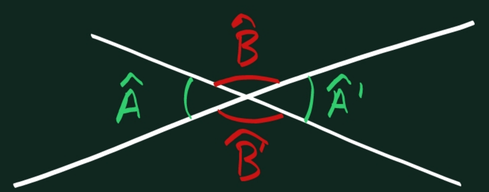
Tema 9- Áreas y Perímetros (P.145)

- Ángulos:

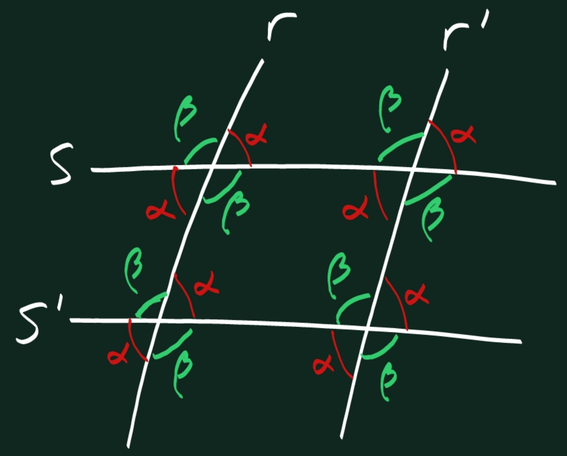
Los ángulos opuestos por el vértice son iguales.



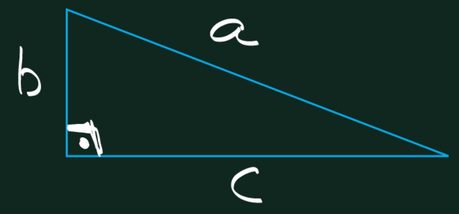
$\hat{A} = \hat{A}'$

$\hat{B} = \hat{B}'$

Los ángulos formados por el corte de una recta con otras 2 rectas paralelas son iguales.



Teorema de Pitágoras:

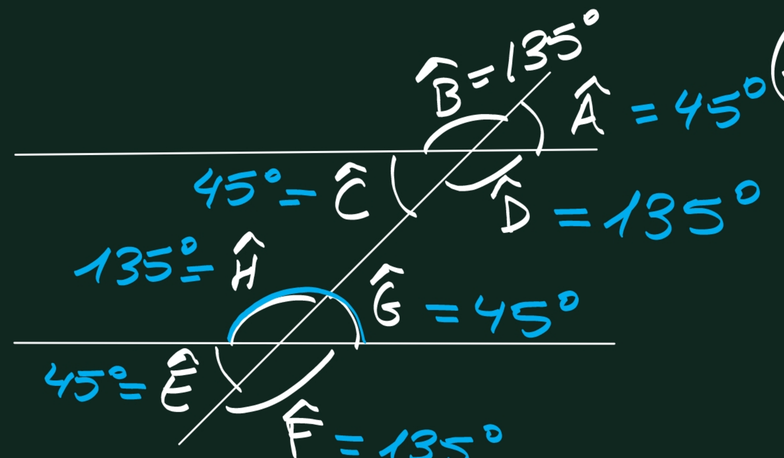


Para un triángulo rectángulo:

$$a^2 = b^2 + c^2$$

P. 148, Ej 8 / P. 149, Ej 11

(8)



$135 \cdot 2 = 270$

$360 - 270 = 90$

$90 : 2 = 45$

(11) a) a = 40,9 cm, b = 12 cm, c = 39,1 cm Sí

Hipotenusa

$\sqrt{b^2 + c^2} = \sqrt{144 + 1528,81} = \sqrt{1672,81} = 40,9$

b) a = 15cm, b = 12 cm, c = 10 cm No

$b^2 + c^2 = 144 + 100 = 244$ $\quad a^2 = 15^2 = 225$

c) a = 20,4 cm, b = 18 cm, c = 9,6 cm Sí

$b^2 + c^2 = 324 + 92,16 = 416,16$ $\quad a^2 = 20,4^2 = 416,16$

Triángulos y cuadriláteros: (P.150)

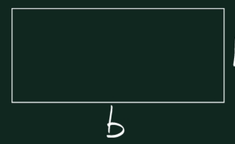
Triángulo

$$A = \frac{b \cdot h}{2} \qquad P = a + b + c$$

Cuadrado

$$A = l^2 \qquad P = 4 \cdot l$$

Rectángulo

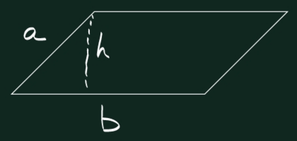


$$A = b \cdot h \qquad P = 2b + 2h = 2 \cdot (b + h)$$

Rombo

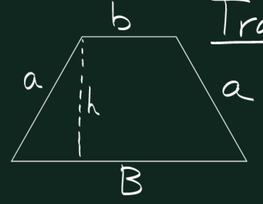
$$A = \frac{D \cdot d}{2} \qquad P = 4l$$

