EXAM 1

Math 212, 2016 Summer Term 1, Clark Bray.

You have 75 minutes.

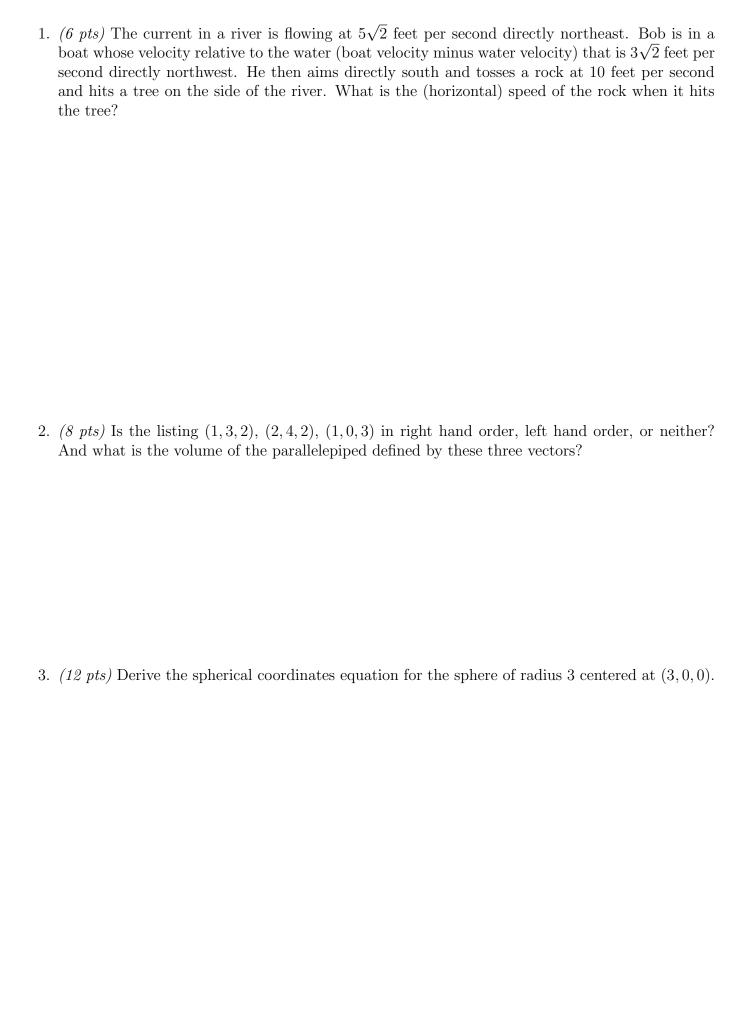
No notes, no books, no calculators.

YOU MUST SHOW ALL WORK AND EXPLAIN ALL REASONING TO RECEIVE CREDIT. CLARITY WILL BE CONSIDERED IN GRADING.

All answers must be simplified. All of the policies and guidelines on the class webpages are in effect on this exam.

Good luck!

	Name
1	
2	"I have adhered to the Duke Community Standard in completing this examination."
3	
4	Signature:
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8	(/100 points)
Q	



4. (12 pts) The line L has symmetric equations below.

$$\frac{x-3}{2} = y+1 = 2z - 6$$

and the plane P has equation 3x - 2y + z = 6

Find the equation for the plane through the origin that is parallel to L and perpendicular to P.

5. (13 pts) The ellipsoid S with equation below can be obtained from the unit sphere by way of any of several sequences of geometric transformations. Identify such a sequence of transformations, including both the transformations and the order in which they are applied.

$$(3(x-2))^2 + (\frac{y}{4})^2 + z^2 = 1$$

6. (12 pts) The surface S is parametrized by $\vec{x}(u,v) = (u-v,u+v,6u-8v)$. Find the function f whose graph is S, and identify the domain and the target of f.

7. (12 pts) Compute the limit below or show that it does not exist.

$$\lim_{(x,y)\to(0,0)} \frac{x^3y}{x^4 + y^4}$$

8. (13 pts) $T: \mathbb{R}^2 \to \mathbb{R}^2$ is a linear transformation, and the information below is given:

$$T(\vec{v}_1) = \begin{pmatrix} 1 \\ 2 \end{pmatrix}, \quad T(\vec{v}_2) = \begin{pmatrix} 4 \\ 3 \end{pmatrix}, \quad \begin{pmatrix} 1 \\ 0 \end{pmatrix} = 3\vec{v}_1 - 2\vec{v}_2, \quad \begin{pmatrix} 0 \\ 1 \end{pmatrix} = \vec{v}_1 + \vec{v}_2$$

Find the matrix A that represents T.

