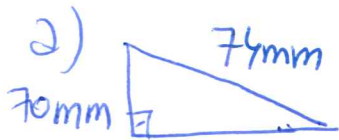


EJERCICIOS TEMA 9

9-1

p208:1] a → hipotenusa



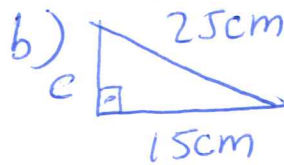
$$74^2 = 70^2 + c^2$$

$$c^2 = 74^2 - 70^2$$

$$c = \sqrt{5476 - 4900}$$

$$c = \sqrt{576}$$

$$c = 24 \text{ mm}$$



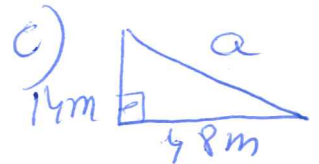
$$a^2 = b^2 + c^2$$

$$25^2 = 15^2 + c^2$$

$$c^2 = 25^2 - 15^2$$

$$c = \sqrt{625 - 225}$$

$$c = \sqrt{400} = 20 \text{ cm}$$

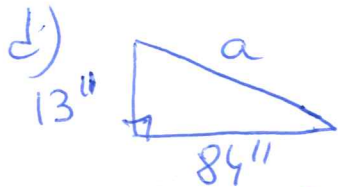


$$a^2 = 14^2 + 48^2$$

$$a = \sqrt{14^2 + 48^2}$$

$$a = \sqrt{2500}$$

$$a = 50 \text{ m}$$

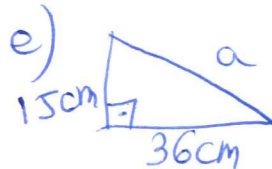


$$a^2 = 13^2 + 84^2$$

$$a = \sqrt{13^2 + 84^2}$$

$$a = \sqrt{7225}$$

$$a = 85''$$

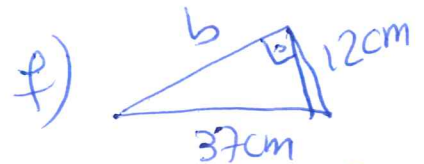


$$a^2 = 15^2 + 36^2$$

$$a = \sqrt{15^2 + 36^2}$$

$$a = \sqrt{1521}$$

$$a = 39 \text{ cm}$$



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

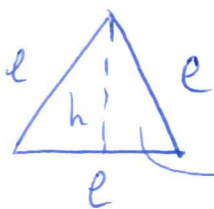
$$37^2 = b^2 + 12^2$$

$$b^2 = 37^2 - 12^2$$

$$b = \sqrt{1369 - 144}$$

$$b = 35 \text{ cm}$$

p212:1]



Por ser equilateral: $\bar{e} = \frac{P}{3} = \frac{54}{3} = 18 \text{ cm}$

Por Pitágoras:

$$18^2 = 9^2 + h^2$$



$$\frac{18}{2} = 9 \text{ cm}$$

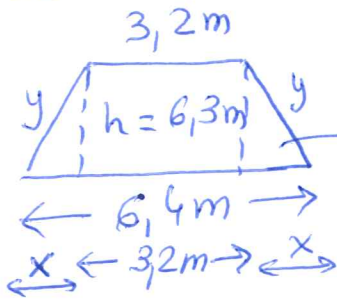
$$h = \sqrt{18^2 - 9^2} = \sqrt{243} = 15.59 \text{ cm}$$

A?

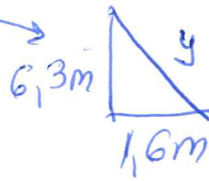
$$P = 54 \text{ cm}$$

$$A = \frac{b \cdot h}{2} = \frac{18 \cdot 15.59}{2} = 140.31 \text{ cm}^2$$

p212:2

A?
P?

$$\overline{x} = \frac{6,4 - 3,2}{2} = \frac{3,2}{2} = \underline{1,6m}$$



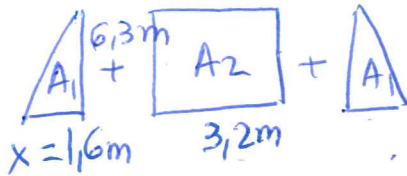
Por Pitágoras:

$$y^2 = 6,3^2 + 1,6^2$$

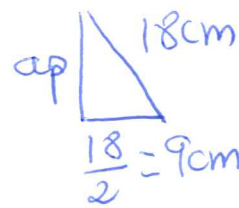
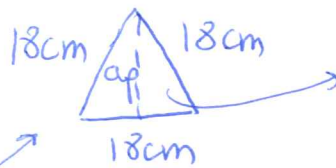
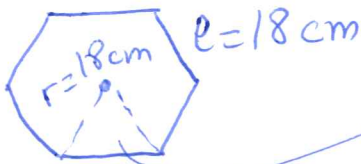
$$\overline{y} = \sqrt{39,69 + 2,56} = \underline{6,5m}$$

$$\overline{P} = 6,4 + 6,5 + 3,2 + 6,5 = \underline{22,6m}$$

$$\overline{A} = 2A_1 + A_2 = 2 \cdot \frac{x \cdot h}{2} + b \cdot h = 2 \cdot \frac{1,6 \cdot 6,3}{2} + 3,2 \cdot 6,3 = 10,08 + 20,16 = \underline{30,24m^2}$$



p212:3



Por Pitágoras:

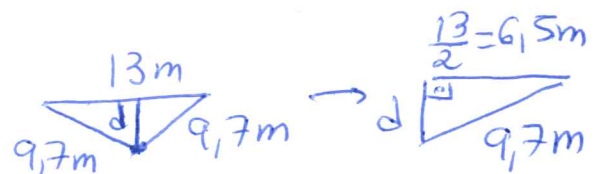
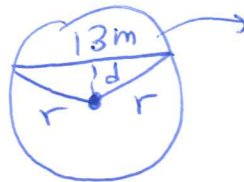
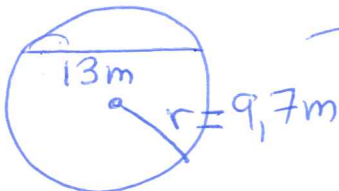
$$18^2 = 9^2 + ap^2$$

$$ap = \sqrt{18^2 - 9^2}$$

$$\overline{ap} = \underline{15,59cm}$$

$$\overline{A} = 6 \cdot A_{\text{triang}} = 6 \cdot \frac{l \cdot ap}{2} = 6 \cdot \frac{18 \cdot 15,59}{2} = \underline{841,86cm^2}$$

p212:4



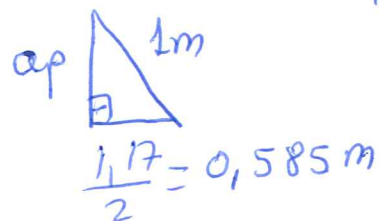
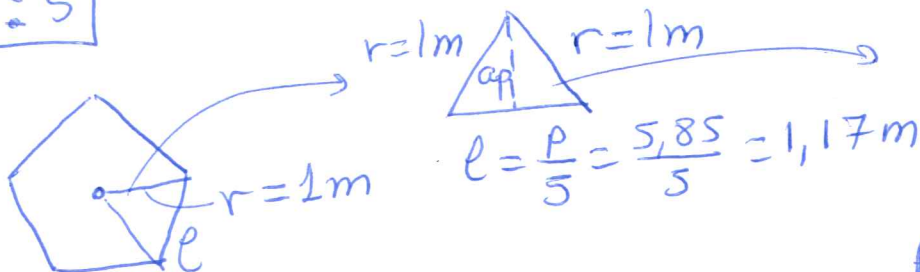
Por Pitágoras:

$$9,7^2 = 6,5^2 + d^2$$

$$\overline{d} = \sqrt{9,7^2 - 6,5^2} = \underline{7,2m}$$

p212:5

9.3



$$P = 5,85m$$

A?

