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Avaliação

1- a) $A = bh = 4 \cdot 8 = 32\ cm^2$

b) $sen30° = \frac{op}{12} \to sen30° = \frac{1}{2} \to \frac{op}{12} = \frac{1}{2} \to op = 6\ cm$

$cos30° = \frac{adj}{12} \to \frac{adj}{12} = \frac{\sqrt{3}}{2} \to adj = 6\sqrt{3}$

$A = bh = (6)(6\sqrt{3}) = 36\sqrt{3} \cong 62{,}35\ cm^2$

2- a) $A = l^2 \to A = 8^2 = 64\ cm^2$

b) $A = 7.1^2 = 50.41\ cm^2$

c) $A = \sqrt{3}^2 = 3\ cm^2$

d) $l = \frac{d}{\sqrt{2}} \to l = \frac{6}{\sqrt{2}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}\ cm$; $A = l^2 = (3\sqrt{2})^2 = 9 \cdot 2 = 18\ cm^2$

3- a) $l = \sqrt{A} \to l = \sqrt{25} = 5\ cm$

b) $l = \sqrt{12} = \sqrt{3 \cdot 4} = \sqrt{3 \cdot 2^2} = 2\sqrt{3}\ cm \cong 3.46\ cm$

4- a) $A = \frac{dD}{2} = \frac{(5)(8)}{2} = 20\ cm^2$

b) $25 = 9 + (D/2)^2 \to D^2/4 = 16 \to D^2 = 64 \to D = 8\ cm \to A = \frac{1}{2}dD = \frac{1}{2}(6)(8) = 24\ cm^2$

c) $sen60° = \frac{\sqrt{3}}{2} \to sen60° = \frac{d/2}{8} = \frac{d}{16} \to \frac{\sqrt{3}}{2} = \frac{d}{16} \to d = 8\sqrt{3}\ cm$

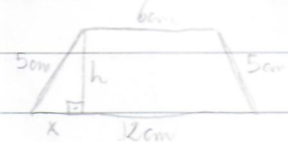
$cos60° = \frac{1}{2} \to cos60° = \frac{D/2}{8} = \frac{D}{16} \to \frac{1}{2} = \frac{D}{16} \to D = 8\ cm$

$A = \frac{1}{2}dD = \frac{1}{2}(8\sqrt{3})(8) = 32\sqrt{3}\ cm^2$

5- $A = \frac{(B+b)h}{2} = \frac{(7+5)4}{2} = 24\ cm^2$

6- $4l = 72 \to l = 18\ cm \to A = 18^2 = 324\ cm^2$

7-



$x = (12-6)\frac{1}{2} = 3\ cm$

$h^2 + 9 = 25 \to h^2 = 16 \to h = 4$

$A = \frac{(B+b)h}{2} = \frac{(18)(4)}{2} = 36\ cm^2$

8- a) $A = bh = 6 \cdot 4 = 24\ cm^2$

b) $sen60° = \frac{op}{6} = \frac{\sqrt{3}}{2} \to op = 3\sqrt{3} \to A = bh = (8)(3\sqrt{3}) = 24\sqrt{3}\ cm^2$

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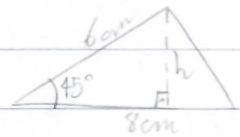
9- a) $A = \frac{1}{2}bh = \frac{1}{2}(8)(5) = 20\ cm^2$

b) $25 + x^2 = 169 \to x^2 = 144 \to x = 12\ cm \to A = \frac{1}{2}bh = \frac{1}{2}(12)(5) = 30\ cm^2$

c) É equilátero ∴

$A = \frac{l^2\sqrt{3}}{4} = \frac{36\sqrt{3}}{4} = 9\sqrt{3}\ cm^2$

d) 

$\frac{6}{\text{sen}90°} = \frac{h}{\text{sen}45°} \to h = 6\,\text{sen}45° = \frac{6\sqrt{2}}{2}$

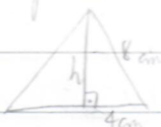
$= 3\sqrt{2}\ cm$

$A = \frac{1}{2}bh = \frac{1}{2}(8)(3\sqrt{2}) = 12\sqrt{2}\ cm^2$

10- $A = bh;\ h = \frac{1}{2}b;\ A = \frac{1}{2}b^2 \to 450 = \frac{1}{2}b^2 \to 900 = b^2 \to b = 30\ m$

11- $bh = 100;\ (1,1b)(0,9h) = A \to (1,1)(0,9)bh = A \to 0,99bh = A \to A = 99\ cm^2$

