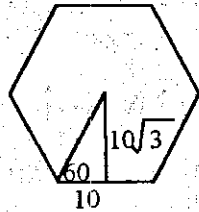


Geometry Solutions: March Regional

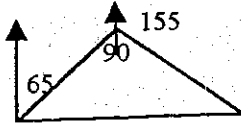
- $C + 23 + C + C + 52 = 360$
 $C = 95$.
- The circle has diameter that is the same size as the patio side. So $C = \pi d \approx 15.71$

3. Area = $\frac{1}{2}ap =$

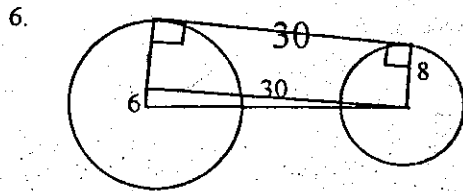
$$\frac{1}{2}(10\sqrt{3})(120) = 600\sqrt{3}$$



- Interior angles = $4(360)$ which equals 1440. Set $(n-2)180=1440$ solves to $n=10$ sides.
- Using alternate interior angles we get that the angle between the two paths is 90 degrees. Using the Pythag.



Theorem, we get $\sqrt{100^2 + 30^2} \approx 104.4$



Tangent lines form right angles with the radii, so we create a rectangle, and a very skinny right triangle with legs 6 and 30. Using the Pythagorean Theorem to get the distance is 30.6

- Angles A and C are complementary so $5x - 13 + 3x + 7 = 90$ so $x=12$. The angles are then 47 and 43 degrees. $K = 180-47= 133$, $M= 43$, so $K+M = 176$.
- $2(3x-8) = 4x-4$ so $x=6$ and the lengths of the bases of the trapezoid (DE and BC) are 10 and 20. Area = $\frac{1}{2}(4)(10+20) = 60$.
- Use the distance formula to find the median of the trapezoid is 5. Since the area of a trapezoid is median(height) then $12 < 5h < 21$ we have the height must be between 2.4 and 4.2. So $L=3$ and $G=4$. The sum is 7.
- The segment shaded has area of $\frac{1}{4}$ of the circle, minus the area of the right triangle.

$$A = \frac{1}{4}\pi(400) - \frac{1}{2}(20)(20)$$

$$100\pi - 200$$

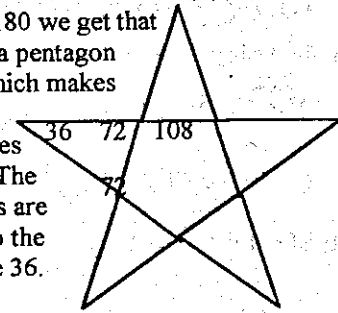
- Since angles A and B are supplementary, $11x+15 = 180$ so $x=15$. Angle D is congruent to angle B: $5(15)+6 = 96$.
- Four times as large makes the volume 64 times as large, so the weight is 1.25 times 64. Weight is 80.
- The slopes of the two lines are $2k$ and $-k/8$.

So $2k = \frac{8}{k}$ which solves to $k=2$ or -2 .

The greatest value of the difference is $2-(-2)=4$.

14. $\frac{45}{360}(36\pi) = 4.5\pi$

15. Using $(n-2)180$ we get that the angles of a pentagon add to 540, which makes the center pentagon angles equal to 108. The exterior angles are then 72 and so the stars points are 36. $36(5) = 180$



TEAM answers

- 95
- 15.71
- $600\sqrt{3}$
- 10
- 104.4
- 30.6
- 176
- 60
- 7
- $100\pi - 200$
- 96
- 80
- 4
- 4.5π
- 180