

This print-out should have 18 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering. The due time is Central time.

001 (part 1 of 2) 4 points

A superhero flies 175 m from the top of a tall building at an angle of 24° below the horizontal.

a) What is the horizontal component of the superhero's displacement? Answer in units of m.

002 (part 2 of 2) 4 points

b) What is the vertical component of the superhero's displacement? Answer in units of m.

003 (part 1 of 2) 5 points

During the rodeo, a clown runs 9.3 m north, turns 29° east of north, and runs 1.1 m. Then, after waiting for the bull to come near, the clown turns due east and runs 6.6 m to exit the arena.

a) What is the magnitude of the clown's total displacement? Answer in units of m.

004 (part 2 of 2) 4 points

b) How many degrees east of north is the clown's total displacement? Answer in units of $^\circ$.

005 (part 1 of 2) 5 points

The pilot of an aircraft wishes to fly due west in a 51.3 km/h wind blowing toward the south. The speed of the aircraft in the absence of a wind is 206 km/h.

a) How many degrees from west should the aircraft head? Let clockwise be positive. Answer in units of $^\circ$.

006 (part 2 of 2) 4 points

b) What should the plane's speed be relative to the ground? Answer in units of km/h.

007 (part 1 of 2) 5 points

A particle undergoes two displacements. The first has a magnitude of 163 cm and makes an

angle of 101.7° with the positive x axis. The resultant displacement of the two displacements is 97 cm directed at an angle of 25.4° to the positive x axis.

Find the magnitude of the second displacement. Answer in units of cm.

008 (part 2 of 2) 4 points

Find the angle of the second displacement (measured from the positive x axis, with counterclockwise positive within the limits of -180° to $+180^\circ$). Answer in units of $^\circ$.

009 (part 1 of 1) 9 points

Two airplanes leave an airport at the same time. The velocity of the first airplane is 740 m/h at a heading of 22.5° . The velocity of the second is 640 m/h at a heading of 120° .

How far apart are they after 1.9 h? Answer in units of m.

010 (part 1 of 1) 9 points

Three vectors \vec{A} , \vec{B} , and \vec{C} have the following x and y components: $A_x = 5$, $A_y = -6.9$; $B_x = -1.8$, $B_y = 3$; $C_x = 1.5$, $C_y = 2.3$.

What is the magnitude of $\vec{A} + \vec{B} + \vec{C}$?

011 (part 1 of 1) 2 points

A stone is thrown straight upward and at the top of its trajectory its velocity is momentarily zero.



What is its acceleration at this point?

1. 9.8 m/s^2 up

2. Zero

3. Unable to determine