12- a) Apótema de triâng. eq. $= \frac{1}{3}$(altura)



$16 + h^2 = 64$

$h^2 = 48$

$h = 4\sqrt{3}\ cm \therefore a = \frac{4\sqrt{3}}{3}\ cm$

$A_c = \pi\left(\frac{4\sqrt{3}}{3}\right)^2 = \pi\left(\frac{16\cdot 3}{9}\right) = \pi\left(\frac{48}{9}\right) = \frac{16\pi}{3}\ cm^2$

$A_t = \frac{l^2\sqrt{3}}{4} = \frac{64\sqrt{3}}{4} = 16\sqrt{3}\ cm^2$

$A_p = 16\sqrt{3} - \frac{16\pi}{3} = \frac{48\sqrt{3} - 16\pi}{3}\ cm^2 \cong 10,9576\ cm^2$

b) $A = \frac{1}{4}\pi r^2 = \frac{1}{4}\pi(100) = 25\pi\ cm^2$

c) Área do setor circular $= \frac{1}{2}\theta r^2$ (com θ em radianos)

Descobrindo o ângulo: $\theta = 180° - 60° = 120°$

Transformando em rad: $\theta_{rad} = \theta_o \cdot \frac{\pi}{180} = 120° \cdot \frac{\pi}{180} = \frac{2\pi}{3}$

$A = \frac{1}{2}\theta r^2 = \frac{1}{2}\left(\frac{2\pi}{3}\right)(36) = \frac{2\pi}{6}(36) = 12\pi\ cm^2$

13- $A_o = 450\ cm^2$

$A_f = (0,8)(30)(0,8)(15) = (0,64)(450) = 288\ cm^2$

$p = 1 - \frac{288}{450} = 1 - 0,64 = 36\% \to$ Letra C

14- a) Área do setor circular $= \frac{1}{2}\theta r^2$

$\theta_{rad} = \frac{\theta_o \cdot \pi}{180} = \frac{135}{180}\cdot\pi = \frac{3\pi}{4}$

$A = \frac{1}{2}\left(\frac{3\pi}{4}\right)(64) = \frac{3\pi}{8}(64) = 24\pi\ cm^2$

Área do triângulo

$A = \frac{1}{2}bh;\ b = 8cm;\ h = 8\,\text{sen}135°$

$h = 8 \cdot \frac{\sqrt{2}}{2} = 4\sqrt{2}\ cm$

$A = \frac{1}{2}(8)(4\sqrt{2}) = 16\sqrt{2}\ cm^2$

$A_T = 24\pi - 16\sqrt{2}\ cm^2$

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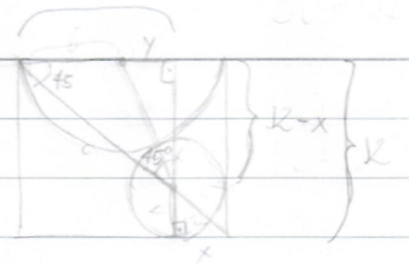
14-b)



$(12-x)^2 + y^2 = (6+x)^2$

$144 - 24x + \cancel{x^2} + y^2 = 36 + 12x + \cancel{x^2}$

$108 - 24x + y^2 = 12x$

$y^2 + 108 = 36x$

$y^2 = 36x - 108$

$6 = 12 - y - x$

$-6 = -y - x$

$y = 6 - x$

$y^2 = 36 - 12x + x^2$

$36 - 12x + x^2 = 36x - 108$

$x^2 - 48x + 144 = 0$

$x = \dfrac{48 \pm \sqrt{2304 - 576}}{2}$

$= \dfrac{48 \pm \sqrt{1728}}{2}$

$= \dfrac{48 \pm 24\sqrt{3}}{2}$

$x = \dfrac{48 + 24\sqrt{3}}{2}$

$= 24 + 12\sqrt{3}$

$\cong 44{,}78$ cm

$>$ que 12, impossível

$\therefore x = \dfrac{48 - 24\sqrt{3}}{2} = 24 - 12\sqrt{3} \cong 3{,}21$ cm

$A = \pi r^2 = \pi(24 - 12\sqrt{3})^2 = \pi(1008 - 576\sqrt{3})$

$= 1008\pi - 576\pi\sqrt{3}$ cm² $\cong 32.48$ cm²

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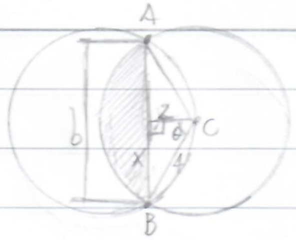
14-c)



A área pedida é igual a duas vezes à área hachurada no desenho ao lado.

