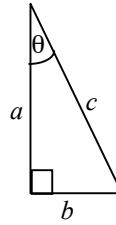


For each question, your solution must show work/calculations and display/explain your reasoning.



$$a^2 + b^2 = c^2$$

$$\sin \theta = \frac{b}{c}$$

$$\cos \theta = \frac{a}{c}$$

$$\tan \theta = \frac{b}{a}$$

1. Converting between Cartesian and polar coordinates.

a) Convert the polar coordinate $(5, 2\pi/3)$ to Cartesian coordinates.

b) Convert the Cartesian coordinate $(-6, 8)$ to polar coordinates, $0 \leq \theta < 2\pi$.

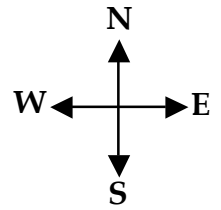
2. An 83-kg man stands on a bathroom scale inside an elevator.

a) The elevator accelerates upward from rest at a rate of 0.75 m/s^2 for 2.0s. What does the scale read during this 2.0s interval?

b) The elevator continues upward at a constant velocity for 7.30s. What does the scale read now?

c) While still moving upward, the elevator's speed decreases at a rate of 0.35 m/s^2 for 3.00s. What is the scale reading during this time?

3. Pizza Pan leaves Pizzaland to deliver a pizza to the Darlings. He travels due East for 0.5 km, then 30° North of West for 1.0 km, and then due South for 2.0 km, ending up at the Darlings. Pan wants to know how far and in what direction he would have needed to travel in order to go directly from Pizzaland to the Darlings.



a) Draw a vector diagram that includes all the individual displacement vectors as well as the resultant displacement vector.

b) Fill out the following table with the sign of the components for each part of Pan's trip. Use a standard coordinate system, so that $+x$ is E and $+y$ is N. For each entry, clearly put a **+**, **0**, or **-**.

	x component	y component
0.5 km, due E		
1.0 km, 30° N of W		
2.0 km, due S		

c) Determine the **distance** that Pan would have needed to travel in order to go directly from Pizzaland to the Darlings. (You can use the table in part b to guide your calculations).

d) Determine the **direction** that Pan would have needed to travel in order to go directly from Pizzaland to the Darlings. Give your answer as a clear to understand angle.