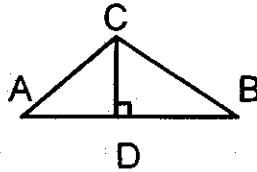
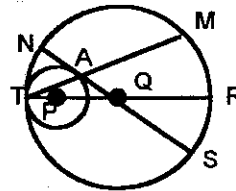


**GAITHER-LETO INVITATIONAL
GEOMETRY TEAM COMPETITION
FEBRUARY 22, 1997**

1. In $\triangle ABC$, $AB = 4$, $BC = 3$, $AC = 2$. D is chosen such that $m\angle CDB = 90^\circ$, find \overline{BD} .

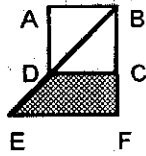


2. Find the value or values of k for which the graph of $4y + 28 = 8kx$ and $8y + kx = 4$ are perpendicular.
3. If each interior angle of a regular polygon is 150° , how many diagonals does the polygon have?
4. The three dimensions of a rectangular solid are in the ratio of 3:4:5. If the diagonal of the solid is $100\sqrt{2}$, find the sum of the lengths of the three dimensions.
5. Angle A is the vertex of an isosceles $\triangle ABC$, the measure of angle B has twice as many degrees as \overline{BC} has centimeters. The measure of angle C has three times as many degrees as \overline{AB} has centimeters. If $m\angle B = x + 6$ and $m\angle C = 2x - 54$, find the perimeter of $\triangle ABC$.
6. \overline{AX} and \overline{BX} are 2 adjacent sides of a regular polygon. If the measure of $\angle ABX$ equals one-third the measure of $\angle AXB$, how many sides has the regular polygon?
7. Given :
 $\odot P$ and $\odot Q$ are internally tangent at T ; diameter \overline{NS} of $\odot Q$ is tangent to $\odot P$ at A ;
 $m\angle MR = 52^\circ$; \overline{TM} passes through A . Find $m\angle MN$.



8. A plane 6 inches from the center of a sphere intersects the sphere in a circle whose area is 64π . Find the number of square inches in the surface area of the sphere.

9. Isosceles right $\triangle BEF$, with $\overline{BF} \cong \overline{EF}$, overlaps square $ABCD$ as shown. If $AB = 1$ and $EB = 2$, what is the area of the shaded region $CDEF$?

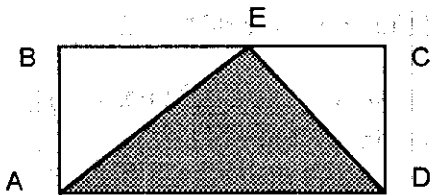


10. Trapezoid $ABCD$ is inscribed in a circle. Diagonals \overline{AC} and \overline{BD} intersect at P . If the smaller base, \overline{BC} , intercepts an arc of 70° and $AB = BC$, find the measure of the smallest angle formed by the diagonals.

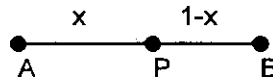
11. In $\triangle ABC$, $AC = 6$, $BC = 8$, and $AB = 10$. A line dividing the triangle into two regions of equal area is perpendicular to \overline{AB} at X , find BX .

12. In a right $\triangle ABC$, \overline{CM} is the median to hypotenuse \overline{AB} . If $\angle A = 60^\circ$ and $AB = 12$, find the distance from the point B to \overleftrightarrow{CM} .

13. In rectangle $ABCD$, $AB = 8$, $AE = 10$, $ED = 17$. What is the area of the shaded triangle?



14. Find the length of \overline{AP} in the golden ratio, where $\frac{AB}{AP} = \frac{AP}{PB}$, if $AB = 1$ and $AP = x$.



15. If $l \parallel m \parallel n$, find $x + y + z$

- $\angle 1 = z$
- $\angle 2 = 7x + 9$
- $\angle 3 = 7y - 4$
- $\angle 4 = 11x - 1$
- $\angle 5 = 2y + 5$