$16 = 4 + x^2 - 2x\cos 90°$

$16 = 4 + x^2 - 0$

$x^2 = 16 - 4$

$x^2 = 12$

$x = \sqrt{12}$

$= 2\sqrt{3}$

$\frac{2\sqrt{3}}{\operatorname{sen}\theta} = \frac{4}{\operatorname{sen}90°}$

$\frac{2\sqrt{3}}{\operatorname{sen}\theta} = 4$

$\operatorname{sen}\theta = \frac{2\sqrt{3}}{4} = \frac{\sqrt{3}}{2}$

$\therefore \theta = 60°$

Ângulo do setor $= 2\theta = 120°$

Área do setor: $A = \frac{1}{2}\alpha r^2$, com α em radianos

Convertendo θ em rad: $\theta_{rad} = 120 \cdot \frac{\pi}{180} = \frac{2\pi}{3}$

$A_s = \frac{1}{\cancel{2}}\left(\frac{\cancel{2}\pi}{3}\right)(16) = \frac{16\pi}{3}$

Calcular e subtrair a área do Triângulo ABC:

$A_{\triangleright} = \frac{1}{2}bh = \frac{1}{2}(2x)(2) = \frac{1}{\cancel{2}}(4\sqrt{3})(\cancel{2}) = 4\sqrt{3}\ cm^2$

$A_{\widehat{AB}} = A_s - A_{\triangleright} = \frac{16\pi}{3} - 4\sqrt{3} = \frac{16\pi - 12\sqrt{3}}{3}\ cm^2$

$A_{final} = 2A_{\widehat{AB}} = 2\left(\frac{16\pi - 12\sqrt{3}}{3}\right) = \frac{32\pi - 24\sqrt{3}}{3}\ cm^2 \cong 19.6539\ cm^2$

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/ /

15 - Letra E

16 - $A_\Delta = \frac{1}{2}bh = \frac{1}{2}\left(\frac{1}{4}\right)\left(\frac{1}{2}\right) = \frac{1}{16}\,m^2$; $A_{Branco} = 4A_\Delta = 4\left(\frac{1}{16}\right) = \frac{4}{16} = \frac{1}{4}\,m^2$

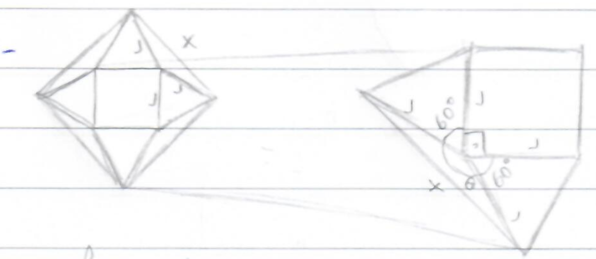
$A_{Cinza} = A_{Total} - A_{Branco} = 1 - \frac{1}{4} = \frac{3}{4}\,m^2$

$P_{Cinza} = 30A_{Cinza} = 30\left(\frac{3}{4}\right) = R\$\,22,50$

$P_{Branco} = 50A_{Branco} = 50\left(\frac{1}{4}\right) = R\$\,12,50$

$P_{Total} = \sum P = 22,5 + 12,5 = R\$\,35,00$

17 -



$\theta + 60° + 60° + 90° = 360°$

$\theta = 150°$

Lei dos cossenos

$x^2 = 2 - 2\cos 150°$

$= 2 + 2\cos 30°$

$= 2 + \cancel{2}\left(\frac{\sqrt{3}}{\cancel{2}}\right)$

$= 2 + \sqrt{3}$

$A = x^2 = 2 + \sqrt{3}$

18 - a) $x = \frac{1}{4}AB$; $A_{EFGH} = A_{ABCD} - 4A_{AEH}$ → $A_{EFGH} = 16x^2 - 6x^2 = 10x^2$

$A_{AEH} = \frac{1}{2}(3x)(x) = \frac{1}{2}(3x^2) = \frac{3}{2}x^2$

$A_{ABCD} = (4x)^2 = 16x^2$

$\text{Razão} = \frac{A_{EFGH}}{A_{ABCD}} = \frac{10\cancel{x^2}}{16\cancel{x^2}} = \frac{5}{8}$

$A_{EFGH} = \frac{5}{8}A_{ABCD}$

b) $A_{sombr} = \frac{1}{2}A_{EFGH} = \frac{1}{2}\cdot\frac{5}{8}\cdot 80 = 25\,cm^2$