Por Pitágoras:

$$1^2 = 0,585^2 + ap^2$$

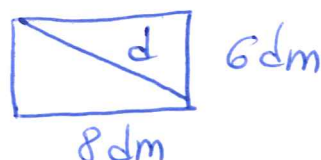
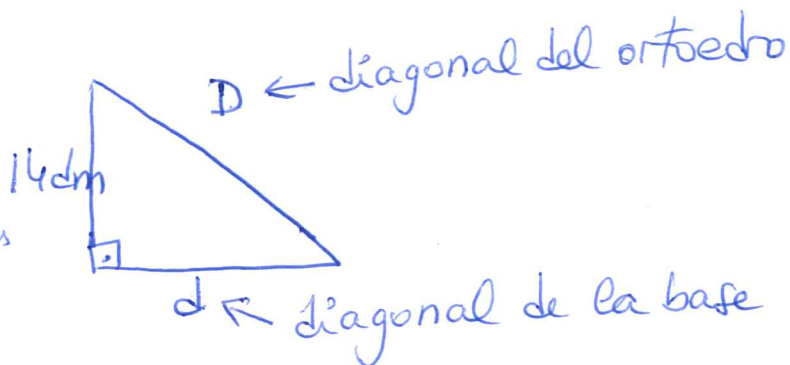
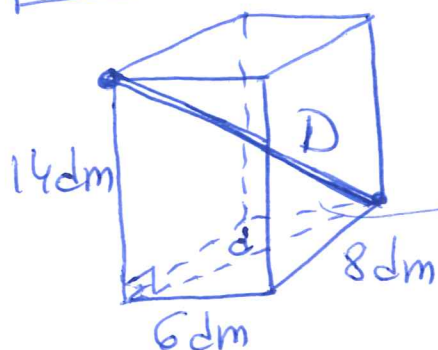
$$ap = \sqrt{1^2 - 0,585^2}$$

$$ap = 0,81m$$

$$A = 5 \cdot A_{\text{triángulo}} = 5 \cdot \frac{b \cdot h}{2} = 5 \cdot \frac{l \cdot ap}{2}$$

$$A = 5 \cdot \frac{1,17 \cdot 0,81}{2} = \boxed{2,37m^2}$$

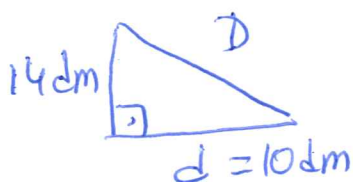
p212:6



(Ver p212 Para fixar ideas n°12)

Por Pitágoras: $d^2 = 6^2 + 8^2$

$$d = \sqrt{36 + 64} = \underline{10dm}$$



otra vez por Pitágoras:

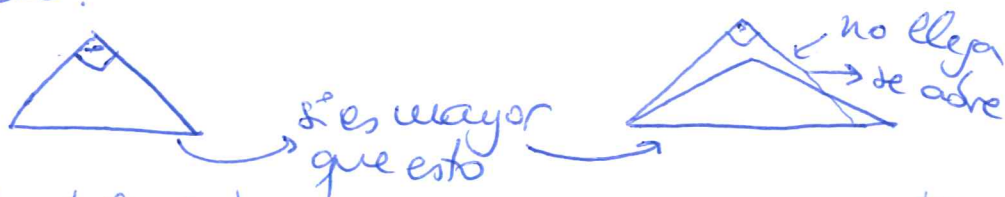
$$D^2 = 14^2 + 10^2$$

$$D = \sqrt{14^2 + 10^2} = \sqrt{296}$$

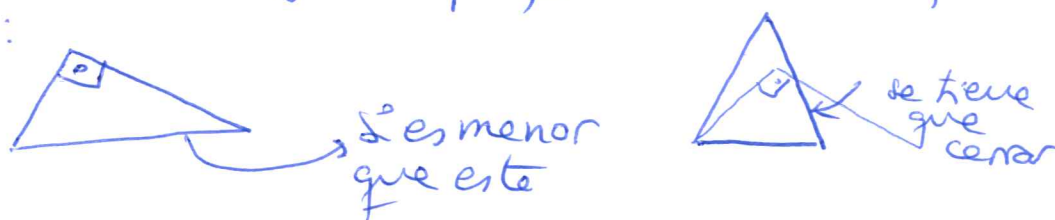
$$D = \boxed{17,20dm}$$

p213:1]

- Si es rectángulo se cumple el T^a de Pitágoras, siendo la hipotenusa el lado más largo.
- Si el lado más largo al cuadrado es mayor que la suma de los cuadrados de los 2 pequeños, quiere decir que los lados pequeños se tienen que abrir más que 90° para alcanzar al lado mayor $\rightarrow$ obtusángulo.



- Si el cuadrado del lado mayor es menor, entonces el triángulo es acutángulo porque se tienen que juntar más:



a) 15, 10, 11 cm

$$15^2 = 225$$

$$10^2 + 11^2 = 100 + 121 = 221$$

 $\rightarrow 225 > 221 \rightarrow \text{OBTUSÁNGULO}$

(Para ser rectángulo el lado mayor debería ser

$$\sqrt{221} = 14'87 < 15$$

b) 35, 12, 37 m

$$37^2 = 1369$$

$$35^2 + 12^2 = 1369$$

 $\rightarrow \text{Rectángulo.}$

c) 23, 28, 21 dm

$$28^2 = 784$$

$$23^2 + 21^2 = 970$$

 $\rightarrow 784 < 970 \rightarrow \text{ACUTÁNGULO}$

(Para ser rectángulo la hipotenusa debería valer

$$\sqrt{970} = 31'14 > 28$$

d) 14, 48, 50 m

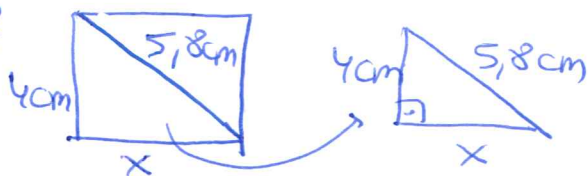
$$50^2 = 2500$$

$$14^2 + 48^2 = 2500$$

 $\rightarrow \text{Rectángulo}$

p213:3

P?