Romboide



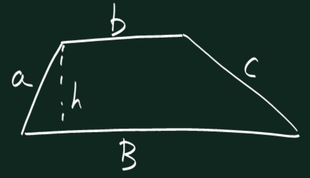
$$A = b \cdot h \qquad P = 2a + 2b = 2(a + b)$$

Trapecio



$$A = \frac{(b + B) \cdot h}{2}$$

$$P = a + b + B + a$$



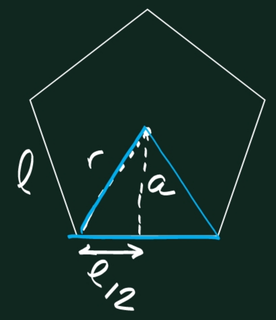
$$P = a + b + B + c$$

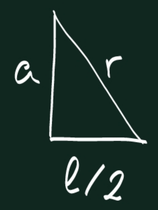
Polígonos Regulares:

$$P = n \cdot l$$

$n = n^{\underline{o}}$ lados

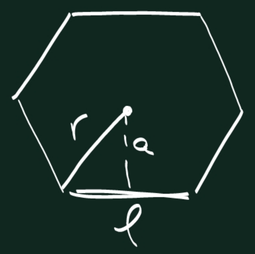
$$A = \frac{l \cdot a}{2} \cdot n = \frac{P \cdot a}{2}$$



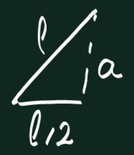


Hace falta conocer "l" y "a" para hacer los cálculos.

Si me falta uno, me tienen que dar "r". y entonces calculo el que me falta con el Teorema de Pitágoras.

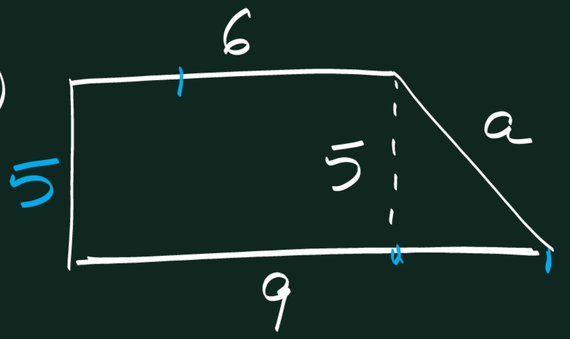


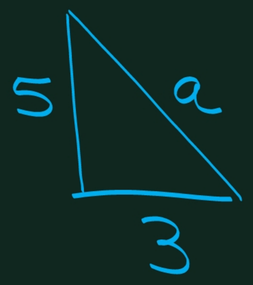
En un hexágono regular: $r = l$



P. 157, Ej 56 / P. 153, Ej 25 y 26

a)





$a^2 = 5^2 + 3^2$

$a^2 = 25 + 9$

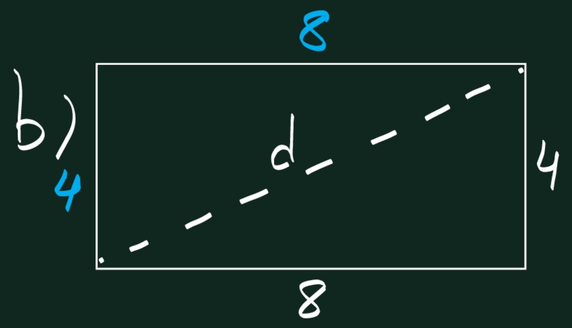
$a^2 = 34$

$a = \sqrt{34} = 5,83 \text{ cm}$

$P = 5 + 6 + 5,83 + 9 = 25,83 \text{ cm}$

$A = \frac{(9+6)\cdot 5}{2} = \frac{75}{2} = 37,5 \text{ cm}^2$

b)

