

**Quiz 1 (10 pts)**  
Math 230, Fall 2008

**NAME(1 pt):**

**STUDENT ID NUMBER:**

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- 1.(3pts) a) Find the distance between the point  $A(1, 5, 12)$  and the  $x$  axis.  
b) Find an equation of a sphere centered at the point  $A(1, 5, 12)$  and touching the  $yz$  coordinate plane.  
c)  $|AB| = 10, |BC| = 7, |AC| = 3$ . Are points  $A, B, C$  on one line?

2.(2pts) A boat is crossing a river with a strong current. The speed of the current is  $2km/hour$ . The speed of the boat in a still water is  $6\sqrt{2}km/hour$ . The angle between the direction of the current and the direction of the boat in the still water is  $\pi/4$ .

- a) Find the speed of the boat.  
b) Find the cosine of the angle between the direction of the current and the actual direction in which the boat is moving.

3.(1 pt) Given two points  $A(1, 2, 0)$  and  $B(4, 6, 12)$ . Find a unit vector in the direction of the vector  $\vec{AB}$ .

4.(3pts) a) Find projection of the vector  $6\mathbf{i} + 9\mathbf{j}$  on the vector  $\langle 2, 2, 1 \rangle$ .

b) Find direction cosines of the vector  $2\mathbf{i} + 3\mathbf{j} + 6\mathbf{k}$

c) Find which of the following vectors parallel or perpendicular to the vector  $\langle 1, -1, 2 \rangle$ :  
 $\langle 2, 4, 1 \rangle, \langle 1, 1, 1 \rangle, \langle 0, 2, 1 \rangle, \langle -2, 2, -4 \rangle, \langle 1, 5, 1 \rangle$