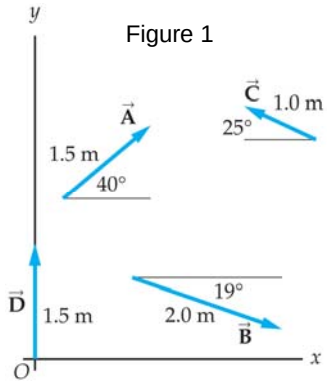
Group Quiz #3
Physics 2425

Name(s):
Group #:
Date: Tuesday, September 22, 2009

Answer each part of the question completely. You must show all of your work for full credit!

1. Express each of the vectors in Figure 1 in component form.

Figure 1



2. Find the magnitude and direction of the vector $2\vec{A}+\vec{B}$, in which $\vec{A}=(12\text{ m})\hat{i}+(0.0\text{ m})\hat{j}$ and $\vec{B}=(0.0\text{ m})\hat{i}+(-32\text{ m})\hat{j}$.

3. Three vectors satisfy the relation $\vec{B} = \vec{A} + \vec{C}$. Vector $\vec{A}$ has a magnitude of 22.0 units and is directed at an angle of 47.0° below the $+x$ axis. Vector $\vec{C}$ has a magnitude of 17.0 units and is directed at an angle ϕ counterclockwise from the $+x$ axis. Vector $\vec{B}$ is along the $+x$ axis.

   (a) Find the angle ϕ.

   (b) Find $\left|\vec{B}\right|$.

4. The position vector of a particle moving in an *x*-*y* plane is given (in meters) by $\vec{r} = \left\langle 2t^3 - 5t, 6 - 7t^2 \right\rangle$, in which *t* is the time in seconds.

   (a) Find $\vec{v}_{av}$ between $t = 0$ and $t = 2\text{ s}$. Express your answer as a vector in component form.

   (b) Find the acceleration vector as a function of time, $\vec{a}(t)$. Express your answer in component form.

   (c) Find the angle between the $+x$ axis and a line tangent to the particle's path at $t = 2\text{ s}$.