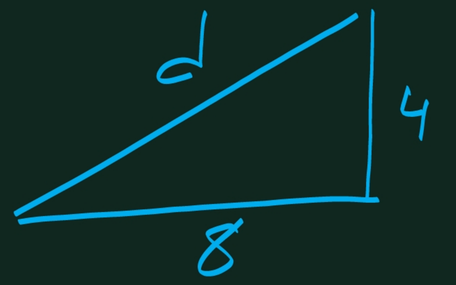


$P = 8 + 4 + 8 + 4 = 24 \text{ cm}$

$P = 2 \cdot 8 + 2 \cdot 4 = 24 \text{ cm}$

$P = 2 \cdot (8 + 4) = 24 \text{ cm}$

$A = 8 \cdot 4 = 32 \text{ cm}^2$



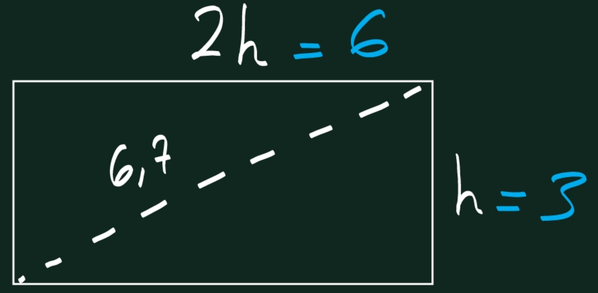
$d^2 = 4^2 + 8^2$

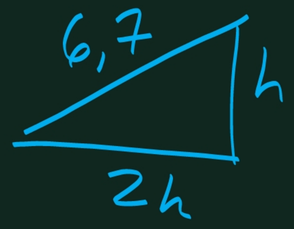
$d^2 = 16 + 64$

$d^2 = 80$

$d = \sqrt{80} = 8,94 \text{ cm}$

c)





$6,7^2 = h^2 + (2h)^2$

$44,89 = h^2 + 4h^2$

$44,89 = 5h^2$

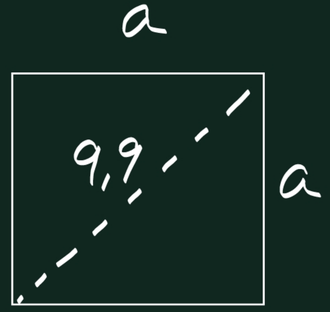
$8,978 = h^2$

$h = \sqrt{8,978} = 2,996... \simeq 3\ cm$

$P = 3+6+3+6 = 18\ cm$

$A = 3 \cdot 6 = 18\ cm^2$

d)



$9,9^2 = a^2 + a^2$

$98,01 = 2a^2$

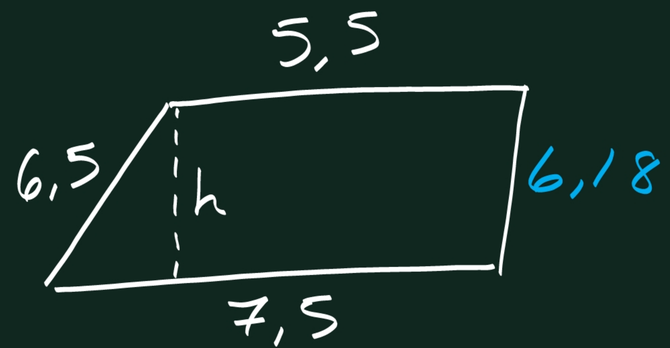
$49 = a^2$

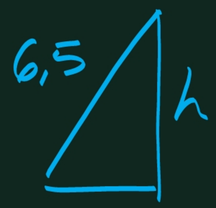
$a = \sqrt{49} = 7\ cm$

$P = 4 \cdot 7 = 28\ cm$

$A = 7^2 = 49\ cm^2$

e)





$6,5^2 = h^2 + 2^2$

$42,25 - 4 = h^2$

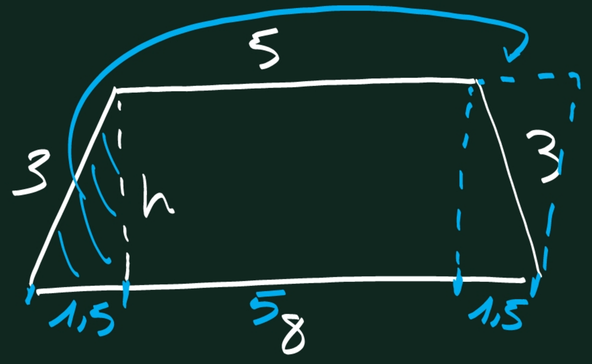
$38,25 = h^2$

$h = \sqrt{38,25} = 6,18\ cm$

$P = 6,5 + 5,5 + 6,18 + 7,5 = 25,68\ cm$

$A = \frac{2 \cdot 6,18}{2} + 5,5 \cdot 6,18 = 40,17\ cm^2$

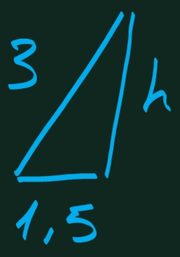
f)