19 - a) $A_{calçadas} = \cancel{4}\left(\frac{1}{\cancel{2}}(x)(10-x)\right) = 2(x)(10-x) = 2(10x - x^2) = 20x - 2x^2\;m^2$

Se $x = 2$: $A_{calçadas} = 20(2) - 2(4) = 40 - 8 = 32\,m^2$

$A_{Total} = (\cancel{x} + 10 - \cancel{x})^2 = 100\,m^2$

$A_{canteiro} = A_{Total} - A_{calçadas} = 100 - 32 = 68\,m^2$

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19 - b) $A_{canteiro} = 100 - (20x - 2x^2) = 2x^2 - 20x + 100\ m^2$

c) $P_{Total} = P_{canteiro} + P_{calçada} = 4(2x^2 - 20x + 100) + 3(20x - 2x^2)$

$= 8x^2 - 80x + 400 + 60x - 6x^2$

$= 2x^2 - 20x + 400$

$\Delta = 400 - 3200 = -2800 \Rightarrow P_{mín} = \frac{-\Delta}{4a} = \frac{2800}{8} =$ R$ 350.00

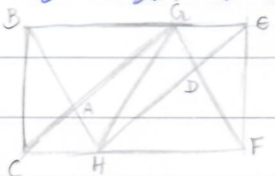
20 - $2(24 + 18 + 8) = A$ Letra D

$100 = A$

21 - a) $A_{ABC} = \frac{1}{2} BDh - A_{ABD}$; $A_{ADE} = \frac{1}{2} BDh - A_{ABD}$

Como BD//CE, h é igual p/ os dois triângulos.

As bases e alturas são as mesmas ∴ Têm a mesma área.

b) 

$A_{ABC} = \frac{1}{2} CHh - A_{ACH} \rightarrow A_{ABC} = A_{AGH}$

$A_{AGH} = \frac{1}{2} CHh - A_{ACH}$

$A_{DEF} = \frac{1}{2} EGh - A_{DEG}$; $A_{DGH} = \frac{1}{2} EGh - A_{DEG}$ ∴ $A_{DGH} = A_{DEF}$

$A_{AGDH} = A_{ABC} + A_{DEF} = 5 + 4 = 9 cm^2$

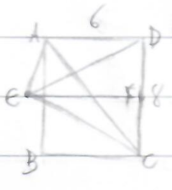
22 - $A_{Total} = 160 \cdot 120 - 50 \cdot 60 = 19200 - 3000 = 16200\ m^2$

Cada parte deve então ter $8100\ m^2$

$A_{ABCP} = 8100 \Rightarrow \frac{(AP + 50)100}{2} = 8100 \Rightarrow 50AP + 2500 = 8100 \rightarrow$

$\Rightarrow 50AP = 5600 \Rightarrow AP = 112$; Deslocamento $= 120 - 112 = 8m$

Letra B

23 - 

$A_{AEC} = A_{ADCE} - A_{ACD} = A_{ADFE} + A_{CEF} - A_{ACD}$

$(EF = h = \frac{\sqrt{3}}{2} l = \frac{\sqrt{3}}{2}(8) = 4\sqrt{3})$; $= \frac{(6+h)4}{2} + \frac{4 \cdot 4\sqrt{3}}{2} - \frac{6 \cdot 8}{2}$

$A_{AEC} = 16\sqrt{3} - 12$

$= (12 + 8\sqrt{3}) + (8\sqrt{3}) - (24)$

$= 12 + 16\sqrt{3} - 24$

$= 16\sqrt{3} - 12$

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24 - Primeiramente, deve ser dito que o triângulo é equilátero, pois os três arcos formados por ele no círculo são congruentes.

$A = A_{\circ} + A_{\triangle} + A_{\diamond} = \pi + A_{\triangle} + A_{\diamond}$

$A_{\circ} = \pi r^2 = \pi \cdot 1 = \pi \text{ cm}^2$

$A_{\triangle} = \frac{1}{3}(A_{\Delta} - A_{\circ}) = \frac{1}{3}(A_{\Delta} - \pi)$

$A_{\Delta} = \frac{\sqrt{3}\, l^2}{4}$; $r = \frac{1}{3}h = \frac{1}{3} \cdot \frac{\sqrt{3}}{2} l = \frac{\sqrt{3}}{6} l \to 1 = \frac{\sqrt{3}}{6} l \to l = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$

$A_{\Delta} = \frac{12\sqrt{3}}{4} = 3\sqrt{3} \text{ cm}$

$A_{\triangle} = \frac{1}{3}(3\sqrt{3} - \pi) = \sqrt{3} - \frac{\pi}{3} \text{ cm}^2$

