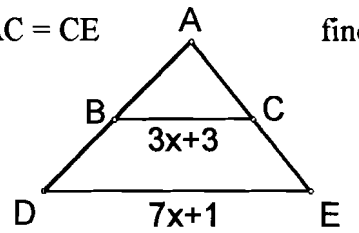
Geometry Ciphering - Hoover High School Math Tournament - February 22, 2003

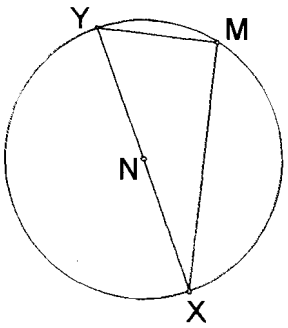
1-1. If AB = BD, and AC = CE find x.



Ans: x=5

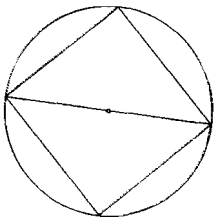
1-2. N is the center of the circle. If YM = YN = 6, what is $m\angle M$ in degrees ?

Ans: 90°

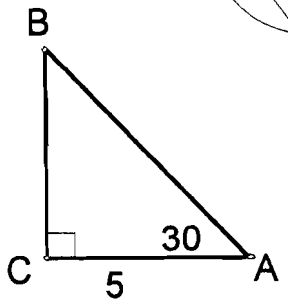


1-3. If the area of the inscribed square is 8π , what is the area of the circle?

Ans: $4\pi^2$



1-4. $\tan \angle A = ?$

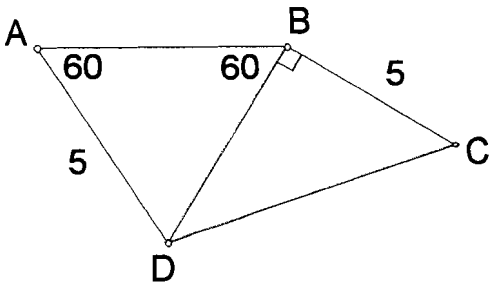


Ans: $\frac{\sqrt{3}}{3}$

1-5. Find the degree measure of the major angle of an arc formed by the hands of a clock at 2:30.

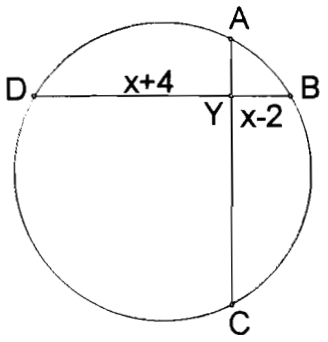
Ans: 255°

2-1. $(CD)^2 = ?$



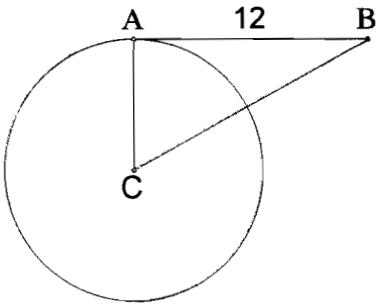
Ans: 50

2.2. If AY = YC = 4, find the area of the circle. Ans: 25π

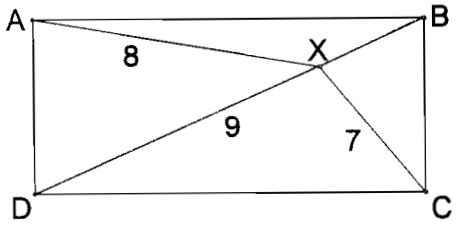


2.3. What is 4 times the area of a triangle with sides length 9, 11, 13? Ans: $33\sqrt{35}$

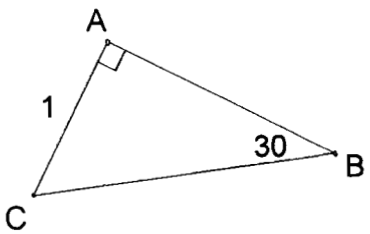
2.4. $\overline{AC}$ is a radius. If the area of the circle is 81π , what is BC ? Ans: 15



2.5. AX = 8, DX = 9, CX = 7. BX = ? Ans: $4\sqrt{2}$

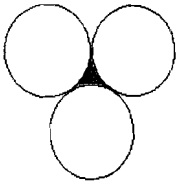


3.1. $m\angle A = 90°$, $m\angle B = 30°$, b = 1 What is the length of the median to side a ?
Ans: 1



3.2. There are three congruent circles tangent to each other as shown. The sum of their circumferences is 36π. What is the shaded area?