$P = 3 + 5 + 3 + 8 = 19\ cm$

$A = \frac{(B + b) \cdot h}{2}$

$A = \frac{(5 + 8) \cdot 2,6}{2} = 16,9\ cm^2$



$3^2 = 1,5^2 + h^2$

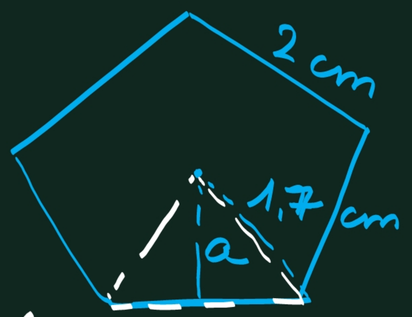
$h^2 = 3^2 - 1,5^2$

$h^2 = 9 - 2,25 = 6,75$

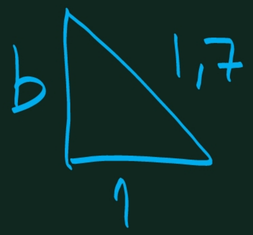
$h = \sqrt{6,75} = 2,6\ cm$

P. 153, Ej. 25

a)



$$A_t = \frac{l \cdot a \cdot n}{2}$$



$a^2 = b^2 + c^2 \Rightarrow 1{,}7^2 = b^2 + 1 \Rightarrow 2{,}89 = b^2 + 1$

$b^2 = 1{,}89$

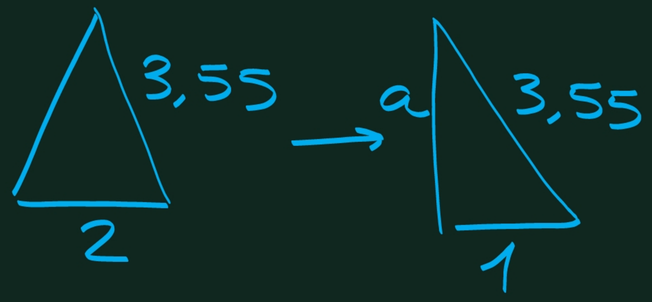
$b = \sqrt{1{,}89} = b = 1{,}37\ cm$

$A = \frac{L \cdot a \cdot n}{2} = \frac{2 \cdot 1{,}37 \cdot 5}{2} = 6{,}85\ cm^2$

b) $n = 11$

$r = 3{,}55\,cm$

$l = 2\,cm$



$3{,}55^2 = a^2 + 1^2$

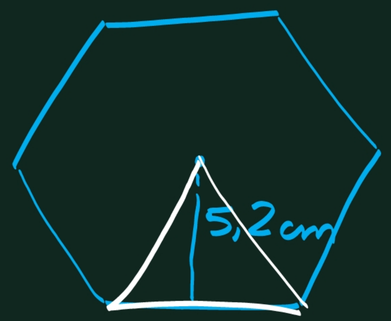
$12{,}6 - 1 = a^2$

$a = \sqrt{11{,}6} = 3{,}35\,cm$

$A = \frac{l \cdot a \cdot n}{2} = \frac{2 \cdot 3{,}35 \cdot 11}{2} = 36{,}85\,cm^2$

26

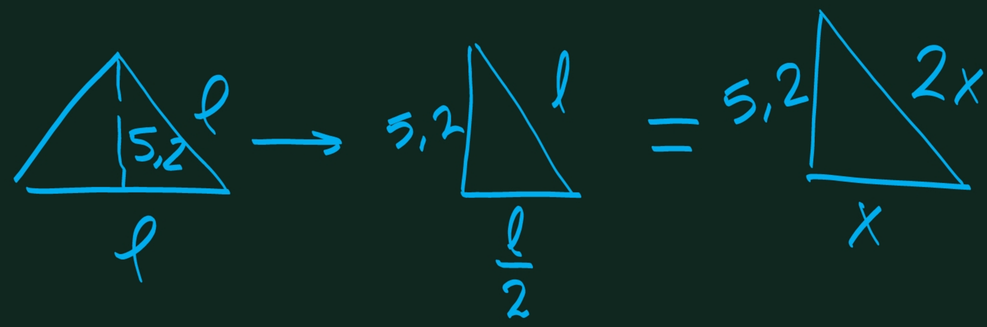
a)



