

1. Converting between Cartesian and polar coordinates. For each problem below,
- i) begin by plotting the point in the appropriate coordinate system
 - ii) sketch in the appropriate right triangle
 - iii) use trigonometric relationships and the Pythagorean Theorem to complete the conversion

a) Convert the polar coordinate $(6, \pi/3)$ to Cartesian coordinates.

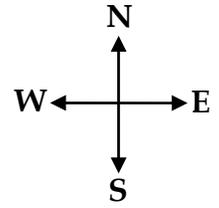
b) Convert the Cartesian coordinate $(5, -12)$ to polar coordinates, $0 \leq \theta < 2\pi$.

2. A 75-kg man stands on a bathroom scale inside an elevator.

REQUIRED ELEMENTS FOR A GOOD SOLUTION: i) A free-body force diagram showing the forces acting on the man; ii) An equation using Newton's second law in terms of symbols on the free-body force diagram; iii) an explanation of the magnitude and direction of the acceleration in each case; iv) all algebra steps clearly shown.

<p>a) The elevator accelerates upward from rest at a rate of 0.50 m/s^2 for 1.0s. What does the scale read during this 1.0s?</p>	<p>b) The elevator continues upward at a constant velocity for 3.0s. What does the scale read now?</p>	<p>c) While still moving upward, the elevator's speed decreases at a rate of 0.30 m/s^2 for 2.00s. What is the scale reading during this time?</p>
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3. Pizza Pan leaves Pizzaland to deliver a pizza to the Darlings. He travels due West for 1.5 km, then 30° West of North for 1.0 km, and then due South for 2.0 km, ending up at the Darlings. Determine how far and in what direction Pan would have needed to travel in order to go directly from Pizzaland to the Darlings.



REQUIRED ELEMENTS FOR A GOOD SOLUTION: i) a careful vector diagram showing the individual displacements along with the requested resultant displacement; ii) a table organizing each vector along with its x- and y- components (as in Physics Lab 12).