CSD2301 Practice

1. Measurements & Vectors

LIN QINJIE

Practice Question 1

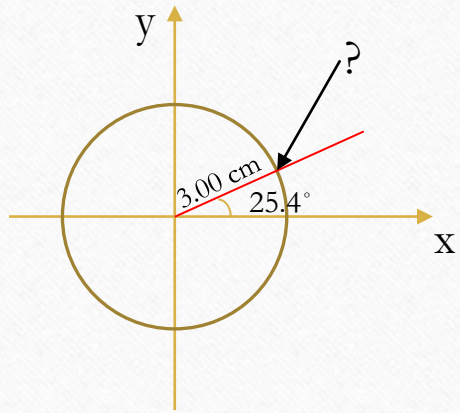
The density of lead is 11.3 g/cm^3. What is this value in kilograms per cubic metre?

Practice Question 2

A line can be described by the equation $y = 4x + 7$. What is the polar coordinates of the point at $x = 5$?

Practice Question 3

The centre of a circle is set as the origin of a coordinate system. The radius of the circle is 3.00 cm. A line which passes through the origin, intersects the circle. This line forms an angle of 25.4° with the horizontal axis. What is the cartesian coordinates at the point of intersection between the line and the circle?



Practice Question 4

Find the x- and y-components of the following vectors. For each vector the numbers given are the magnitude of the vector and the angle, measured in the sense from the +x-axis toward the +y-axis, that it makes with the +x-axis: (a) magnitude 9.30 m, angle 60.0°; (b) magnitude 22.0 km, angle 135°; (c) magnitude 6.35 cm, angle 307°

Practice Question 5

Vector $\vec{A}$ has components A_x = 1.30 cm, A_y = 2.25 cm; vector $\vec{B}$ has components B_x = 4.10 cm, B_y = -3.75 cm. Find (a) the components of the vector sum $\vec{A} + \vec{B}$; (b) the magnitude and direction of $\vec{A} + \vec{B}$; (c) the components of the vector difference $\vec{B} - \vec{A}$; (d) the magnitude and direction of $\vec{B} - \vec{A}$.

Practice Question 6

A rocket fires two engines simultaneously. One produces a thrust of 725 N directly forward while the other gives a 513 N thrust at 32.4° above the forward direction. Find the magnitude and direction (relative to the forward direction) of the resultant force which these engines exert on the rocket.

Practice Question 7

Let the angle θ be the angle that the vector $\vec{A}$ makes with the +x-axis, measured counter-clockwise from that axis. Find the angle θ for a vector that has the following components: (a) A_x = 2.00 m, A_y = -1.00 m; (b) A_x = 2.00 m, A_y = 1.00 m; (c) A_x = -2.00 m, A_y = 1.00 m; (d) A_x = -2.00 m, A_y = -1.00 m.

Practice Question 8

Given two vectors $\vec{A} = 4.00\hat{\imath} + 3.00\hat{\jmath}$ and $\vec{B} = 5.00\hat{\imath} - 2.00\hat{\jmath}$, (a) find the magnitude of each vector; (b) write an expression for the vector difference $\vec{A} - \vec{B}$ using unit vectors; (c) find the magnitude and direction of the vector difference $\vec{A} - \vec{B}$.

The End