _____

TRIG-STAR PROBLEM LOCAL CONTEST

PRINT NAME: _____



KNOWN: DISTANCE AB = 179.12 DISTANCE BC = 375.63

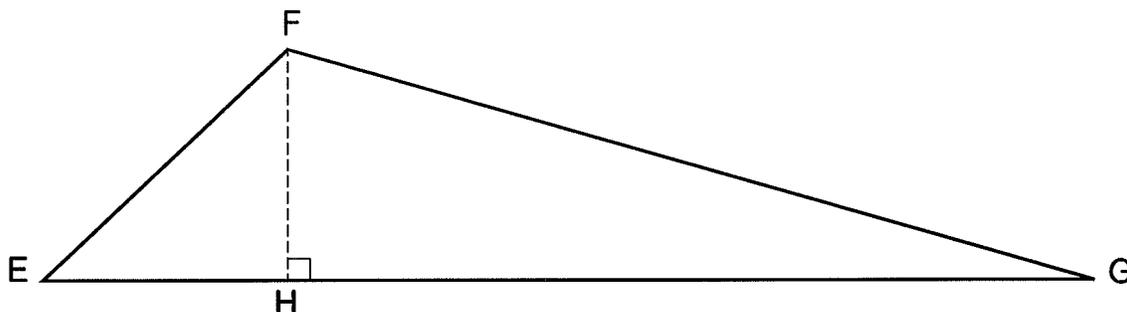
FIND: $\angle CBA =$ _____ (5 POINTS)

DISTANCE AC = _____ (5 POINTS)

REQUIRED ANSWER FORMAT

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

TRIG-STAR PROBLEM LOCAL CONTEST



KNOWN: DISTANCE EF = 190.81 $\angle EFG = 120^{\circ}57'18''$ $\angle FEG = 42^{\circ}24'54''$

FIND: $\angle EGF =$ _____ (6 POINTS)

DISTANCE EH = _____ (6 POINTS)

DISTANCE FH = _____ (6 POINTS)

DISTANCE FG = _____ (6 POINTS)

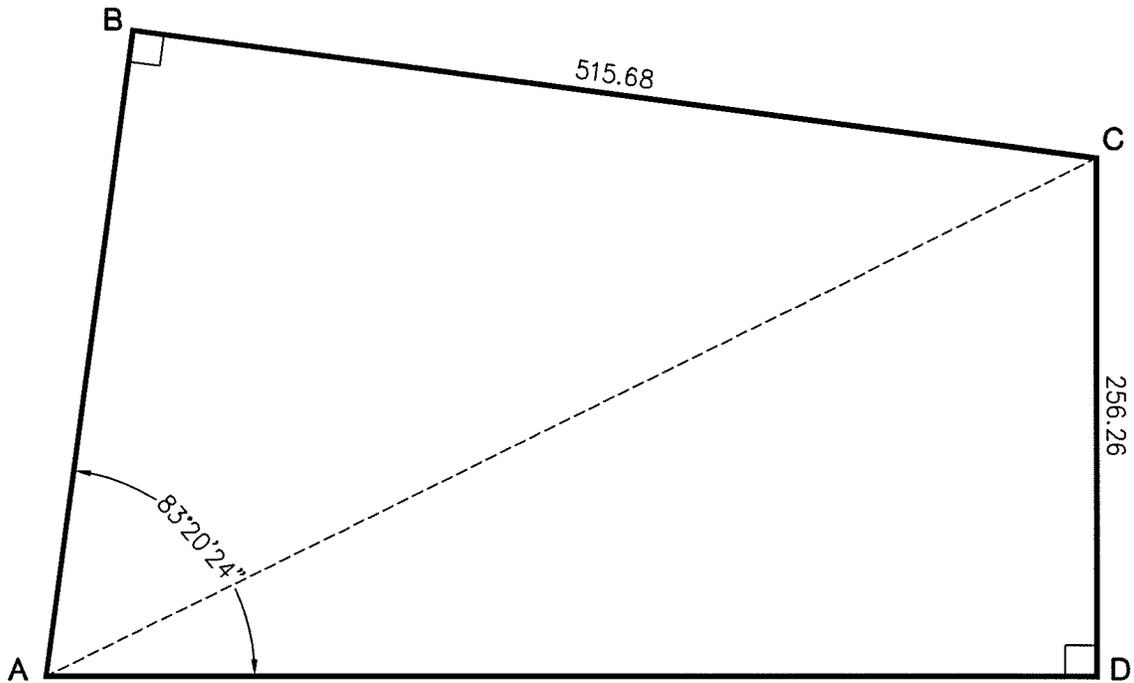
DISTANCE GH = _____ (6 POINTS)