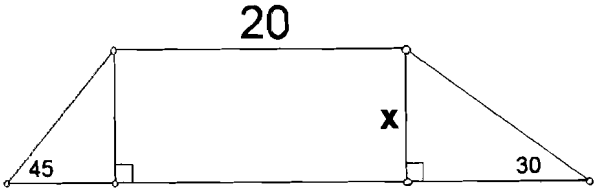
Ans: $36\sqrt{3}-18\pi$



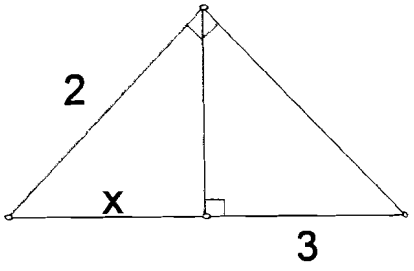
3.3 What is the volume of a regular tetrahedron that has base area = $9\sqrt{3}$

Ans: $18\sqrt{2}$

3.4 The area of this trapezoid is $50\left(5+\sqrt{3}\right)$. X = ? Ans: 10

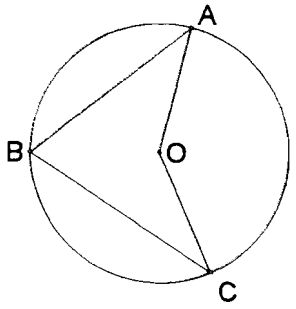


3.5 What is x^2 ? Ans: 1



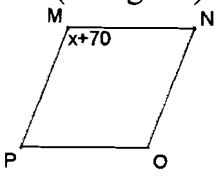
4.1 In circle O,. $m\widehat{ABC} = 240°$, radius r = 2003. The arc length of $\widehat{AC}$ can be written in form $\frac{a\pi}{b}$. Find $\frac{3a}{2b}$.

Ans: 2003

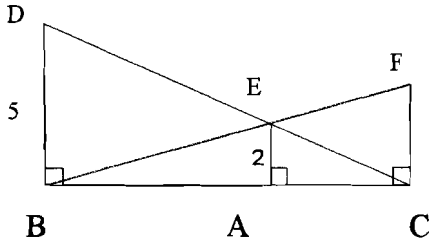


4.2 Figure MNOP is a parallelogram. $m\angle P$ = Measure of interior angle of a regular pentagon. Find x (in degrees) where x+70 is $m\angle M$.

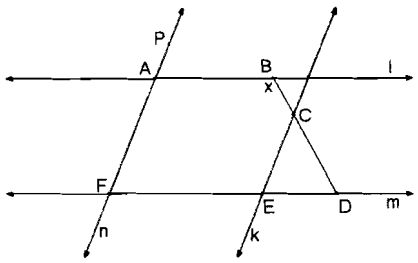
Ans: 2



4.3 3 poles, AE, BD, and CF, are placed next to each other as shown. BD is 5 ft. tall and AE is 2 ft. tall. What is 3 times the height of CF? Ans: 10



4.4 $\begin{matrix} l \parallel m \\ n \parallel k \end{matrix}$ $m\angle ECD = 30°; m\angle PAB = 58°$ What is $\frac{1}{5}x°$? (figure is not to scale) Ans: $\frac{88}{5}$



4.5 What is the slope of the line perpendicular to the line with equation 200x + 3y = 2003?

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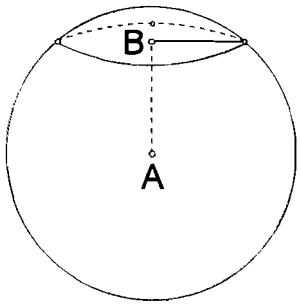
Ans: $\frac{3}{200}$

E.1 A = number of diagonals in an icosagon.

B = measure of an interior angle in a regular nonagon. $(A-B)^2 = ?$ Ans: 900

E.2 Sphere A has a great circle with a circumference of 20π. Small circle B has an area of 20π. What is the distance between A and B? Ans: $4\sqrt{5}$



E.3 If Ax+By +C=0 is the perpendicular bisector of the line segment with endpoints (4,-20) and (-8,26), find the square root of C. (note: $|A|,|B|,|C|$ are relatively prime integers and A>0.)

Ans: 9