

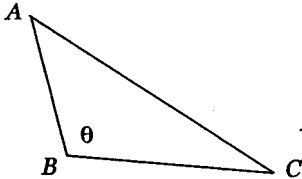
Name: _____

Math 206A: Winter 2012
Exam 1: February 10

Correct answers accompanied by incorrect or incomplete work will not receive full credit.

Good Luck!

1. Consider the triangle with vertices $A = (1, 1, 1)$, $B = (3, -2, 3)$, and $C = (3, 4, 6)$. (Figure may not be drawn to scale.)



- (a) (10 points) Find $\angle ABC$, i.e., find θ . In your work use correct vector notation.
- (b) (10 points) Find the area of the triangle. In your work use correct vector notation.

2. Consider the equation $Ax^2 + By^2 + Cz^2 = D$. Fill in each blank with a **single** number that makes the statement correct.

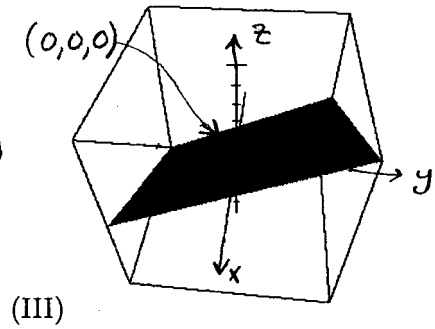
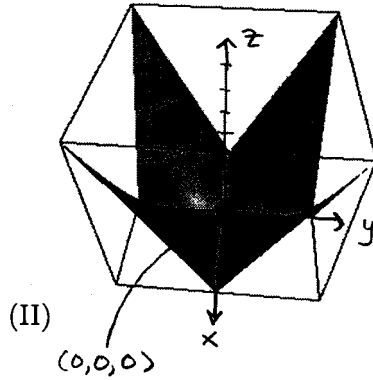
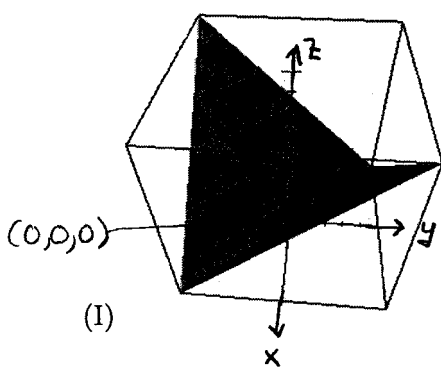
(a) (10 points) If $A = \underline{\hspace{1cm}}$, $B = \underline{\hspace{1cm}}$, $C = \underline{\hspace{1cm}}$, and $D = \underline{\hspace{1cm}}$ then the graph of the equation is a hyperboloid of 2 sheets with axis being the x -axis.

(b) (10 points) If $A = \underline{\hspace{1cm}}$, $B = \underline{\hspace{1cm}}$, $C = \underline{\hspace{1cm}}$, and $D = \underline{\hspace{1cm}}$ then the graph of the equation is a (double) cone with axis being the y -axis.

3. (10 points) Write the equation of the ellipsoid with center $(2, -3, 5)$ that is tangent to the planes $x = 0$, $y = 0$, and $z = 0$.

4. (a) (15 points) Sketch the $z = 0$, $x = 0$, and $y = 0$ traces of $f(x, y) = |x + y|$.

(b) (5 points) Which of the following graphs is the graph of $f(x, y) = |x + y|$?



5. Consider the lines $\vec{l}_1(t) = (6t + 1, 3t - 1, 2t + 2)$ and $\vec{l}_2(t) = (t + 3, \frac{1}{2}t + 1, \frac{1}{3}t - 1)$.

(a) (10 points) Show that $\vec{l}_1(t)$ and $\vec{l}_2(t)$ are parallel.

(b) (10 points) Write the equation of the plane through these two lines. Your final answer must have the form $Ax + By + Cz = D$.

6. (10 points) Write the parametrization for the portion of the ellipse pictured. Where the marked points correspond to the indicated values of t .