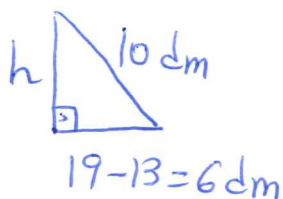
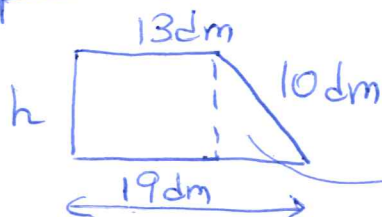
Por Pitágoras:

$$5,8^2 = 4^2 + x^2$$

$$x = \sqrt{5,8^2 - 4^2} = 4,2 \text{ cm}$$

$$P = 2 \cdot 4 + 2 \cdot 4,2 = 8 + 8,4 = 16,4 \text{ cm}$$

p213:4



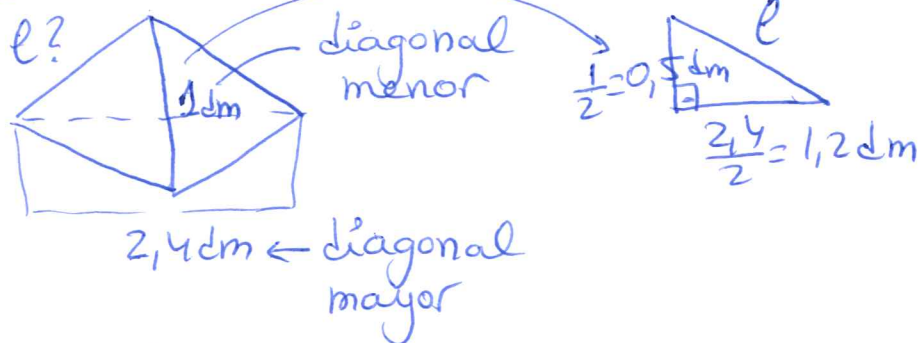
$$10^2 = h^2 + 6^2$$

$$h^2 = 10^2 - 6^2$$

$$h = \sqrt{100 - 36} = 8 \text{ dm}$$

p213:5

e?



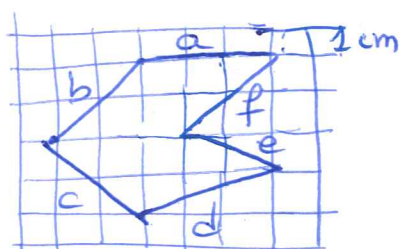
Por Pitágoras:

$$e^2 = 0,5^2 + 1,2^2$$

$$e = \sqrt{1,69}$$

$$e = 1,3 \text{ dm}$$

p213:7



P?

$$a = 3 \text{ cm}$$

$$b \rightarrow b = \sqrt{2^2 + 2^2} = \sqrt{8} = 2,83 \text{ cm}$$

$$c = b = 2,83 \text{ cm}$$

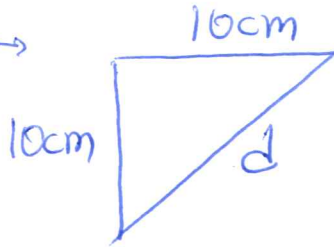
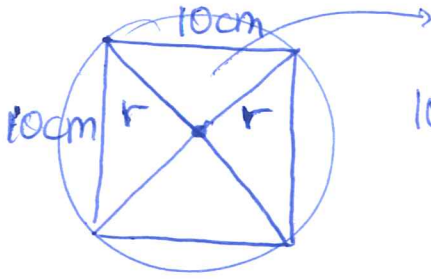
$$d \rightarrow d = \sqrt{1^2 + 3^2} = \sqrt{10} = 3,16 \text{ cm}$$

$$e \rightarrow e = \sqrt{1^2 + 2^2} = \sqrt{5} = 2,24 \text{ cm}$$

$$f = b = 2,83 \text{ cm}$$

$$P = 3 + 2,83 \cdot 3 + 3,16 + 2,24 = 16,89 \text{ cm}$$

p213:8

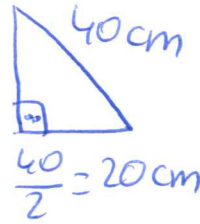
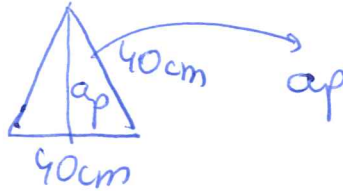
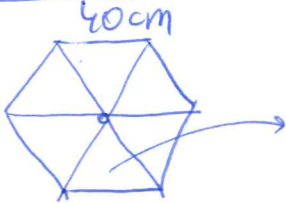


$$d^2 = 10^2 + 10^2$$

$$d = \sqrt{200} = 14,14$$

$$\boxed{r = \frac{d}{2} = \frac{14,14}{2} = 7,07 \text{ cm}}$$

p213:9



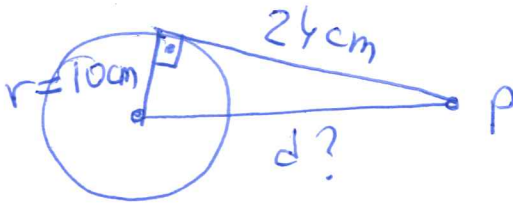
$$40^2 = 20^2 + ap^2$$

$$ap^2 = 40^2 - 20^2$$

$$ap = \sqrt{1600 - 400}$$

$$\boxed{ap = 34,64 \text{ cm}}$$

p213:11

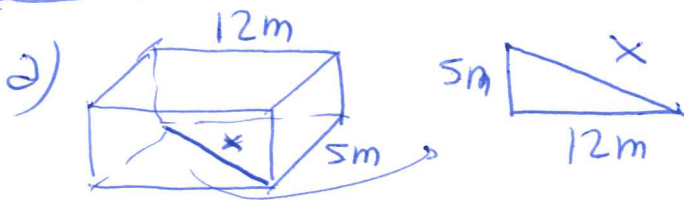


Por Pitágoras:

$$d^2 = 24^2 + 10^2$$

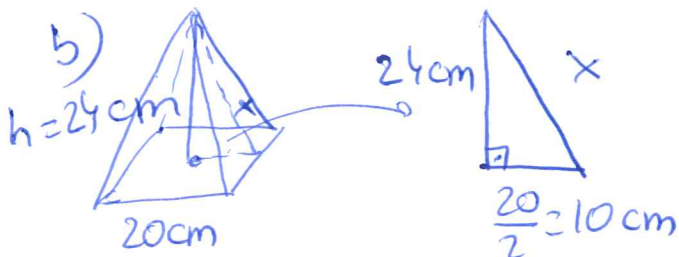
$$\boxed{d = \sqrt{24^2 + 10^2} = 26 \text{ cm}}$$

p24:12



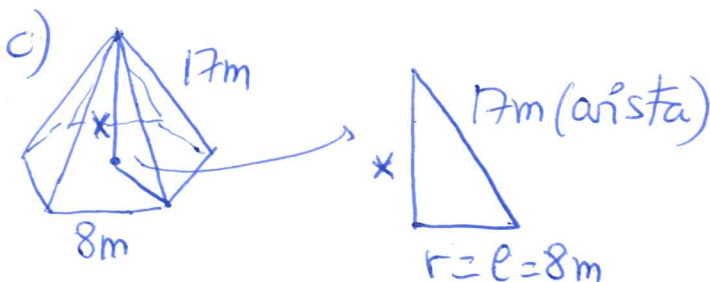
$$x^2 = 5^2 + 12^2$$

$$\boxed{x = \sqrt{5^2 + 12^2} = 13 \text{ m}}$$



$$x^2 = 24^2 + 10^2$$

$$\boxed{x = \sqrt{24^2 + 10^2} = 26 \text{ cm}}$$

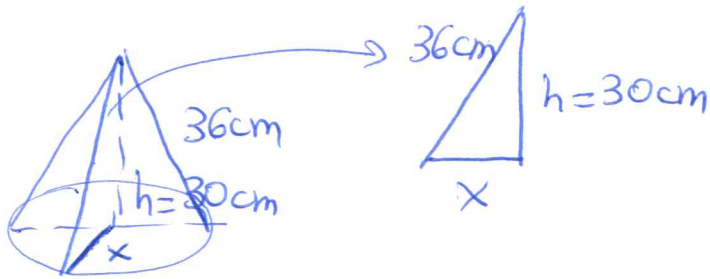


$$17^2 = 8^2 + x^2$$

$$x^2 = 17^2 - 8^2$$

$$\boxed{x = \sqrt{17^2 - 8^2} = 15 \text{ m}}$$

d)

