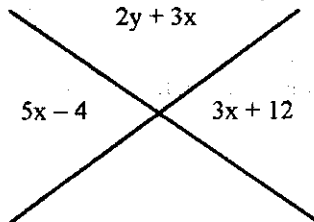**GEOMETRY TEAM**   January, Regional   **QUESTION 1.**

Label each of the following as true or false
A. The intersection of the altitudes of a triangle is the incenter.
B. If AB = CD, then CD = AB is an example of the transitive property.
C. A plane is defined as an infinite set of points in a flat surface.
D. If segment CD bisects segment EF at M then CM = MD.
E. The diagonals of a trapezoid can be perpendicular.
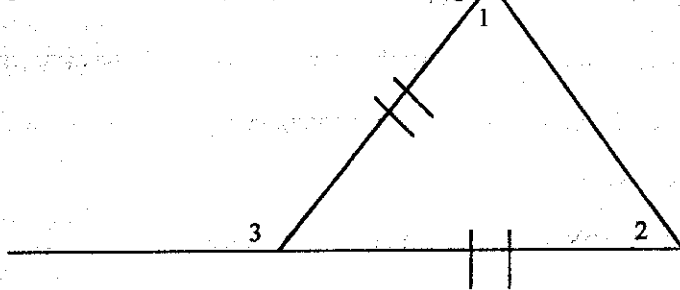
GEOMETRY TEAM   **QUESTION 2**   January, Regional

Find the sum of x and y.

$2y + 3x$

$5x - 4$ $3x + 12$

GEOMETRY TEAM   **QUESTION 3**   January, Regional

$3x$ $4x - 9$ p $r \parallel s$ Find x and y.

$5y + 2$ $4y + 5$ q

r s
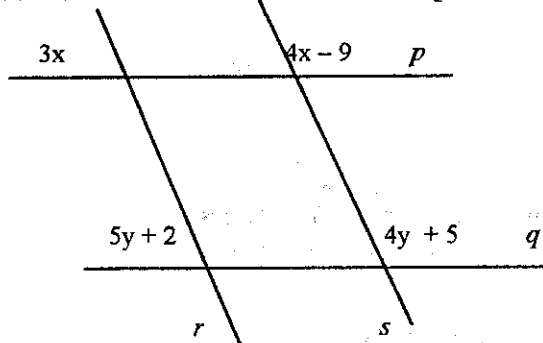
GEOMETRY TEAM   **QUESTION 4.**   January, Regional

1

The diagram is not drawn to scale.

3   2

$m\angle 2 = 3y$ $m\angle 1 = 3x - 7$ $m\angle 3 = y + 12$

Find the sum of x and y.

GEOMETRY TEAM   **QUESTION 5**   January, Regional

Given $\angle CAP$.
Ray AM bisects $\angle CAP$.   Ray AT bisects $\angle MAP$.   Ray AN bisects $\angle TAP$.
$m\angle MAN = 3x + 24$ $m\angle CAN = 8x + 50$
Find $m\angle CAP$.

GEOMETRY TEAM   **QUESTION 6**   January, Regional

Find the product of x and y if
$\triangle ABC \cong \triangle ZYX$ and AB = 3x + 14   BC = 3y − 2   XY = 2x + 5   YZ = 6y − 10
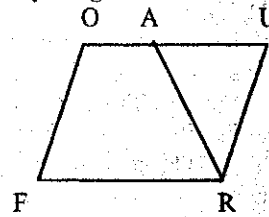
GEOMETRY TEAM   **QUESTION 7**   **January, Regional**
Given rhombus FOUR, with FO = 24 and A between O and U

The median of FOAR = 15.   Find AU.

GEOMETRY TEAM   **QUESTION 8**   **January, Regional**
Given the perimeter of triangle ABC is 27.
Ray BD bisects $\angle$B and D is on segment AC.   BC = 9   AB = 6. Find DC

GEOMETRY TEAM   **QUESTION 9**   **January, Regional**
A tire with a diameter of 22 inches is resting on point P. Point X is located clockwise on the circumference 80 degrees from P. If the tire rolls counterclockwise for exactly one mile, how many times will point X touch the ground?

GEOMETRY TEAM   **QUESTION 10**   **January, Regional**
Given triangle MTV with vertices at (0, −2), (4, 2) and (6, -2).
Find the sum of the lengths of the medians of the triangle.

GEOMETRY TEAM   **QUESTION 11**   **January, Regional**
Given a right rectangular prism with diagonal measuring $5\sqrt{10}$, and base edges of 12 and 5.
Find   A. Lateral area. B: Total area and C. Volume.

GEOMETRY TEAM   **QUESTION 12**   **January, Regional**
Thirty-seven students from Culinary Arts High disembarked from their bus at Tri-Flavors Tastee Freeze.
Cranberry Chip, Raspberry vanilla, and Spunky Spumoni were the three flavors offered that day, in a choice of single, double or triple dip servings.
Twenty-five students tried at least the raspberry vanilla flavor.
Only five very hungry fellows were adventurous enough to sample a triple dip serving, each taking one of each flavor.
When the students reboarded the bus the clerk noted she had served a total of 21 cranberry chip dips and 15 spunky spumoni dips.
A survey taken on the bus showed that twelve of the students had at least the spunky spumoni and the raspberry vanilla.
Of the sixteen people who ordered a double dip (no duplicate flavors in one serving), no one opted for a combination of cranberry chip and spunky spumoni.
How many students did not taste any of the three flavors of the day?

GEOMETRY TEAM   **QUESTION 13**   **January, Regional**
Given a driveway with a 12% grade.
A.   At what angle will the driveway rise from the road? Round to the nearest tenth.
B: If the driveway is 34 feet in length, to the nearest tenth of a foot. How high will it rise above level of the road?

GEOMETRY TEAM   **QUESTION 14**   **January, Regional**
Farmer John has 112 feet of fence and wants to close in a rectangular plot of maximum area against his side of his barn that is 52 feet in length. He will only fence three sides against the barn. What should the dimensions of the plot be if they are to be integral values?

GEOMETRY TEAM   **QUESTION 15**   **January, Regional**
Pam intends to tile a perfectly square foyer with regular octagons and squares so that tiles do not overlap or have gaps.
What is the ratio of the number of octagons to squares?