

Math 120
Exam 3
March 14, 2008

Name: _____

1. Your exam contains 6 questions and 5 pages; Please make sure you have a complete exam.
2. The entire exam is worth 100 points. Point values for problems vary and these are clearly indicated. You have 50 minutes for this exam.
3. Make sure to **ALWAYS SHOW YOUR WORK**; you will not receive credit unless all work is clearly shown. If in doubt, ask for clarification.
4. If you need extra space, use the back page of the exam and clearly indicate this.
5. You are allowed one 8.5×11 sheet of handwritten notes (both sides). Graphing and scientific calculators are allowed.

Problem	Total Points	Score
1	10	
2	20	
3	16	
4	16	
5	22	
6	16	
Total	100	

1. (10 pts.) Find the exact value of $\sec(\tan^{-1} 6)$.

2. (20 pts.)

(a) (10 pts.) Convert the point $(x, y) = (-5, 12)$ to polar coordinates.

(b) (10 pts.) Convert the polar equation $r = \tan \theta$ to rectangular coordinates.

3. (16 pts.) $\mathbf{u} = 2\mathbf{j}$ $\mathbf{v} = 3\mathbf{i} + 7\mathbf{j}$

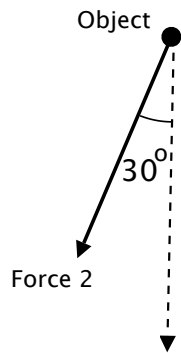
(a) (6 pts.) Find $2\mathbf{v} - \mathbf{u}$ and simplify.

(b) (10 pts.) Find $\mathbf{u} \cdot (\mathbf{u} + \mathbf{v})$.

4. (16 pts.) Find **all** solutions to the following equation: $4 \sin^2 x - 3 = 0$ (Give exact values.)

5. (22 pts.) Two forces are acting on an object. Force 1 is given by the vector $\mathbf{F}_1 = \langle 4, 8 \rangle$. Force 2 has a magnitude of 2 lbs. and is shown in the diagram below. (Feel free to sketch in the standard set of axes.)

(a) (14 pts.) Find the resultant (net) force acting on the object.



(b) (8 pts.) Find the magnitude and direction of Force 1.

6. (16 pts.) Suppose the height (in feet) of the tide at Golden Gardens is given by

$$h(t) = 6 \cos \frac{\pi}{6}(t - 3) + 5 \quad \text{at time } t \text{ (in hours).}$$

Find **all** times in the interval $[0,20]$ for which the height of the tide is 8 feet.