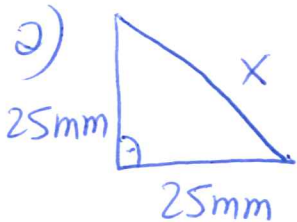


$$36^2 = 30^2 + x^2$$

$$x^2 = 36^2 - 30^2$$

$$\boxed{x = \sqrt{36^2 - 30^2} = 19,9 \text{ cm}}$$

p214:13 | A? P?

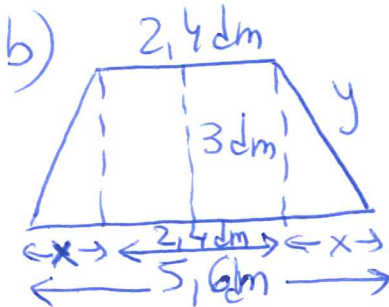


$$x^2 = 25^2 + 25^2$$

$$\boxed{x = \sqrt{1250} = 35,36 \text{ mm}}$$

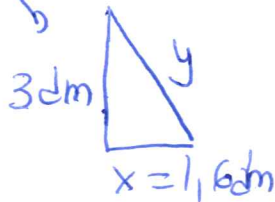
$$\boxed{P = 25 + 25 + 35,36 = 85,36 \text{ mm}}$$

$$\boxed{A = \frac{b \cdot h}{2} = \frac{25 \cdot 25}{2} = 312,5 \text{ mm}^2}$$



$$2x + 2,4 = 5,6$$

$$\boxed{x = \frac{5,6 - 2,4}{2} = 1,6 \text{ dm}}$$

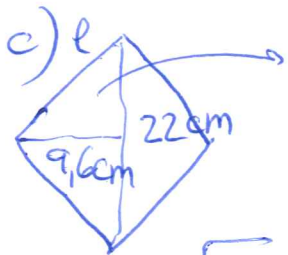


$$y^2 = 3^2 + 1,6^2$$

$$\boxed{y = \sqrt{9 + 2,56} = 3,4 \text{ dm}}$$

$$\boxed{P = 3,4 + 2,4 + 3,4 + 5,6 = 14,8 \text{ dm}}$$

$$\boxed{A = 2 \cdot A_{\text{triang}} + A_{\text{rect.}} = 2 \cdot \frac{1,6 \cdot 3}{2} + 2,4 \cdot 3 = 4,8 + 7,2 = 12 \text{ dm}^2}$$



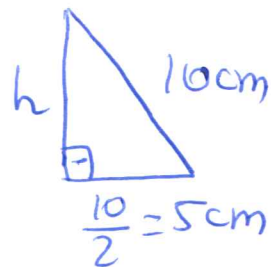
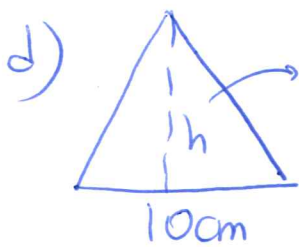
$$\frac{22}{2} = 11 \text{ cm}$$

$$e^2 = 11^2 + 9,6^2$$

$$\boxed{e = 14,6 \text{ cm}}$$

$$\boxed{A = 4 \cdot A_{\text{triang}} = 4 \cdot \frac{9,6 \cdot 11}{2} = 211,2 \text{ cm}^2}$$

$$\boxed{P = 4 \cdot e = 4 \cdot 14,6 = 58,4 \text{ cm}}$$



$$10^2 = h^2 + 5^2$$

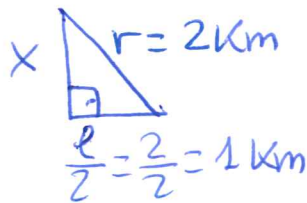
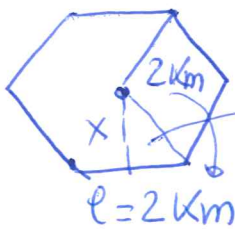
$$h^2 = 10^2 - 5^2$$

$$h = \sqrt{100 - 25} = \sqrt{75} = 8,66 \text{ cm}$$

$$\boxed{\bar{P} = 3 \cdot 10 = 30 \text{ cm}}$$

$$\boxed{\bar{A} = \frac{b \cdot h}{2} = \frac{10 \cdot 8,66}{2} = 43,3 \text{ cm}^2}$$

e)



$$2^2 = x^2 + 1^2$$

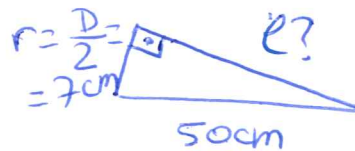
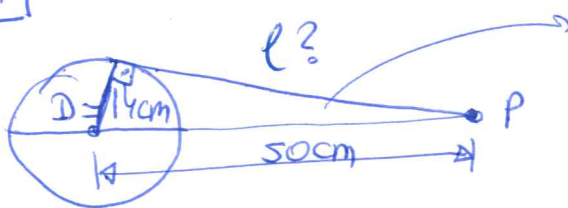
$$x^2 = 2^2 - 1^2$$

$$\boxed{x = \sqrt{4 - 1} = \sqrt{3} = 1,73 \text{ km}}$$

$$\boxed{\bar{P} = 6 \cdot 2 = 12 \text{ km}}$$

$$\boxed{\bar{A} = \frac{6 \cdot l \cdot x}{2} = \frac{6 \cdot 2 \cdot 1,73}{2} = 10,38 \text{ km}^2}$$

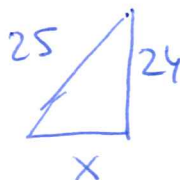
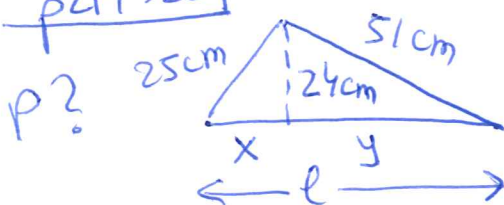
p214:19