$P = 6 \cdot 6 = 36\ cm$

$A = \frac{6 \cdot 5{,}2 \cdot 6}{2} = 93{,}6\ cm^2$

$l = 2x$



$(2x)^2 = x^2 + 5{,}2^2$

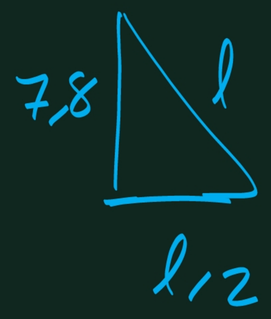
$4x^2 = x^2 + 27{,}04$

$3x^2 = 27{,}04$

$x^2 = 9{,}01$

$x = \sqrt{9{,}01} \simeq 3\ cm \rightarrow l = 2 \cdot x = 2 \cdot 3 = 6\ cm$

b)



$$l^2 = 7,8^2 + \frac{l^2}{4}$$

$$l^2 = 60,84 + \frac{l^2}{4}$$

$$4l^2 = 243,36 + l^2$$

$$3l^2 = 243,36 \longrightarrow l = \sqrt{\frac{243,86}{3}} = 9\ cm$$

$$P = 9 \cdot 6 = 54\ cm$$

$$A = \frac{9 \cdot 7,8 \cdot 6}{2} = 210\ cm^2$$

Figuras Circulares:

CÍRCULO:

$$P = 2 \cdot \pi \cdot r = \pi \cdot d$$

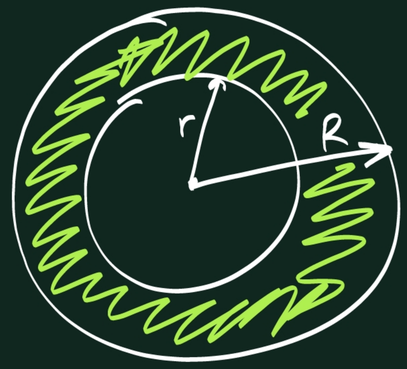
$$A = \pi \cdot r^2$$

SECTOR CIRCULAR:

$$P = 2\pi r \cdot \frac{\alpha}{360} + 2r$$

$$A = \pi \cdot r^2 \cdot \frac{\alpha}{360}$$

CORONA CIRCULAR:

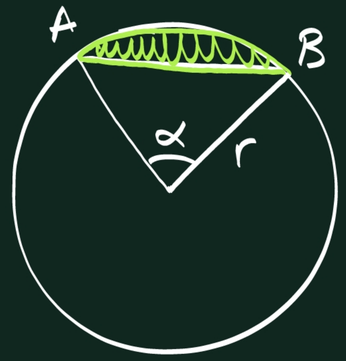


$$P = 2\pi \cdot R + 2\pi \cdot r =$$

$$= 2\pi(R + r)$$

$$A = \pi R^2 - \pi r^2 =$$

$$= \pi(R^2 - r^2)$$



SEGMENTO CIRCULAR:

$$P = 2\pi r \frac{\alpha}{360} + \overline{AB}$$

$$A = A_{SECTOR} - A_{TRIÁNGULO}$$

Página 155, Ej 31 / Página 158, Ej 68, 69

a)

