Exercise 1: (1.5 ptos)

a) Find the parametric, continuous and general equations of the straight line that goes through the points $A(5,-1)$ and $B(-2,7)$

$$\vec{u}=(-7,8) \qquad r\equiv\begin{cases}x=5-7t\\y=-1+8t\end{cases} \qquad \frac{x-5}{-7}=\frac{y+1}{8} \qquad 8x+7y-33=0$$

b) Write the equation of the straight line that's perpendicular to $r\equiv x+5y-7=0$ and goes through the point $P(2,-3)$ $\qquad 5x-y-13=0$

Exercise 2: (1 pto) Given the points $P(k+4,-2)$ and $Q(4,k)$ find the value of k so that $\left|\overrightarrow{PQ}\right|=\sqrt{34}$

$k=-5, \quad k=3$

Exercise 3: (1 pto) Given the vectors $\vec{u}=(7,2)$, $\vec{v}=(1,18)$ and $\vec{w}=(5,-3)$ write $\vec{v}$ as a linear combination of $\vec{u}$ and $\vec{w}$ $\qquad \vec{v}=3\vec{u}-4\vec{w}$

Exercise 4: (1 pto) If $\cos\alpha=0.45$ and $\dfrac{3\pi}{2}<\alpha<2\pi$ find the other two principal trigonometric functions and the value of the angle α

$\sin\alpha=-0.89 \qquad\qquad \tan\alpha=-1.98 \qquad\qquad \alpha=296.74°$

Exercise 5: (1 pto) Find the three principal trigonometric functions of $\alpha=\dfrac{2\pi}{3}$ (no calculator allowed)

$$\cos\frac{2\pi}{3}=-\frac{1}{2} \qquad\qquad \sin\frac{2\pi}{3}=\frac{\sqrt{3}}{2} \qquad\qquad \tan\frac{2\pi}{3}=-\sqrt{3}$$

Exercise 6: (1.25 ptos) Before I leave İstanbul I've asked my friend Hakan to help me measure the height of the dome of the Hagia Sophia (yes, I am going incognito). Gonyometrem nerede? Ah burada. We are standing 80 m apart and we see the top of the dome with angles of $50°$ and $59.05°$. What's its height?
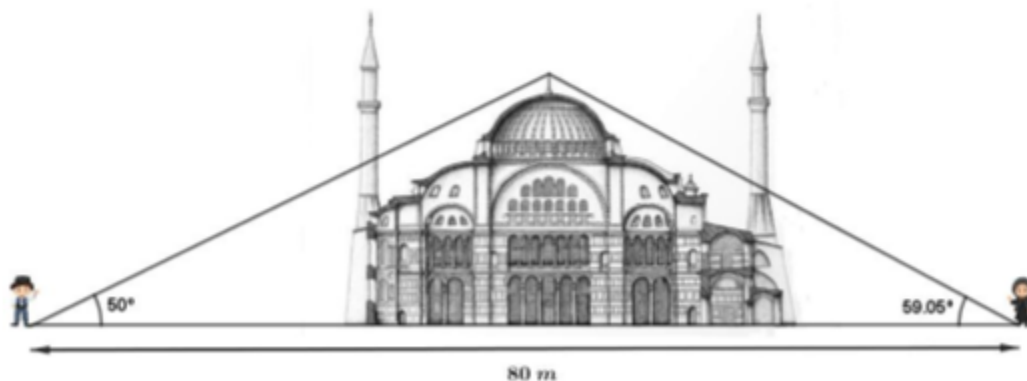
$h=55.6\text{ m}$

Exercise 7: (1.5 ptos) Given two events so that $P(\bar{A}) = 0.35$, $P(B) = 0.7$ and $P(A \cup B) = 0.9$, find:

a) $P(A \cap B) = 0.45$

b) $P(B \,/\, A) = 0.69$

c) Are A and B independent events? Are they mutually exclusive? Why? **They are not independent and they are not mutually exclusive**

Exercise 8: (1.75 ptos) A certain company stated that 80% of their employees got to work using some kind of vehicle, while the rest just walked. 12% of the people arriving by vehicle and 7% of the ones who didn't were late. Taking a random person working in that company find the probability that:

a) They arrived late   0.11

b) They walked to work, given that they got there in time   0.21