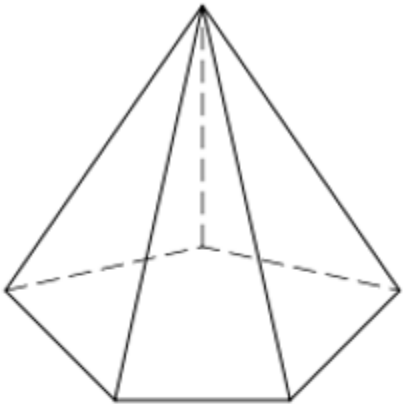
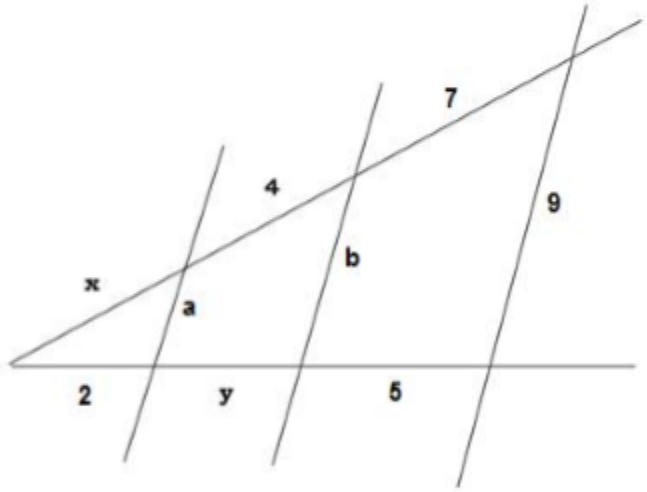
GEOMETRY - 4º ESO

Exercise 1: (2 ptos) Work out the value of the area of a pentagonal pyramid with altitude 10 cm if the length of the side of the base is 7 cm and the length of its edge is 12 cm.



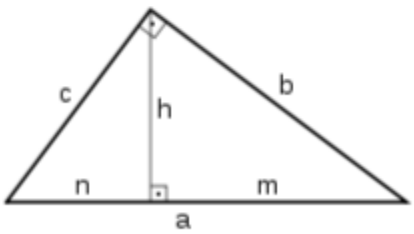
$A_{LAT} = 200.87 \text{ cm}^2$
$A_{BASE} = 98.61 \text{ cm}^2$
$A_{PYR} = 299.48 \text{ cm}^2$

Exercise 2: (1 pto) Find the values of the indeterminates in the following figure



$x = 2.8 \text{ cm}$
$m = 2.86 \text{ cm}$
$a = 1.83 \text{ cm}$
$b = 4.47 \text{ cm}$

Exercise 3: (1 pto) Knowing that you are not allowed to use Pythagoras' theorem, find the value of all the indeterminates in the following triangle knowing that $a = 20 \text{ cm}$ and $c = 12 \text{ cm}$. Indicate what theorem you are using in each step



$n = 7.2 \text{ cm}$
$m = 12.8 \text{ cm}$
$h = 9.6 \text{ cm}$
$b = 16 \text{ cm}$

Exercise 4: (1 pto) Given the vectors $\vec{u}=(3,2)$, $\vec{v}=(\sqrt{3},\sqrt{2})$, $\vec{w}=(4,-6)$ and $\vec{z}=(5,-1)$

a) Find the magnitude of the vector $\vec{v}$ $\boxed{|\vec{v}|=\sqrt{5}}$

b) Express $\vec{w}$ as a linear combination of $\vec{u}$ and $\vec{z}$ $\boxed{\vec{w}=-2\vec{u}+2\vec{z}}$

c) Are $\vec{u}$ and $\vec{z}$ perpendicular vectors? $\vec{u}\cdot\vec{z}=13\neq 0 \rightarrow$ Nope

d) Indicate the coordinates of the vector $\vec{u}+3\vec{w}-2\vec{z}=(5,-14)$

Exercise 5: (1 pto)

a) If $\vec{u}=(2,-1)$ and $\vec{v}=(3,5)$ find a third vector $\vec{w}$ so that $\vec{w}\cdot\vec{u}=1$ and $\vec{w}\perp\vec{v}$

$\boxed{\vec{w}=\left(\frac{5}{13},\frac{-3}{13}\right)}$

b) Indicate a direction vector and a point of the straight line $3x-y+4=0 \rightarrow \begin{cases}P'(0,4)\\ \vec{u}=(1,3)\end{cases}$

Exercise 6: (1.5 ptos) Given the straight line

$$r\equiv\begin{cases}4+3t\\ 2t-1\end{cases}$$

a) Find the general equation of a parallel line r' that passes through the point $A(-2,5)$

$\boxed{2x-3y+19=0}$

b) Find the general equation a perpendicular line r'' that passes through the point $B(-4,1)$

$\boxed{3x+2y+10=0}$

c) Find the point where r and r'' cross $\boxed{P=\left(\frac{8}{5},\frac{-37}{5}\right)}$

Exercise 7: (1.5 ptos)

a) Determine if the points $A(3,6)$, $B(-3,2)$ and $C(0,4)$ are aligned. If the answer is *yes*, find the continuous equation of the straight line they belong to.

Yes, they are aligned $\rightarrow$ $\boxed{2x-3y+12=0}$

b) Work out the coordinates of the symmetric point of $P(3,1)$ with respect to $Q(-3,7)$ $\boxed{P'(-9,13)}$

c) Find the value of *k* so that the point $R(k,-2)$ belongs to the straight line

$$r\equiv\begin{cases}2-3t\\ -1+4t\end{cases} \qquad \boxed{k=\frac{11}{4}}$$

Exercise 8: (1 pto) Los puntos $A(1,1)$, $B(5,4)$ y $C(5,-1)$ son los tres vértices de un triángulo.

a) Calcula la altura del triángulo tomando como base el lado $\overline{AC}$ $\boxed{h=\sqrt{20}\text{ cm}}$

b) Halla el perímetro y el área de dicho triángulo. $\boxed{P=10+\sqrt{20}\text{ cm}}$ $\boxed{A=10\text{ cm}^2}$