$$A = A_G - A_M - 2 \cdot A_P$$

$r_G = 4\,cm$

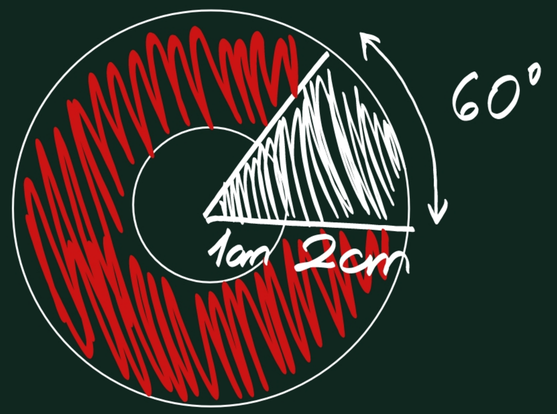
$r_M = 2\,cm$

$r_P = 1\,cm$

$$A = \pi 4^2 - \pi 2^2 - 2\pi \cdot 1^2 =$$

$$= 16\pi - 4\pi - 2\pi = 10\pi = 31{,}4\,cm^2$$

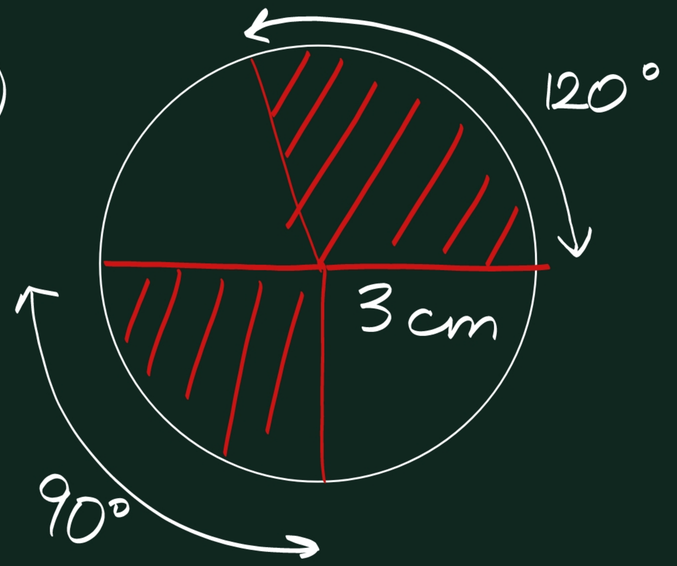
b)



$$A = \left(A_{\text{circulo G}} - A_{\text{circulo P}}\right) \cdot \frac{300}{360}$$

$$A = (\pi 9 - \pi) \cdot \frac{300}{360} = 8\pi \cdot \frac{5}{6} = 20{,}94\ cm^2$$

c)

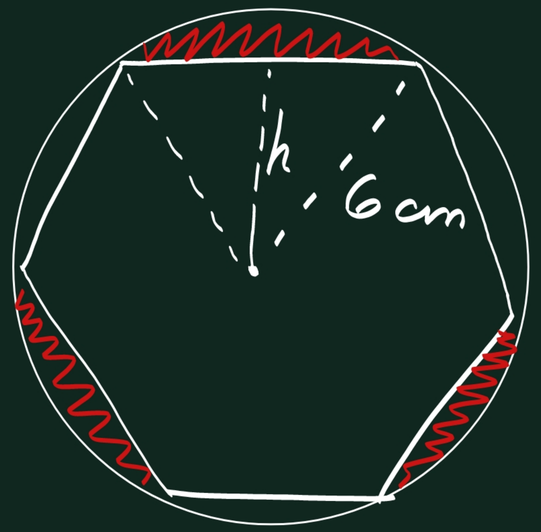


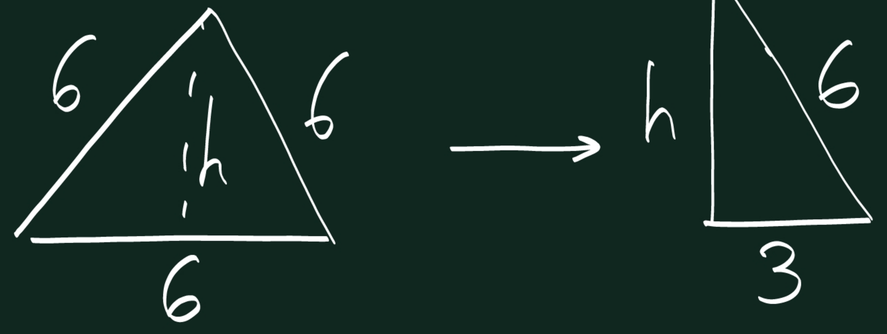
$\frac{1}{4}$ $\frac{1}{3}$

$$A = \pi r^2 \frac{90}{360} + \pi r^2 \frac{120}{360} = \pi r^2 \frac{210}{360} =$$

$$= 16{,}49\ cm^2$$

d)





$6^2 = h^2 + 3^2$

$h^2 = 6^2 - 3^2$

$h = \sqrt{36-9} = \sqrt{27}$

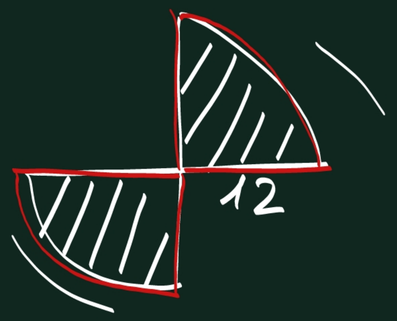
$h \simeq 5{,}2$ cm

$A = (A_{SECTOR} - A_{TRIÁNGULO}) \cdot 3$

$A = \left(\pi 6^2 \cdot \frac{1}{6} - \frac{6 \cdot 5{,}2}{2}\right) \cdot 3 = (3{,}25) \cdot 3 = 9{,}75\ cm^2$

