GEOMETRY TEST – 4º ESO

Exercise 1: (1 pto)

a) Write the continuous equation of the straight line given by $r \equiv 7x + 5y - 19 = 0$

$$\boxed{\dfrac{x-2}{5} = \dfrac{y-1}{-7}} \quad \rightarrow \quad \boxed{\dfrac{x-2}{5} = \dfrac{1-y}{7}}$$

b) Find the general equation of a straight line r' that's perpendicular to r and goes through the point $P(5,-2)$

$$\boxed{5x - 7y - 39 = 0}$$

Exercise 2: (1.5 ptos)

a) Find the symmetric of the point $Q(3,-7)$ with respect to $R(2,5)$ $\boxed{Q'(1,17)}$

b) Write $\vec{w} = (-4,3)$ as a linear combination of $\vec{u} = (5,1)$ and $\vec{v} = (-2,9)$

$$\boxed{\vec{w} = \dfrac{-30}{47}\vec{u} + \dfrac{19}{47}\vec{v}}$$

Exercise 3: (2 ptos) Given the straight line $r \equiv \dfrac{x+5}{4} = 3 - y$

a) Indicate a point and the direction vector $\vec{u}$ $\boxed{P(-5,3) \qquad \vec{u} = (4,-1)}$

b) Find $\left|\vec{u}\right|$ $\boxed{\left|\vec{u}\right| = \sqrt{17}}$

c) Write the general equation of a straight line r' that's parallel to r and goes through the point $A(-1,3)$ $\boxed{x + 4y - 11 = 0}$

d) Write the parametric equations of r' $\boxed{r' \equiv \begin{cases} x = -1 + 4t \\ y = 3 - t \end{cases}}$

Exercise 4: (1 pto) Given the vectors $\vec{u} = (2,1)$ and $\vec{v} = (-3,4)$, find another vector $\vec{w}$ so that $\vec{w}$ is orthogonal to $\vec{v}$ and $\vec{u} \cdot \vec{w} = 22$ $\boxed{\vec{w} = (8,6)}$

Exercise 5: (1.75 ptos)

a) Given the points $A(k+1,3)$, $B(2k,-2)$ and $C(3k-2,2k-2)$, find the value of k so that the triangle ABC is isosceles $\boxed{k = 4, \qquad k = 2/7}$
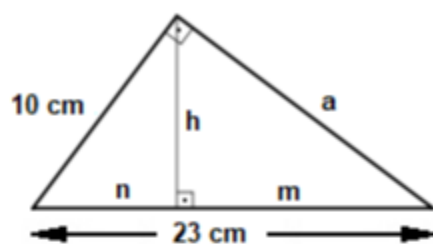
b) Find the value of m so that the vectors $\vec{u} = (m-3,8)$ and $\vec{v} = (m+3,m)$ are perpendicular $\boxed{m = 1, \qquad m = -9}$
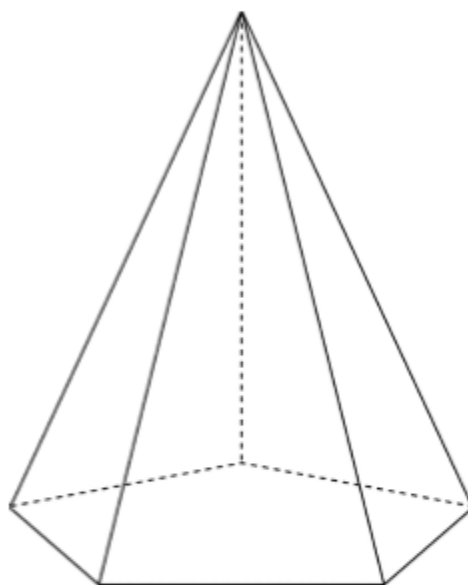
Exercise 6: (1 pto) Find the values of the sides of the triangle using the right triangle altitude theorems:

10 cm   h   a   n   m   23 cm

$$n = 4.35\,\text{m} \qquad m = 18.65\,\text{m} \qquad h = 9\,\text{m} \qquad a = 20.71\,\text{m}$$

Exercise 7: (1.75 ptos) Work out the value of the area and the volume of a regular pentagonal pyramid if the length of the side of the base is 13 cm, its radius measures 10 cm and the edge of the faces has a length of 12 cm

$$A_B = 246.98\,\text{cm}^2 \qquad A_L = 327.83\,\text{cm}^2 \;\rightarrow\; A_P = 574.81\,\text{cm}^2$$