Colégio Imaculada

Nome Regina nº 30 3º Exatas

Complemento de Matemática (2ª fase)

1) A área de um círculo inscrito em um hexágono regular é $81\pi cm^2$. Calcule a área deste hexágono

$S_o = 81\pi\ cm^2$

$S_\hexagon$

$S_o = \pi r^2$

$81\pi = \pi r^2$

$r^2 = \frac{81\pi}{\pi}$

$r = 9$

$r = a$

$\boxed{a = 9}$

$S = p \cdot a$

$\downarrow \quad \downarrow$

$? \quad 9$

$\left(\frac{l}{2}\right)^2 + a^2 = l^2$

$\frac{l^2}{4} + a^2 = l^2$

$\frac{l^2}{4} + 81 = l^2$

$81 = l^2 - \frac{l^2}{4}$

$81 = \frac{3l^2}{4} \Rightarrow 3l^2 = 324$

$l^2 = 108$

$l = \sqrt{108}$

$l = 6\sqrt{3}$

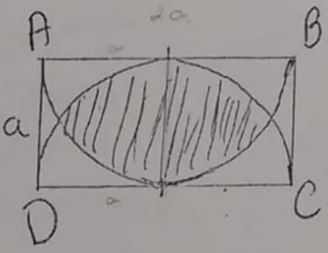
$2p = 6 \cdot 6\sqrt{3}$

$2p = 36\sqrt{3} \Rightarrow p = 18\sqrt{3}$

$S = 18\sqrt{3} \cdot 9$

$\boxed{S = 162\sqrt{3}\ cm^2}$

2) Na figura ABCD é um retângulo de lados a e 2a. Calcular a área da região sombreada



Já é:

$360° \text{ — } \pi r^2$

$60° \text{ — } S$

$360S = 60\pi \cdot a^2$

$S = \frac{60\pi a^2}{360} = \frac{\pi a^2}{6}$

$S_{retângulo} - S_\triangle - S_\diamond$

$\frac{\pi a^2}{6} - \frac{a^2\sqrt{3}}{4} = \frac{2\pi a^2 - 3a^2\sqrt{3}}{12}$

$S_\diamond \frac{a^2(2\pi - 3\sqrt{3})}{12}$

$S_\triangle + 2 \cdot S_\diamond =$

$\frac{a^2\sqrt{3}}{4} + 2 \cdot \frac{a^2(2\pi - 3\sqrt{3})}{12}$

$\frac{3a^2\sqrt{3} + 2a^2(2\pi - 3\sqrt{3})}{12}$

$3a^2\sqrt{3} + 4a^2\pi - 6a^2\sqrt{3}$

$-3a^2\sqrt{3} + 4a^2\pi$

12

$\frac{a^2(4\pi - 3\sqrt{3})}{12}$

Total

$2 \times \frac{a^2(4\pi - 3\sqrt{3})}{12} = \boxed{\frac{a^2(4\pi - 3\sqrt{3})}{6}}$

- Heron:

$2p = a + a + a$

$p = \frac{3a}{2}$

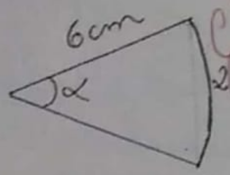
$S = \sqrt{\frac{3a}{2}\left(\frac{3a}{2} - a\right)\left(\frac{3a}{2} - a\right)\left(\frac{3a}{2} - a\right)}$

$S = \sqrt{\frac{3a}{2}\left(\frac{a}{2}\right)\left(\frac{a}{2}\right)\left(\frac{a}{2}\right)}$

$S = \sqrt{\frac{3a^4}{16}} = \frac{a^2\sqrt{3}}{4}$

3) Considere a figura abaixo e calcule α (não use fórmulas diretas)

a) $\frac{\pi}{3}$ rad
b) $\frac{1}{3}$ rad
c) 3 rad
d) 3π rad
e) n.d.a



Como vou saber a resposta

$360° — \pi \cdot 6^2$
α rad — S

$\alpha\pi \cdot 36 = 360 S$

$\alpha = \frac{360 S}{\pi \cdot 36}$

$\alpha = \frac{10 S}{\pi}$ → ?