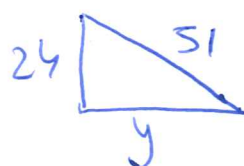
$$50^2 = 7^2 + l^2$$

$$\boxed{l = \sqrt{50^2 - 7^2} = 49,51 \text{ cm}}$$

p214:20



$$\boxed{x = \sqrt{25^2 - 24^2} = 7 \text{ cm}}$$

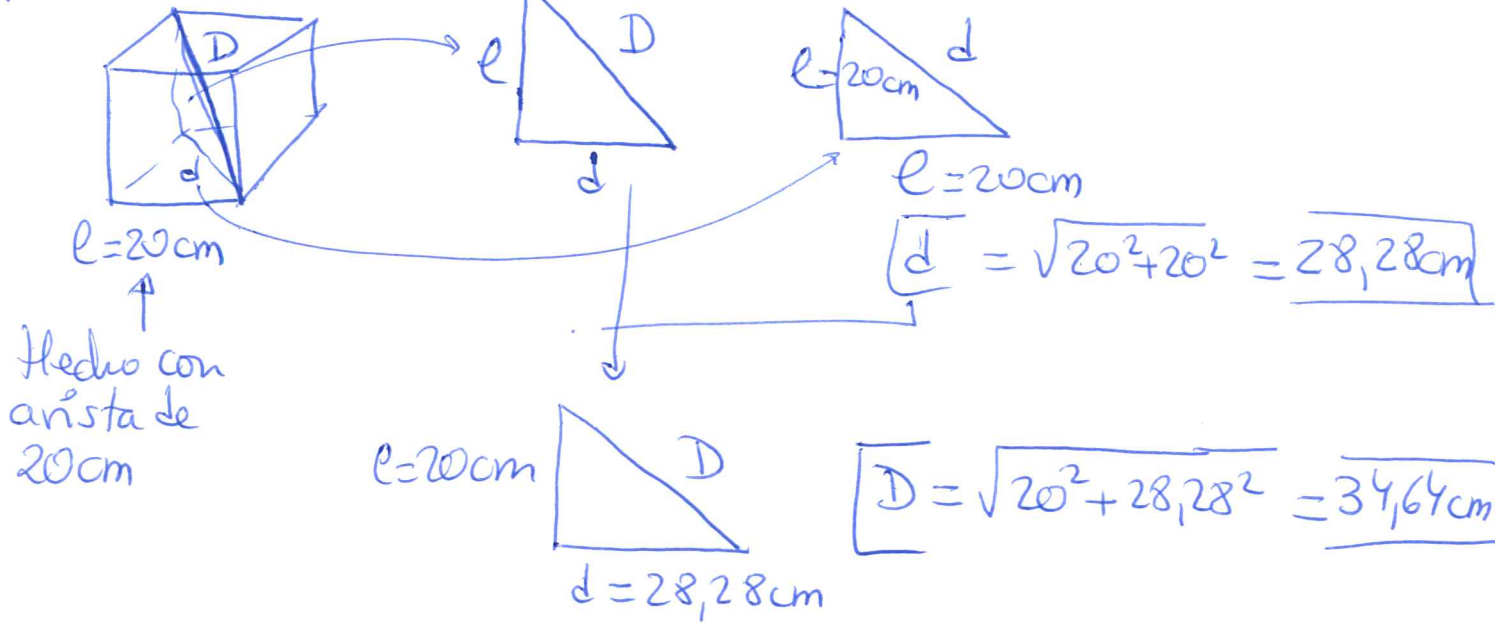


$$\boxed{y = \sqrt{51^2 - 24^2} = 45 \text{ cm}}$$

$$\boxed{l = x + y = 7 + 45 = 52 \text{ cm}}$$

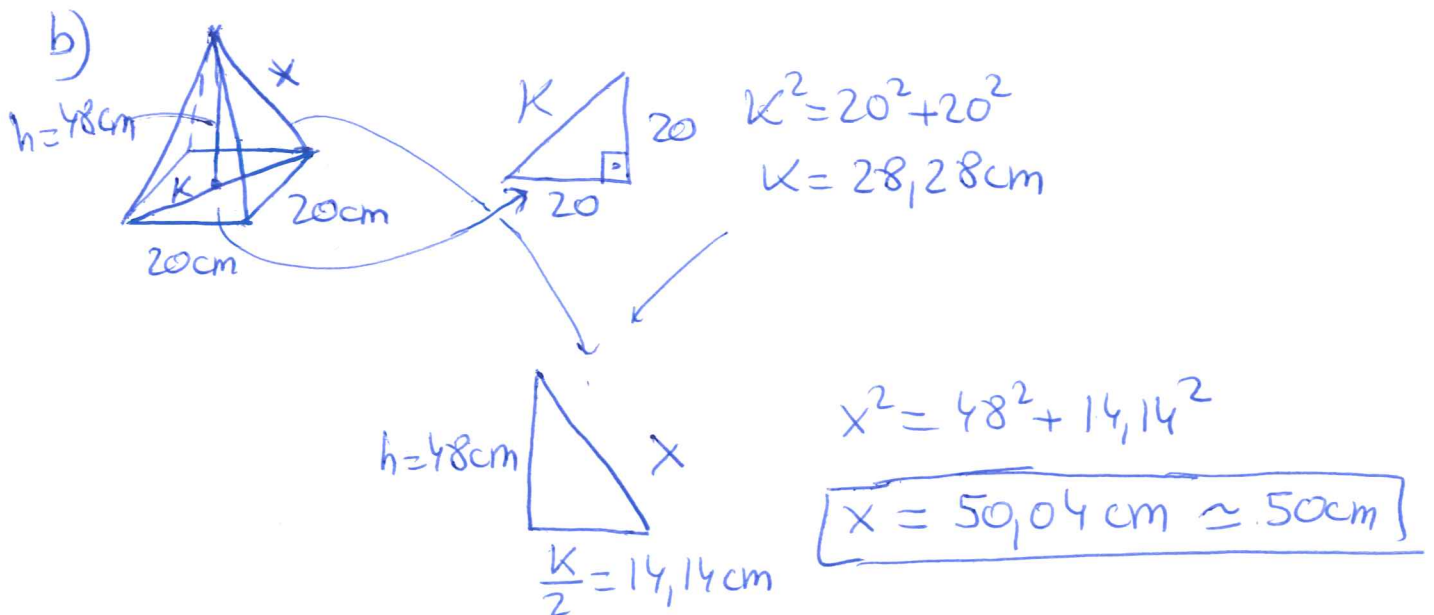
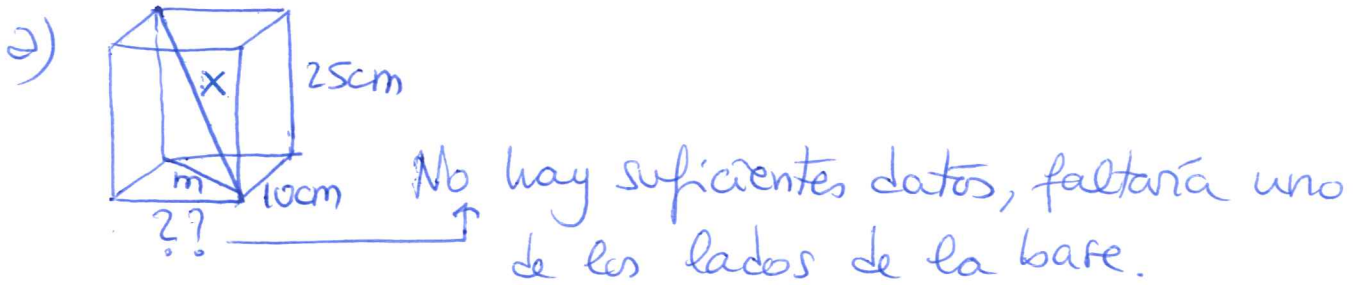
$$\boxed{P = 25 + 51 + 52 = 128 \text{ cm}}$$

p214: 211

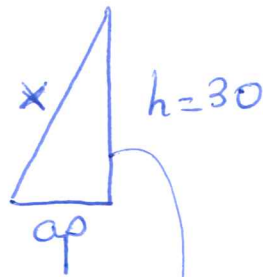
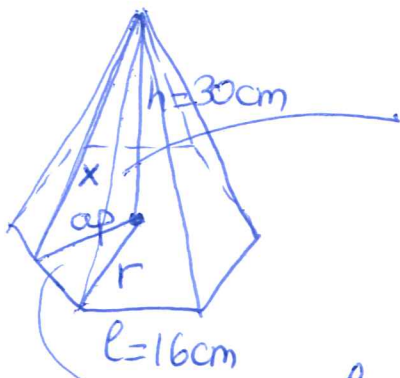


