

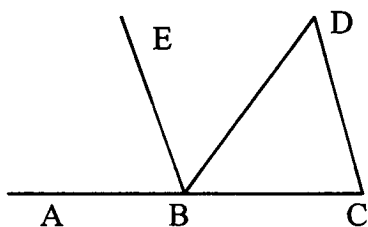
**#1 Geometry Team Question
January Regional 2005**

The perimeter of parallelogram PRST is 14 more than six times the length of segment RS. If $PR = 27$, find RS.

**#2 Geometry Team Question
January Regional 2005**

Diagram may not be drawn to scale.

In the diagram, $\overline{BE} \parallel \overline{CD}$, \overline{BE} bisects $\angle ABD$. If $m\angle DBC = 64$, find $m\angle D - m\angle C$.



**#3 Geometry Team Question
January Regional 2005**

A = the length of a rectangle with width $4\sqrt{3}$ and diagonal $5\sqrt{3}$

B = the length of a diagonal of a square with a perimeter of $24\sqrt{2}$

C = the perimeter of an equilateral triangle that has an altitude of 9

D = the altitude to the base of an isosceles triangle with legs 13 and base 10

Find the value of $\frac{C}{A} + \frac{B}{D}$.

**#4 Geometry Team Question
January Regional 2005**

Two of the exterior angles of a pentagon have measures 75° and 105° . The measures of the remaining three exterior angles are in the ratio 3:4:5.

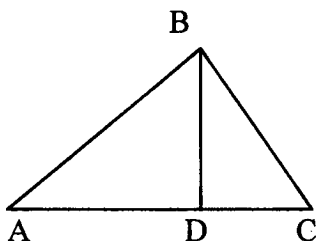
What is the degree measure of the largest angle of the pentagon?

#5 Geometry Team Question

January Regional 2005

Diagram may not be drawn to scale.

In the diagram of right triangle ABC with hypotenuse \overline{AC} and $\overline{BD} \perp \overline{AC}$, $AD = 3, BD = 3\sqrt{3}$,



R = the length of \overline{DC}

S = the length of \overline{AB}

T = the length of \overline{BC}

U = the length of \overline{AC}

Find the exact value of $R + U + \left(\frac{T}{S}\right)^2$.

#6 Geometry Team Question

January Regional 2005

A = the length of the shorter leg of a right triangle with hypotenuse 10 and one acute angle has a measure of 60°

B = the number of sides of a convex polygon when the sum of the interior angles equals the sum of the exterior angles

C = the number of sides in polygon with 44 diagonals

Find the value of $A - B + C$.

#7 Geometry Team Question

January Regional 2005

A = the length of an altitude of an equilateral triangle with perimeter 12

B = the measure of an angle whose supplement is 40° more than twice the complement of the angle

C = $m\angle K$ in $\triangle JKL$ when $m\angle J = 120$ and an exterior angle at L is a supplement of $\angle K$

Find the value of $A + B + C$ rounded to the nearest tenth.

**#8 Geometry Team Question
January Regional 2005**

Diagram may not be drawn to scale.

In the diagram, $ABCD$ is a rectangle and AGE is an isosceles triangle with $AG = EG$, $\overline{GF} \perp \overline{AD}$, E is the midpoint of \overline{AD} , $AB=8$, $AD=24$.

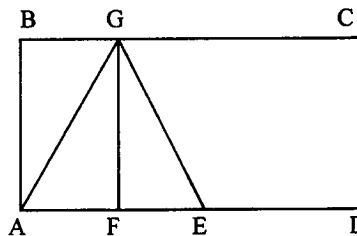
R = the length of \overline{EC}

S = the length of \overline{AF}

T = the length of \overline{AG}

U = the area of $\triangle AGE$

Find the value of $\frac{U}{S} + R - T$ rounded to the nearest 10^{th} .



**#9 Geometry Team Question
January Regional 2005**

Diagram may not be drawn to scale.

In the diagram, $ABCD$ is a parallelogram.

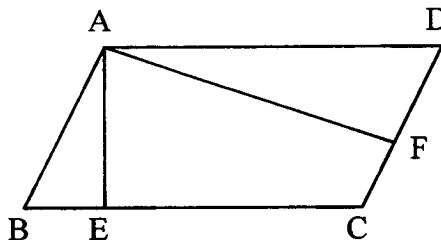
$AB = 10$, $AF = 12$, $AD = 15$, $\overline{AE} \perp \overline{BC}$, $\overline{CD} \perp \overline{AF}$.

R = the length of \overline{CF}

S = the length of \overline{EC}

T = the length of \overline{AE}

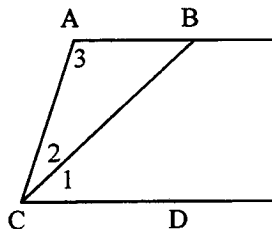
Find the value of $\frac{R+T}{S}$.



**#10 Geometry Team Question
January Regional 2005**

Diagram may not be drawn to scale.

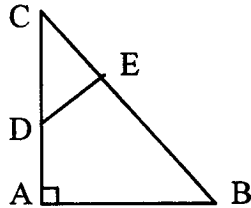
In the diagram, $\overline{AB} \parallel \overline{CD}$, $m\angle 1$ is 20° larger than $m\angle 2$ and $m\angle 1$ is 128° less than the sum of $m\angle 3$ and $m\angle 2$. What is the $m\angle 3$?



**#11 Geometry Team Question
January Regional 2005**

Diagram may not be drawn to scale.

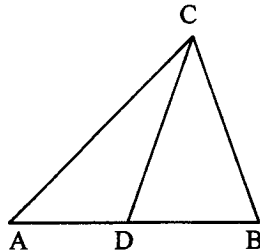
In the diagram, right triangle ABC has the right angle at A, $\overline{DE} \perp \overline{BC}$, $DC = 5$, $AD = 6$, $CE = 3$. Find the exact length of \overline{AB} .



**#12 Geometry Team Question
January Regional 2005**

Diagram may not be drawn to scale.

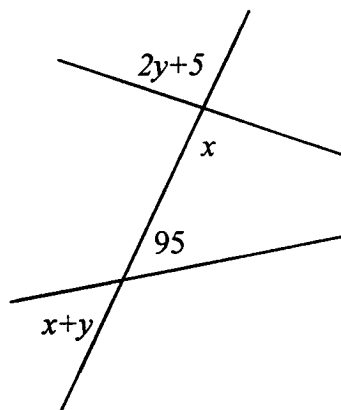
In the diagram, $m\angle B = 60$, $AD = 5$, $AC = 9$, $m\angle CDB = 80$, $AD = CD$. Find $BD : BC$.



**#13 Geometry Team Question
January Regional 2005**

Diagram may not be drawn to scale.

Using the diagram with measures as indicated, find the value of $x - y$.



#14 Geometry Team Question
January Regional 2005

The bases of a trapezoid are 10 and 20. Find the lengths of the segments into which the median of the trapezoid is divided by one of the diagonals.

#15 Geometry Team Question
January Regional 2005

An exterior angle of a regular polygon is $\frac{1}{3}$ of a right angle. How many diagonals does the polygon have?