$C = 2\pi r$
$C = 2\pi \cdot 6$
$C = 12\pi$

$12\pi — 2\pi r$
$2 — S$
$12\pi S = 4\pi \cdot r$
$S = 24\pi$

ℓ

4 exercício:

$\frac{\pi r^2}{2} - \frac{\ell^2(4\pi - 3\sqrt{3})}{36} = \frac{18\pi \cdot (\frac{\ell}{2})^2 - 4\pi\ell^2 + 3\sqrt{3}\ell^2}{36}$

$\frac{18\pi \cdot \frac{\ell^2}{4} - 4\pi\ell^2 - 3\sqrt{3}\ell^2}{36} = \frac{\frac{9\pi\ell^2}{2} - 4\pi\ell^2 + 3\sqrt{3}\ell^2}{36}$

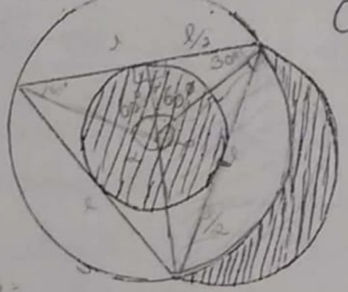
$\frac{\frac{9\pi\ell^2 - 8\pi\ell^2 + 6\sqrt{3}\ell^2}{2}}{36} = \frac{\pi\ell^2 + 6\sqrt{3}\ell^2}{72} = \frac{\ell^2(\pi + 6\sqrt{3})}{72}$

$S_{total} = \frac{\pi\ell^2}{12} + \frac{\ell^2\pi + 6\ell^2\sqrt{3}}{72}$

$S = \frac{6\pi\ell^2 + \pi\ell^2 - 6\ell^2\sqrt{3}}{72} =$

$\frac{7\pi\ell^2 - 6\sqrt{3}\ell^2}{72} = \boxed{\frac{\ell^2(7\pi + 6\sqrt{3})}{72}}$

4) Calcule a área da região sombreada



Considere o Δ equilátero de lado ℓ

r = a

$S_o =$

$tg\,30° = \frac{a}{\frac{\ell}{2}}$

$\frac{\sqrt{3}}{3} = a \cdot \frac{2}{\ell}$

$\frac{\sqrt{3}}{3} = \frac{2a}{\ell}$

$\sqrt{3}\ell = 6a$

	30	45	60
sen	1/2		
cos	$\sqrt{3}/2$		
tg	$\frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$		

$a = \frac{\sqrt{3}\ell}{6}$

r = a

$S_o = \pi r^2$

$S_o = \pi \cdot a^2$

$S_o = \pi \cdot \left(\frac{\sqrt{3}\ell}{6}\right)^2$

$S = \pi \cdot \frac{3\ell^2}{36}$

$\boxed{S_o = \frac{\pi\ell^2}{12}}$

$r = \frac{\ell}{2}$

$S = S - S$

$\frac{\pi r^2}{2} - ?$

$360° = 60° + 60° + \alpha + \alpha$

$360 = 120 + 2\alpha$

$240 = 2\alpha$

$\alpha = 120$

$360° — \pi r^2$ → 1 pedaço

$120° — S$

$360 S = 120\pi \cdot \left(\frac{\sqrt{3}\ell}{3}\right)^2$

$360 S = 120\pi \cdot \frac{3\ell^2}{9}$

$\frac{360 S}{120} = \pi \cdot \frac{\ell^2}{3}$

$3 S = \pi \cdot \frac{\ell^2}{3}$

$S = \frac{\pi \cdot \frac{\ell^2}{3}}{3} = \frac{\pi \cdot \ell^2}{3} \cdot \frac{1}{3} = \frac{\pi\ell^2}{9}$

$sen\,30° = \frac{a}{r}$

$\frac{1}{2} = \frac{\frac{\sqrt{3}\ell}{6}}{r}$

$\frac{r}{2} = \frac{\sqrt{3}\ell}{6}$

$6r = 2\sqrt{3}\ell$

$r = \frac{2\sqrt{3}\ell}{6}$

$r = \frac{\sqrt{3}\ell}{3}$

1,9

$S_{setor} - S_{\Delta}$ $\quad S = \frac{\frac{\sqrt{3}\ell}{3} \cdot \ell}{2} \cdot sen\,30° =$

$\frac{\frac{\sqrt{3}\ell^2}{3} \cdot \frac{1}{2}}{2} = \frac{\frac{\sqrt{3}\ell^2}{6}}{2} = \frac{\sqrt{3}\ell^2}{12}$

$\frac{\pi\ell^2}{9} - \frac{\sqrt{3}\ell^2}{12} = \frac{4\pi\ell^2 - 3\sqrt{3}\ell^2}{36} =$

$S = \frac{\ell^2(4\pi - 3\sqrt{3})}{36}$

Boa sorte!

Elony