*Con la arista de 30 cm, la diagonal $D = 51,96 \text{ cm}$

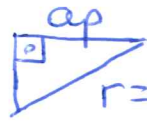
p215: 241



c)

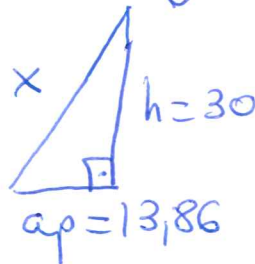


$$\frac{l}{2} = 8$$



$$r = l = 16 \rightarrow 16^2 = 8^2 + ap^2$$

$$\boxed{ap = \sqrt{16^2 - 8^2} = 13,86 \text{ cm}}$$

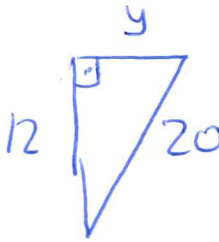
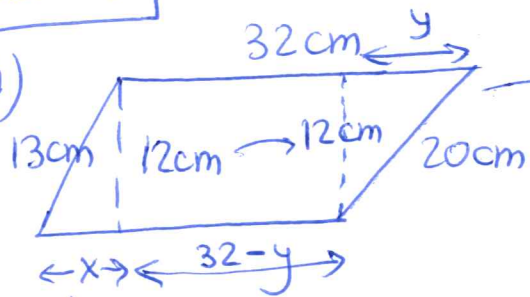


$$x^2 = 30^2 + 13,86^2$$

$$\boxed{x = 33,05 \approx 33 \text{ cm}}$$

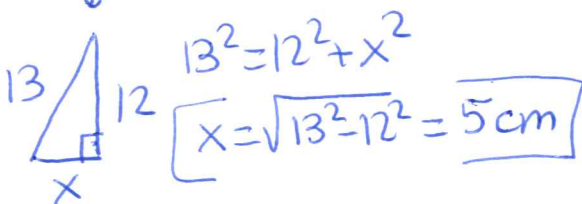
p215:25

a)



$$20^2 = 12^2 + y^2$$

$$\boxed{y = 16 \text{ cm}}$$

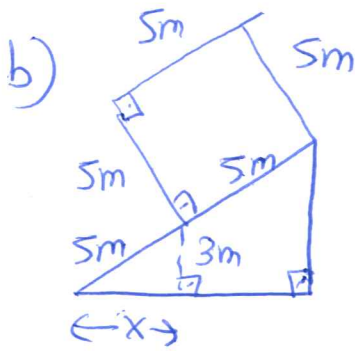


$$13^2 = 12^2 + x^2$$

$$\boxed{x = \sqrt{13^2 - 12^2} = 5 \text{ cm}}$$

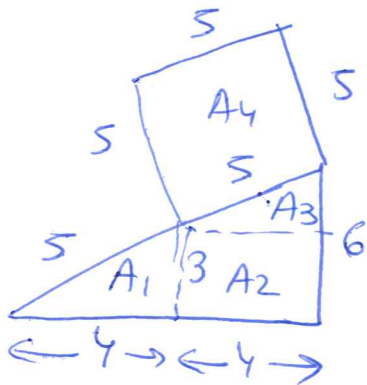
$$\boxed{P = 13 + 32 + 20 + (32 - 16) + 5 = 86 \text{ cm}}$$

$$\boxed{A = \frac{12 \cdot 5}{2} + (32 - 16) \cdot 12 + \frac{16 \cdot 12}{2} = 318 \text{ cm}^2}$$

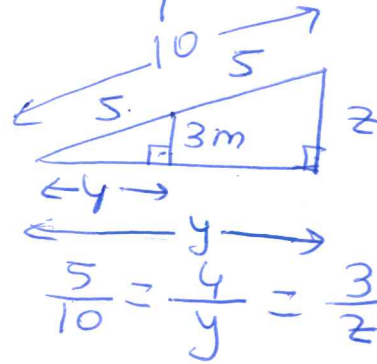


$$5^2 = 3^2 + x^2$$

$$\boxed{x = \sqrt{25 - 9} = 4 \text{ cm}}$$



Por semelhança:



$$\frac{5}{10} = \frac{4}{y}$$

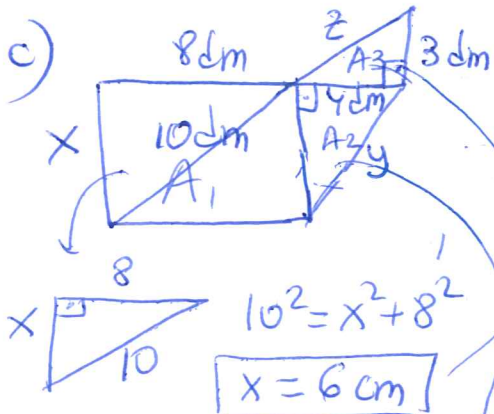
$$\boxed{y = 8 \text{ cm}}$$

$$\frac{5}{10} = \frac{3}{z}$$

$$\boxed{z = 6 \text{ cm}}$$

$$\boxed{P = 5 + 5 + 5 + 5 + 6 + 4 + 4 = 34 \text{ m}}$$

$$\boxed{A = A_1 + A_2 + A_3 + A_4 = \frac{4 \cdot 3}{2} + 4 \cdot 3 + \frac{4 \cdot 3}{2} + 5 \cdot 5 = 49 \text{ m}^2}$$



$$\boxed{A = A_1 + A_2 + A_3 = 8 \cdot 6 + \frac{4 \cdot 6}{2} + \frac{3 \cdot 4}{2} = 66 \text{ dm}^2}$$

$$y^2 = 6^2 + 4^2$$

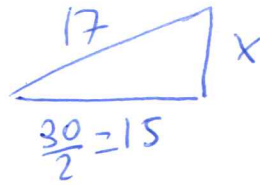
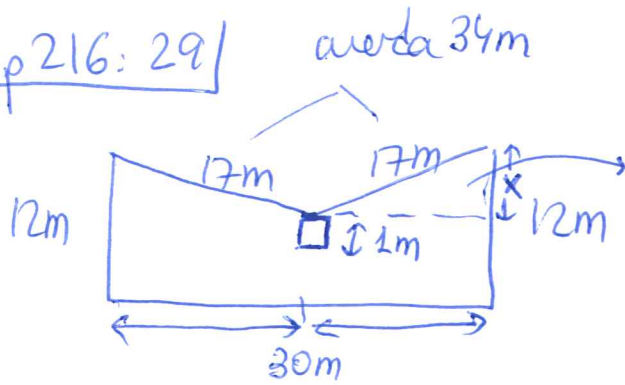
$$\boxed{y = 7.2 \text{ cm}}$$

