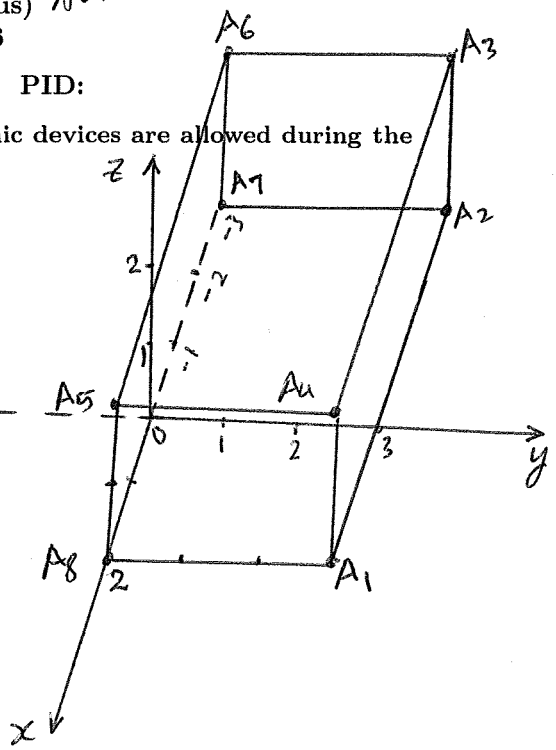
MAC 2313 (Multivariable Calculus) Answers
QUIZ 1, Friday August 26, 2016

Name: **PID:**

Remember that no documents or calculators, or any other electronic devices are allowed during the quiz. Also remember to show your work.

1. [2] State the coordinates of each of the eight points on the figure.



$A_1(2,3,0)$ $A_6(-3,0,2)$

$A_2(-3,3,0)$ $A_7(-3,0,0)$

$A_3(-3,3,2)$ $A_8(2,0,0)$

$A_4(2,3,2)$

$A_5(2,0,2)$

0.25 for each point

2. [2] Find an equation for the sphere having the points $A(-1,2,3)$ and $B(2,2,-5)$ as endpoints of a diameter.

If R = radius of sphere, then $R = \frac{1}{2}\sqrt{(2+1)^2+0^2+(-5-3)^2} = \frac{\sqrt{9+64}}{2} = \frac{\sqrt{73}}{2}$ 0.5

C = center of sphere = midpoint of A and $B = \left(\frac{2-1}{2}, \frac{2+2}{2}, \frac{3-5}{2}\right) = \left(\frac{1}{2}, 2, -1\right)$ 0.5

Eqn of sphere: $\left(x-\frac{1}{2}\right)^2+(y-2)^2+(z+1)^2 = \frac{73}{4}$ 1

3. [4] Describe the surface whose equation is given.

a) $4x^2+4y^2+4z^2+20x-16z+41=0$.

$4\left(x^2+5x+\frac{25}{4}+y^2+z^2-4z+4\right)+41 = 25+16 = 41$

or $4\left[\left(x+\frac{5}{2}\right)^2+y^2+(z-2)^2\right] = 41-41 = 0$; point with coordinates $(-5/2, 0, 2)$

1 for equation

0.5 if point, 0.5 for coordinates

b) $x^2+y^2+z^2-4y+6z+4=0$.

$x^2+y^2-4y+4+z^2+6z+9 = 9$

$x^2+(y-2)^2+(z+3)^2 = 9$; sphere; $C(0,2,-3)$, $R=3$

1 0.25 0.5 0.25

4. [2] Decide whether the statement is true or false. No explanation needed.

a) The graph $x^2+y^2=8$ in 3-space is a circle. False; it is a circular cylinder along z-axis

b) The point $D(1,2,-1)$ lies on the xy-plane. False; because the z-component is not zero.

1 1