REQUIRED ANSWER FORMAT

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

PAGE TOTAL: _____ POINTS

TRIG-STAR PROBLEM LOCAL CONTEST



KNOWN: DISTANCE $BC = 515.68$ DISTANCE $CD = 256.26$
 $\angle BAD = 83^{\circ}20'24''$

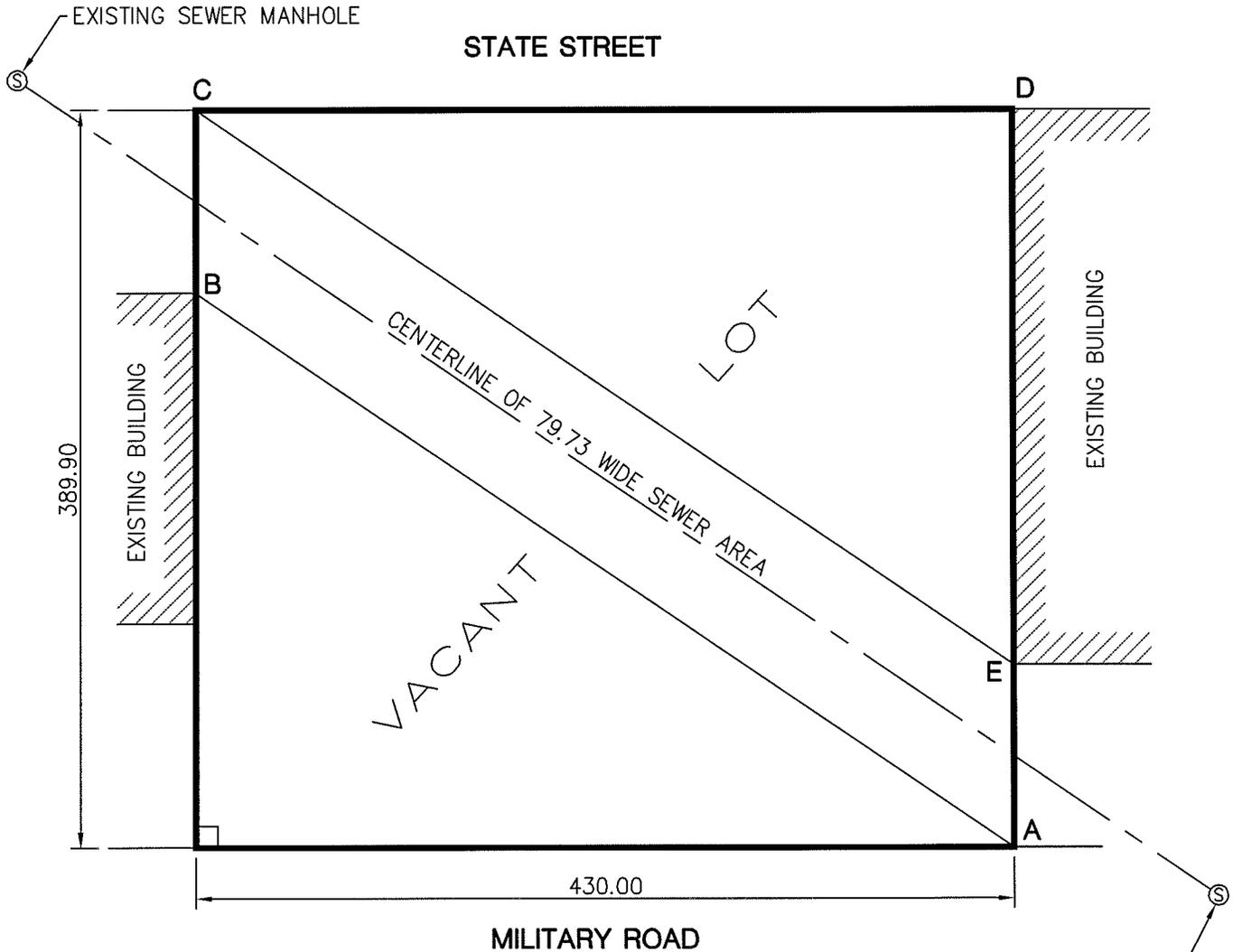
FIND: DISTANCE $AB =$ _____ (10 POINTS)
DISTANCE $AD =$ _____ (10 POINTS)
DISTANCE $AC =$ _____ (10 POINTS)