$$z^2 = 3^2 + 4^2$$

$$\boxed{z = 5 \text{ cm}}$$

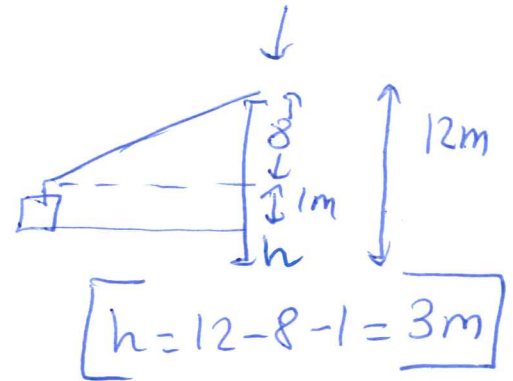
$$\boxed{P = 8 + 6 + 8 + 7.2 + 3 + 5 = 37.2 \text{ cm}}$$

p216: 29



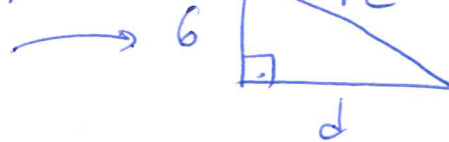
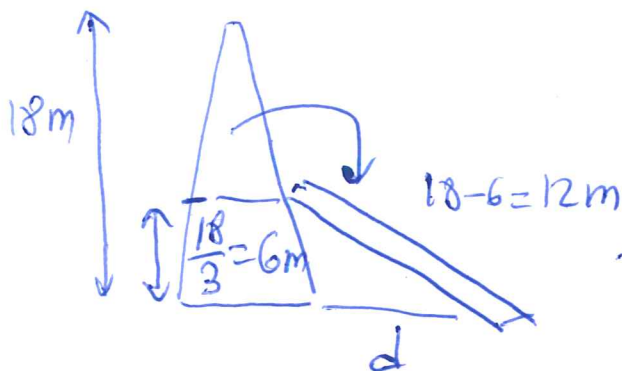
$$17^2 = 15^2 + x^2$$

$$x = \sqrt{17^2 - 15^2} = 8$$



$$h = 12 - 8 - 1 = 3m$$

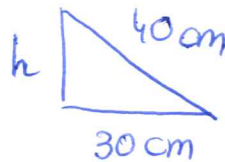
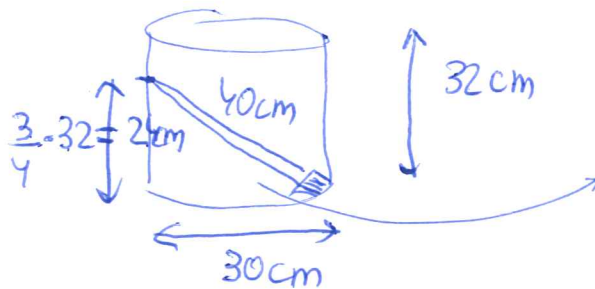
p216: 30



$$12^2 = 6^2 + d^2$$

$$d = \sqrt{12^2 - 6^2} = 10,39m$$

p216: 31

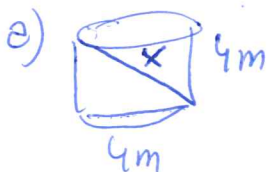


$$40^2 = h^2 + 30^2$$

$$h = \sqrt{40^2 - 30^2} = 26,46cm$$

Sol: Como el bote tiene pintura hasta 24cm, no queda todo el pincel sumergido

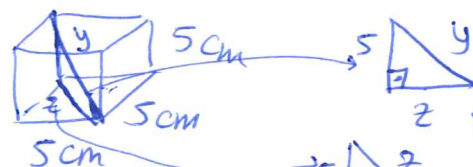
p216: 32



$$x^2 = 4^2 + 4^2$$

$$x = \sqrt{16 + 16} = 5,66m$$

b)

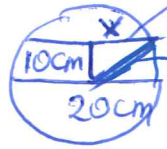
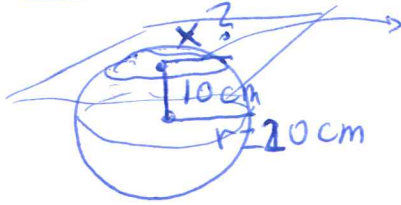


$$z = \sqrt{5^2 + 5^2} = 7,07cm$$

Este es el mayor

$$y = \sqrt{5^2 + 7,07^2} = 8,66m$$

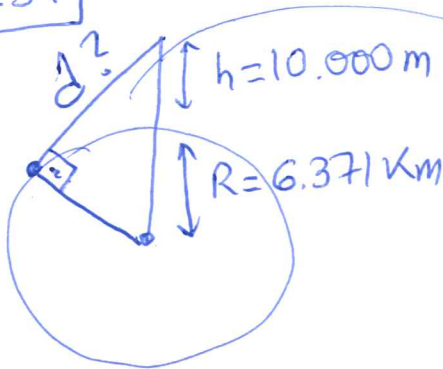
p217:33



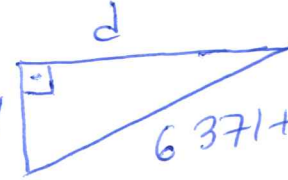
$$20^2 = 10^2 + x^2$$

$$x = \sqrt{20^2 - 10^2} = 17,32 \text{ cm}$$

p217:34



$$R = 6371$$

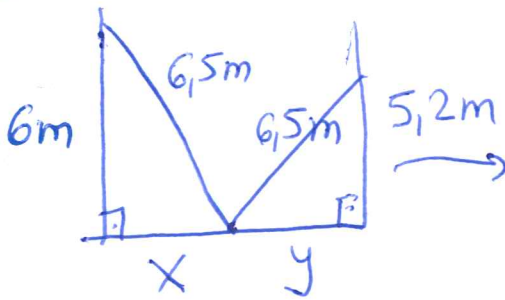


$$6371 + 10000 = 16371$$

$$16371^2 = 6371^2 + d^2$$

$$d = \sqrt{16371^2 - 6371^2} = 15080,45 \text{ km}$$

p217:35



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

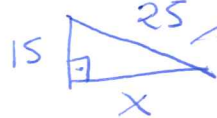
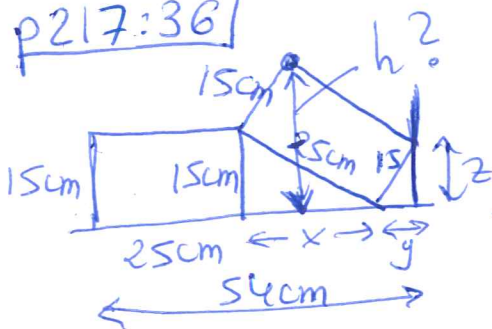
$$y = \sqrt{6,5^2 - 5,2^2} = 3,9 \text{ m}$$

