This print-out should have 12 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001 (part 1 of 2) 10.0 points
Two points in the \(xy\) plane have cartesian coordinates \((x_1, y_1)\) and \((x_2, y_2)\), where \(x_1 = 1.2 \text{ m}, \ y_1 = -10 \text{ m}, \ x_2 = -10 \text{ m}, \) and \(y_2 = 9.4 \text{ m} \).

Find the distance between these points. Answer in units of \(\text{m}\).

002 (part 2 of 2) 10.0 points
What is the angle between the line connecting the two points and \(x\)-axis (measured counter-clockwise from the \(x\)-axis), within the limits of \(-180^\circ\) to \(+180^\circ\)?) Answer in units of \(^\circ\).

003 (part 1 of 2) 10.0 points
Two vectors \(A\) and \(B\), are lying in the \(xy\) plane and given by
\[
\mathbf{A} = A_x \mathbf{i} + A_y \mathbf{j} \\
\mathbf{B} = B_x \mathbf{i} + B_y \mathbf{j}
\]
where \(A_x = 2.29 \text{ m}, \ A_y = 0.154 \text{ m}, \ B_x = 5.63 \text{ m}, \ B_y = -5.6 \text{ m} \). Let \(\mathbf{R} = \mathbf{A} + \mathbf{B}\).

Find the magnitude of \(\mathbf{R}\). Answer in units of \(\text{m}\).

004 (part 2 of 2) 10.0 points
Find the angle \(\theta\) that the vector \(\mathbf{R}\) makes from the positive \(x\) axis. Choose your answer to be between \(-180^\circ\) and \(+180^\circ\). The positive angular direction is counter clockwise measured from the \(x\) axis. Answer in units of \(^\circ\).

005 (part 1 of 2) 10.0 points
The cartesian coordinates of a point in the \(xy\) plane are \(x = -2.68 \text{ m}, \ y = -3.44 \text{ m}\).

Find the distance, \(r\), from the point to the origin. Answer in units of \(\text{m}\).

006 (part 2 of 2) 10.0 points
Calculate the angle \(\theta\) between the radius-vector of the point and the positive \(x\) axis (measured counterclockwise from the positive \(x\) axis, within the limits of \(-180^\circ\) to \(+180^\circ\)). Answer in units of \(^\circ\).

007 (part 1 of 2) 10.0 points
A vector representing 110 \(\text{N}\) is oriented at \(48^\circ\) with the horizontal.

What is the magnitude of its horizontal component? Answer in units of \(\text{N}\).

008 (part 2 of 2) 10.0 points
What is the magnitude of its vertical component? Answer in units of \(\text{N}\).

009 (part 1 of 2) 10.0 points
The vectors \(\vec{A}\) and \(\vec{B}\) are given by
\[
\vec{A} = 4.16 \hat{i} + 5.66 \hat{j} \\
\vec{B} = -2.12 \hat{i} + 3.94 \hat{j}
\]
Find the scalar product \(\vec{A} \cdot \vec{B}\).

010 (part 2 of 2) 10.0 points
Find the angle between \(\vec{A}\) and \(\vec{B}\). Answer in \(^\circ\).

011 (part 1 of 2) 10.0 points
A descent vehicle landing on the moon has a vertical velocity toward the surface of the moon of 34 \(\text{m/s}\). At the same time, it has a horizontal velocity of 52.9 \(\text{m/s}\).

a) At what speed does the vehicle move along its descent path? Answer in units of \(\text{m/s}\).

b) At what angle with the vertical is its path? Answer in units of \(^\circ\).

012 (part 2 of 2) 10.0 points