P. 158

(68) a)



$P = ?$

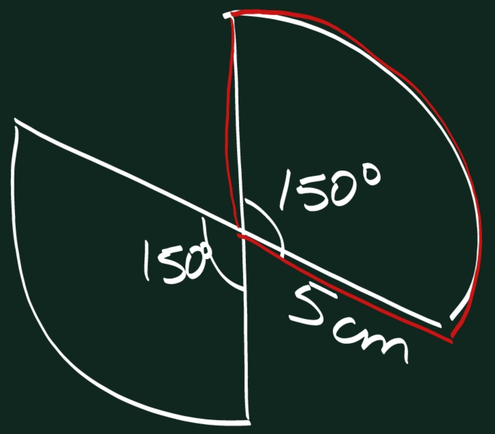
$A = ?$

$$P = 2\pi \cdot r \cdot \frac{\alpha}{360} = 2 \cdot 3'14 \cdot 12 \cdot \frac{180}{360} = 37'7\,cm$$

$$A = \pi r^2 / 2 = 3'14 \cdot 12^2 / 2 = 226'2\,cm^2$$

$37'7 + 12 \cdot 4 = 85'7\,cm$

b)

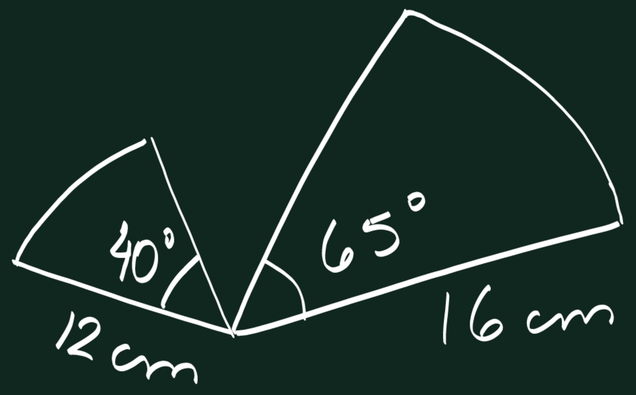


$$P = \left(\left(2\pi r \frac{\alpha}{360} + 2r\right) \cdot 2\right) =$$

$$= \left(2 \cdot 3'14 \cdot 5 \frac{150}{360} + 2 \cdot 5\right) 2 = 46'38\text{cm}$$

$$A = \left(3'14 \cdot 5^2 \frac{150}{36}\right) : 2 = 65'94\text{cm}^2$$

c)



d) $P = 99,85\ cm$

$A = 179,33\ cm^2$

$P_1 = 2\pi \cdot r \frac{\alpha}{360} + 2 \cdot r \rightarrow 2 \cdot 3'14 \cdot 12 \frac{40}{360} + 2 \cdot 12 \rightarrow P_1 = 32'37\ cm$

$P_2 = 2\pi \cdot r \frac{\alpha}{360} + 2 \cdot r \rightarrow 2 \cdot 3'14 \cdot 16 \frac{65}{360} + 2 \cdot 16 \rightarrow P_2 = 50'14\ cm$

$P = 82'51\ cm$

$A_1 = \pi \cdot r^2 \frac{\alpha}{360} \rightarrow A_1 = 3'14 \cdot 12^2 \frac{40}{360} \rightarrow A_1 = 50'24\ cm^2$

$A_2 = \pi \cdot r^2 \frac{\alpha}{360} \rightarrow A_2 = 3'14 \cdot 16^2 \frac{65}{360} \rightarrow A_2 = 145'14\ cm^2$

$A = 195'38\ cm^2$

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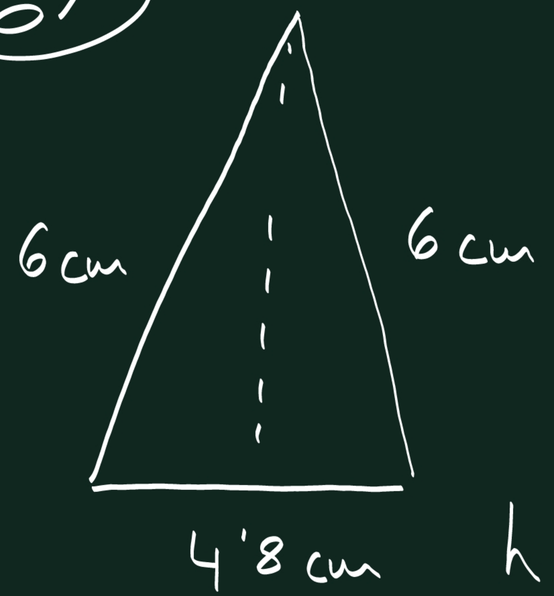