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

$$x = \sqrt{6,5^2 - 6^2} = 2,5 \text{ m}$$

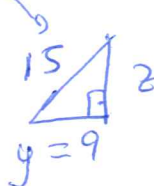
Sol: la anchura de la calle es $2,5 + 3,9 = 6,4 \text{ m}$

p217:36



$$x = \sqrt{25^2 - 15^2} = 20 \text{ cm}$$

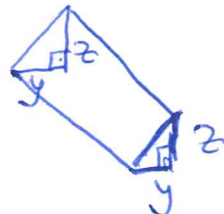
$$y = 54 - 25 - 20 = 9 \text{ cm}$$



$$15^2 = z^2 + 9^2$$

$$z = \sqrt{15^2 - 9^2} = 12 \text{ cm}$$

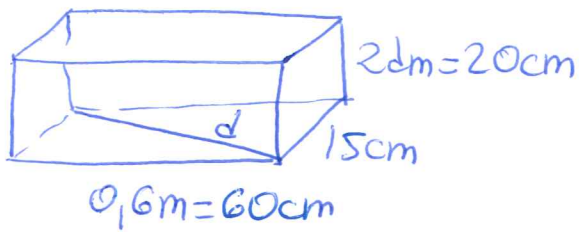
Este triángulo es como el superior:



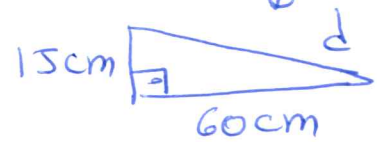
$$h = 15 + z = 15 + 12 = 27 \text{ cm}$$

Sol: La mosca está a 27cm

p217:37



Alaundia de 20cm x 62cm

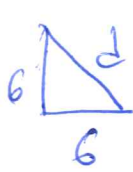
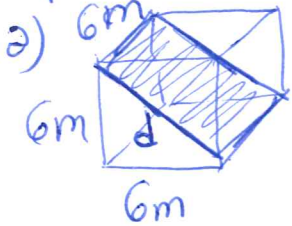
cabe de
aetola mayor
dimensión
es "d"

$$d^2 = 60^2 + 15^2$$

$$d = \sqrt{60^2 + 15^2} = 61,84 \text{ cm}$$

Sl: $61,84 \text{ cm} < 62 \Rightarrow \text{No cabe}$

p217:38

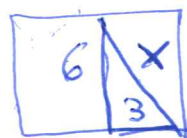
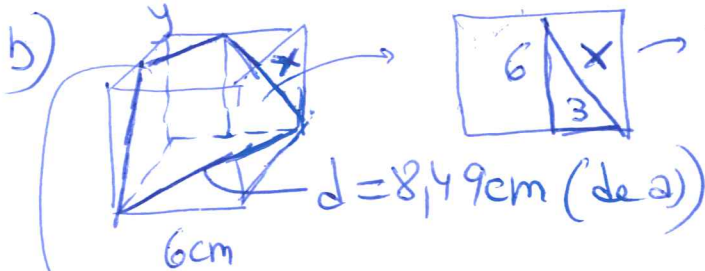


$$d^2 = 6^2 + 6^2$$

$$d = 8,49 \text{ m}$$

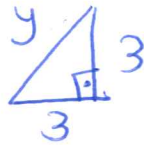
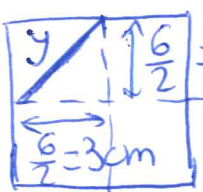
$$P = 2 \cdot 8,49 + 2 \cdot 6 = 28,98 \text{ m}$$

$$A = b \cdot h = 6 \cdot 8,49 = 50,94 \text{ m}^2$$



$$x^2 = 6^2 + 3^2$$

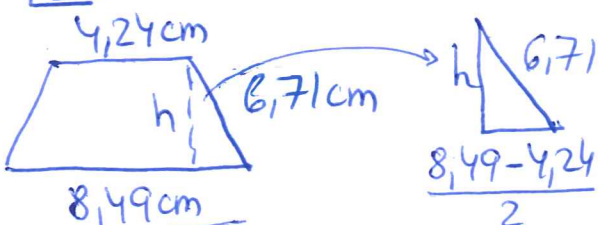
$$x = 6,71 \text{ cm}$$



$$y^2 = 3^2 + 3^2$$

$$y = 4,24 \text{ cm}$$

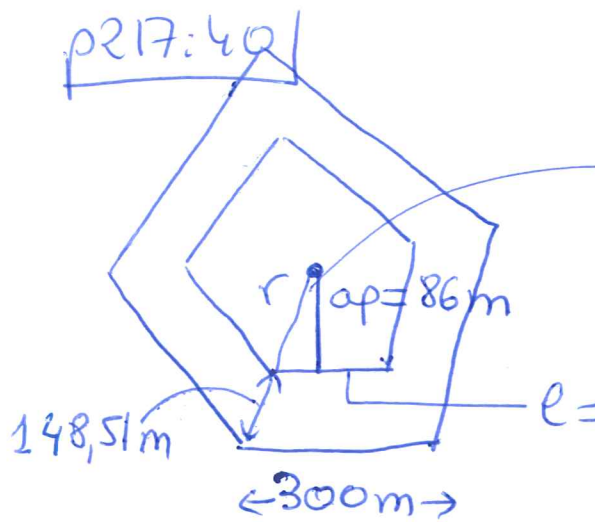
$$P = 8,49 + 2 \cdot 6,71 + 4,24 = 26,15 \text{ cm}$$



$$h = \sqrt{6,71^2 - 2,125^2} = 6,36 \text{ cm}$$

$$\frac{8,49 - 4,24}{2} = 2,125$$

$$A_1 = 4,24 \cdot 6,36 + 2 \cdot \frac{2,125 \cdot 6,36}{2} = 40,48 \text{ cm}^2$$

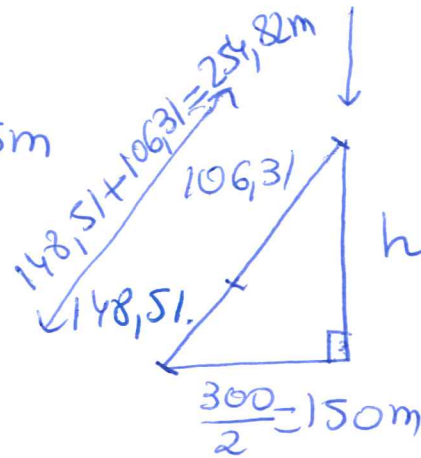


$$r = ap = 86m$$

$$\frac{125}{2} = 62,5m$$

$$r^2 = 86^2 + 62,5^2$$

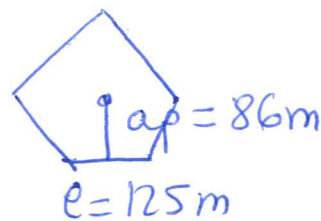
$$r = 106,31m$$



$$254,82^2 = 150^2 + h^2$$

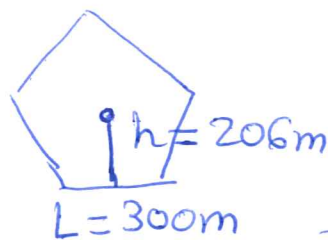
$$h = \sqrt{254,82^2 - 150^2} = 206m$$

• Pentágono pequeño:



$$Ap = \frac{P \cdot ap}{2} = \frac{5 \cdot 125 \cdot 86}{2} = 26.875m^2$$

• Pentágono grande:



$$Ag = \frac{P \cdot ap}{2} = \frac{5 \cdot 300 \cdot 206}{2} = 154.500m^2$$

$$A_{\text{construida}} = Ag - Ap = 154.500 - 26.875 = 127.625m^2$$

Sol: La planta del Pentágono es de $154.500m^2$ y construidos hay $127.625m^2$