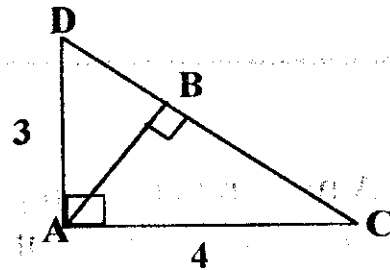


Geometry

#1

Given right triangle  $ACD$  with altitude  $\overline{AB}$ , as shown. Find the value of  $AB+CB+BD$ .



#2

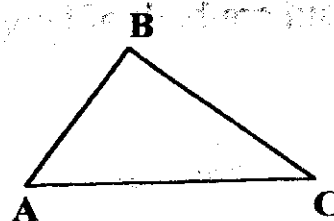
A square is inscribed in a circle of radius 6. An equilateral triangle is circumscribed about the same circle. Find the ratio of the area of the triangle to the area of the square.

#3

The dimensions of a cylinder are three times that of another. If the volume of the larger cylinder is  $8100\pi$  then find the volume of the smaller cylinder.

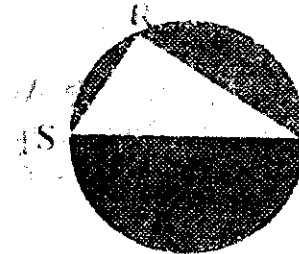
#4

Let  $\overline{BD}$  be the bisector of  $\angle ABC$  and  $\overline{BE}$  be the median to side  $\overline{AC}$ . Points D and E both lie on side  $\overline{AC}$ . If  $AB=3$  and  $BC=4$  and  $AC=6$ , then find the length DE.



#5

A triangle  $RST$  is inscribed in a circle so that  $ST$  is the diameter of the circle. If  $RS=3$  and  $RT=6$  then find the area of the shaded region



(not drawn to scale)

#6

A man travels from point A to point B at 10 miles per hour (mph) and then from point B to point A at 8 mph. Using the average speed from his round trip described above, he then travels an additional 18 miles, from point A to point C. How long does it take him to go from point A to C on the last leg of his journey?

#7

Let  $A$  = the perimeter of a rhombus with diagonals of length 10 cm and 24 cm.

Let  $B$  = the length of the arc of a circle which is intercepted by an angle of degree 60. The radius of the circle is 10 cm.

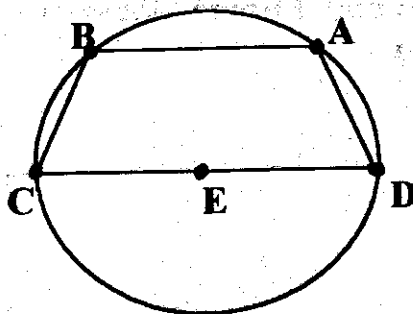
Find the value of  $A + \frac{6B}{\pi}$ .

Show out

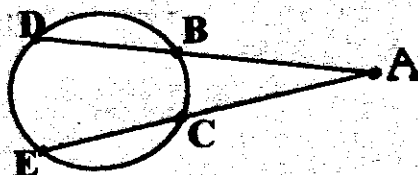
#8

A trapezoid has median 12 and height 6. If the legs of the trapezoid are both of length 14, find the perimeter of the trapezoid.

#7 Arc  $\widehat{ABC}$  of circle E contains 120 degrees, and trapezoid ABCD is inscribed as shown, with base  $\overline{CD}$  on the diameter. If  $AD=10$  and  $BA=10$ , find the area of the trapezoid.



#10  $\overline{AD}$  and  $\overline{AE}$  are secant segments, as shown. If  $AB=4$ ,  $BD=8$  and  $EC=13$ , find the length AC.



#11

Consider a convex heptagon GEOMETRY. Let

A = the total number of diagonals of GEOMETRY

B = the maximum number of diagonals that may be drawn from one vertex of GEOMETRY.

C = the total degree measure of the interior angles of GEOMETRY.

Find the value of  $A + B + C$

#12

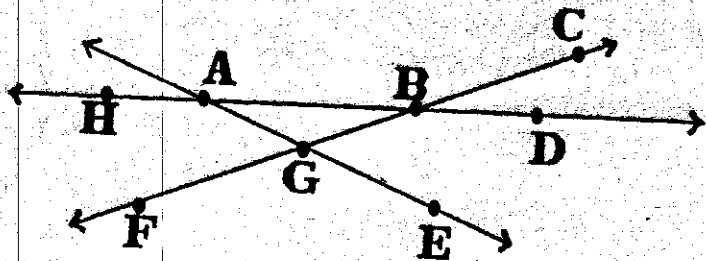
Two parallel lines,  $l$  and  $m$ , are 3 units apart and point P lies on line  $m$ . P is a vertex of an isosceles triangle with leg lengths 5. All three vertices of the triangle lie on  $l$  and  $m$ . How many points, excluding P, lie on one of the parallel lines and could be a vertex of the isosceles triangle?

#13

Consider the coplanar lines shown, with intersection points B, G and A.

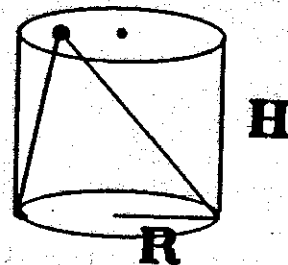
Find the geometric figure determined by

$$[(\vec{GA} \cup \vec{GB}) \cap \vec{GE}] \cup \vec{FG}$$



#14

A solid right circular cylinder of height 10 and diameter 12 has removed from it a solid circular cone of the same radius and height. What is the exact volume of the remaining solid?



#15

A rectangular room has dimensions 10 ft by 10 ft by 12 ft. A spider is on one end wall (10 by 10 ft) in the center, and 1 ft from the floor. A fly is on the opposite wall, in the center, and 1 ft from the ceiling. If the fly does not move and the spider crawls only (no webs, jumps, etc), what is the minimum distance that the spider must crawl to get to the fly? Round to the nearest foot.