$$A = \frac{b \cdot h}{2} \rightarrow \frac{4'8 \cdot 5'5}{2} = 13,2\ cm^2$$

$$h = \sqrt{a^2 - \frac{b^2}{4}} = \sqrt{6^2 - \frac{4'8^2}{4}} = 5'5\ cm$$

$$P = b + 2a = 4'8 + 2 \cdot 6 = 16'8\ cm$$

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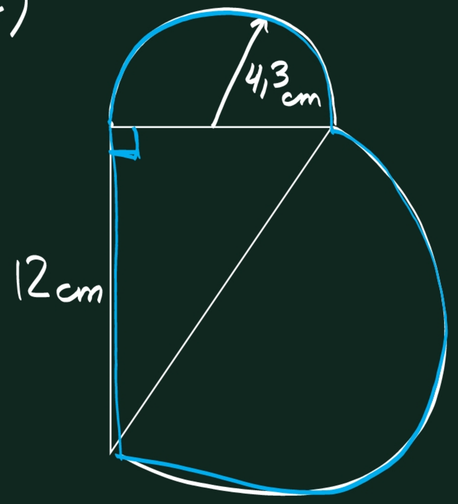
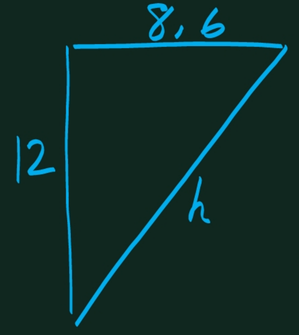
a)



$$A = \pi r^2/2 = \frac{\pi \cdot 4{,}3^2}{2} = 29{,}04\,cm^2$$



$$h = \sqrt{12^2 + 8{,}6^2} = 14{,}76\,cm$$

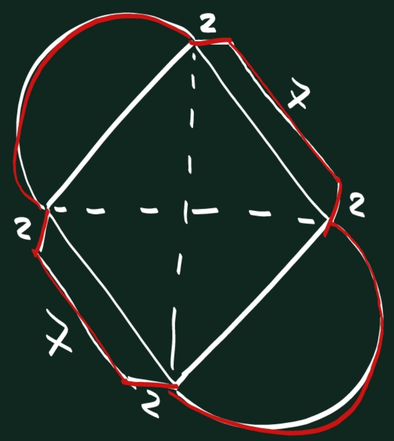
$$A = \frac{b \cdot a}{2} = \frac{12 \cdot 8{,}6}{2} = 51{,}6\,cm^2$$

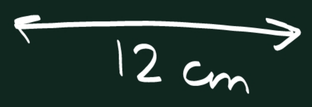
$$A = \frac{\pi r^2}{2} = \frac{\pi \cdot 7{,}38^2}{2} = 85{,}55\,cm^2$$

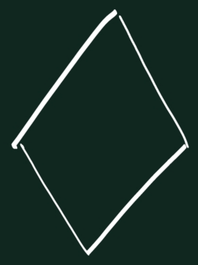
$$A_T = 29{,}04 + 51{,}6 + 85{,}55 = 166{,}19\,cm^2$$

$$P = \frac{2\pi r}{2} + \frac{2\pi R}{2} + 12 = \pi \cdot 4{,}3 + \pi \cdot 7{,}38 + 12 = 48{,}69\,cm$$

b)

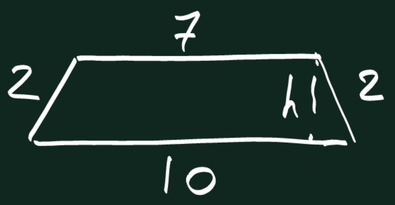


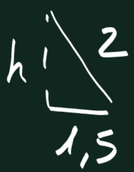




$$A_r = \frac{D \cdot d}{2} = \frac{12 \cdot 16}{2} = 96\,cm^2$$

$$c = \sqrt{8^2 + 6^2} = 10\,cm$$





$$h = \sqrt{2^2 - 1,5^2} = 1,32\,cm$$

$$A_t = \frac{(B+b) \cdot h}{2} = 11,24\,cm^2$$

$$A_{sc} = \frac{\pi r^2}{2} = \frac{\pi \cdot 5^2}{2} = 39,27\,cm^2$$

$$A_T = A_r + 2 \cdot A_t + 2 \cdot A_{sc} = 197,02\,cm^2$$