



**TRIGONOMETRY AND
ANALYTIC GEOMETRY**
4º ESO



Exercise 1: (1.75 ptos)

- a) (1.25) Find the three principal trigonometric functions of $\alpha = \frac{11\pi}{6} \text{ rad}$ without using a calculator

$$\sin \frac{11\pi}{6} = \frac{-1}{2} \quad \cos \frac{11\pi}{6} = \frac{\sqrt{3}}{2} \quad \tan \frac{11\pi}{6} = \frac{-\sqrt{3}}{3}$$

- b) (0.5) Transform $\frac{8\pi}{15} \text{ rad}$ into degrees, and 165° into radians

$$\frac{8\pi}{15} \text{ rad} = 96^\circ \quad 165^\circ = \frac{11\pi}{12} \text{ rad}$$

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

Exercise 3: (1 pto) If $\tan \alpha = -0.75$, $\frac{\pi}{2} < \alpha < \pi$ find the values of $\cos \alpha$, $\sin \alpha$ and the angle α

$$\cos \alpha = -0.8 \quad \sin \alpha = 0.6 \quad \alpha = 143.13^\circ = 143^\circ 7' 48''$$

Exercise 4: (2.25 ptos)

- a) (1.25) Determine if the triangle given by $A(8, 4)$, $B(6, 7)$ and $C(9, 9)$ has a right angle and work out its perimeter.

$$\overrightarrow{AB} \cdot \overrightarrow{BC} = 0 \rightarrow \overrightarrow{AB} \perp \overrightarrow{BC}$$

$$P = 2\sqrt{13} + \sqrt{26} = 12.31 \text{ u}$$

- b) (1) Find the general equation of the line that goes through the points $P(-2, 7)$ and $B(4, 1)$

$$x + y - 5 = 0$$

Exercise 5: (2.5 ptos) Given the straight line $r \equiv \frac{x-5}{2} = y+3$ work out:

- a) (1) The general equation of a parallel line going through $P(2, -4)$ $\rightarrow x - 2y - 10 = 0$

- b) (1) The general equation of a perpendicular line going through $Q(3, 7)$ $\rightarrow 2x + y - 13 = 0$

- c) (0.5) The parametric equations of r $\rightarrow r \equiv \begin{cases} x = 5 + 2t \\ y = -3 + t \end{cases} \quad t \in \mathbb{R}$

Exercise 6: (1.5 ptos) Given the points $A(k, 3)$, $B(6, 5)$ and $C(k+3, k+1)$ find the value of k so that the triangle that they form is isosceles in B $\rightarrow k = -3, \quad k = 5$