REQUIRED ANSWER FORMAT
DISTANCES: NEAREST HUNDREDTH

PAGE TOTAL: _____ POINTS

TRIG-STAR PROBLEM LOCAL CONTEST

A MANUFACTURING PLANT WOULD LIKE TO EXPAND BUT NEEDS MORE SEWER CAPACITY. THE CITY HAS AGREED TO HELP BY INSTALLING A NEW SEWER LINE ACROSS A RECTANGULAR SHAPED VACANT LOT TO A NEW MANHOLE FOR THE PLANT'S CONVENIENCE. THE SEWER LINE WILL NEED AN AREA 79.73 IN WIDTH FOR CONSTRUCTION AND MAINTENANCE PURPOSES. THIS AREA IS TO BE PLACED ON THE VACANT LOT SUCH THAT THE OPPOSITE SIDES PASS THROUGH THE DIAGONAL CORNERS OF THE LOT. THE OWNER OF THE VACANT LOT WOULD LIKE MORE INFORMATION BEFORE SELLING THE SEWER AREA TO THE CITY.



FIND:

- DISTANCE AC = _____ (5 POINTS)
- DISTANCE AE = _____ (6 POINTS)
- DISTANCE CE = _____ (6 POINTS)
- AREA ABCE = _____ (6 POINTS)
- AREA CDE = _____ (7 POINTS)

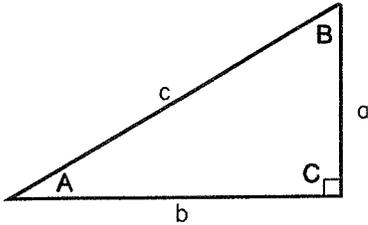
NEW SEWER MANHOLE FOR MANUFACTURING PLANT

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

PAGE TOTAL: _____ POINTS

TRIG-STAR MISCELLANEOUS DATA

RIGHT TRIANGLE FORMULAS

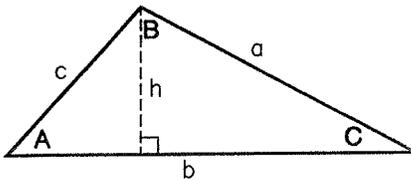


PYTHAGOREAN THEOREM: $a^2 + b^2 = c^2$

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

TRIGOMETRIC FUNCTIONS: $\sin A = \frac{a}{c}$ $\cos A = \frac{b}{c}$
 $\tan A = \frac{a}{b}$

OBLIQUE TRIANGLE FORMULAS

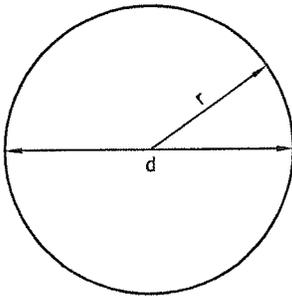


LAW OF SINES: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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

CIRCLE FORMULAS



DIAMETER = d 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.

TRIG-STAR ANSWER KEY LOCAL CONTEST

PAGE 1

$$\sphericalangle CBA = \boxed{61^{\circ}31'12''}$$

$$\text{DISTANCE AC} = \boxed{330.17}$$

PAGE 1

$$\sphericalangle EGF = \boxed{16^{\circ}37'48''}$$

$$\text{DISTANCE EH} = \boxed{140.87}$$

$$\text{DISTANCE FH} = \boxed{128.70}$$

$$\text{DISTANCE FG} = \boxed{449.70}$$

$$\text{DISTANCE GH} = \boxed{430.89}$$

PAGE 2

$$\text{DISTANCE AB} = \boxed{318.21}$$

$$\text{DISTANCE AD} = \boxed{549.11}$$

$$\text{DISTANCE AC} = \boxed{605.96}$$

PAGE 3

$$\text{DISTANCE AC} = \boxed{580.45}$$

$$\text{DISTANCE AE} = \boxed{96.52}$$

$$\text{DISTANCE CE} = \boxed{520.55}$$

$$\text{AREA ABCE} = \boxed{41503}$$

$$\text{AREA CDE} = \boxed{63077}$$