$A_{\diamond} = \frac{1}{3}(A_{\circ\circ} - A_{\Delta}) = \frac{1}{3}(A_{\circ\circ} - 3\sqrt{3})$

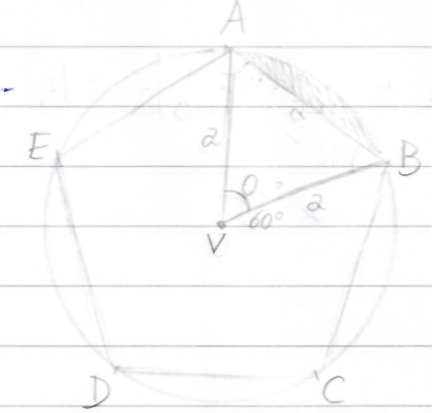
$R = 2r = 2 \therefore A_{\circ\circ} = \pi R^2 = 4\pi \text{ cm}^2$

$A_{\diamond} = \frac{1}{3}(4\pi - 3\sqrt{3}) = \frac{4}{3}\pi - \sqrt{3} \text{ cm}^2$

$A = \frac{4}{3}\pi - \cancel{\sqrt{3}} + \cancel{\sqrt{3}} - \frac{\pi}{3} + \pi = \frac{4}{3}\pi - \frac{1}{3}\pi + \pi = 2\pi \text{ cm}^2$

Letra A

25-



AVB é uma parte de uma circunferência dividida em 6.
AOB forma um triângulo equilát.

$S_p = 5(A_{AOB} - A_{AVB})$

$S_p = 5\left(\frac{60}{360}\pi a^2 - \frac{a^2\sqrt{3}}{4}\right)$

$S_p = 5\left(\frac{\pi a^2}{6} - \frac{a^2\sqrt{3}}{4}\right)$

$S_p = \frac{5a^2}{2}\left(\frac{\pi}{3} - \frac{\sqrt{3}}{4}\right)$

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26- $\cos\theta = \frac{BC}{BE} = \frac{12}{16} = \frac{3}{4} \rightarrow \theta = \cos^{-1}\left(\frac{3}{4}\right) \rightarrow \theta \cong 41.4°$

$\hat{ABC} = 90° \rightarrow \hat{ABF} = 90° - 41.4 = 48.6°$

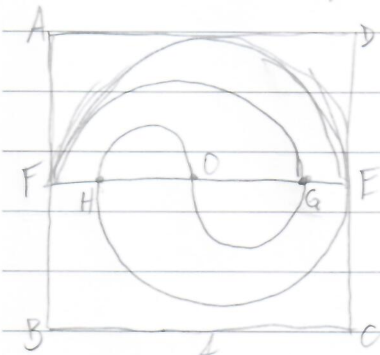
$\text{sen}\,48.6° = \frac{AF}{AB} = \frac{AF}{12} \rightarrow AF = 12\,\text{sen}\,48.6° \cong 12(0{,}75) \cong 9\text{ cm}$

27- $FH = GE$; $HO = FO - FH = OE - GE = OG$

Área do semicírculo de diâmetro HO é igual à de OG

— — — — — FG e HO — — — — HE e OG

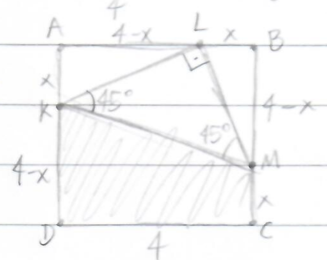
Com isso podemos visualizar a figura da seguinte forma:



Logo, devemos calcular a área do semicírculo de diâmetro FE. Como FE vale 4, seu raio vale 2:

$A = \frac{2^2\pi}{2} \rightarrow A = 2\pi$

28-



ABMK = CDKM, então

ABCD = ABMK + CDKM

chamando ABMK + CDKM de 2y:

$2y = ABCD \rightarrow y = 8$

$y = 4^2/2$ CDKM = 8

Letra B

Se o triângulo é isósceles, então:

KL = LM, portanto o ângulo de BLM é igual ao de LKA, formando uma congruência por LAA, e possuindo áreas iguais. Existem dois trapézios, ABMK e CDKM, cujas áreas são: (Considere que LB = MC = AK = x e que AL = KD = BM = 4 - x)

$ABMK \rightarrow \frac{4((4-x)-x)}{2} = 16$

$\therefore ABMK = CDKM$

$CDKM \rightarrow \frac{4((4-x)-x)}{2} = 16$