MATH 200 PROBLEM SET I ANSWERS

1) $(x-3)^2+(y-2)^2+(z-7)^2=11$

2 a) $(1,2,3),\ (0,3,7),\ (3,5,11)$ are not collinear

b) The vectors $(0,3,-5),\ (1,2,-3),\ (3,0,1)$ are collinear.

3) The circle of centre $\left(\frac{25}{3},1,-\frac{11}{3}\right)$ and radius $\frac{\sqrt{332}}{3}$.

4 a) This is the plane that contains the y axis and lies $45°$ above the part of the x–z plane with $x>0$.

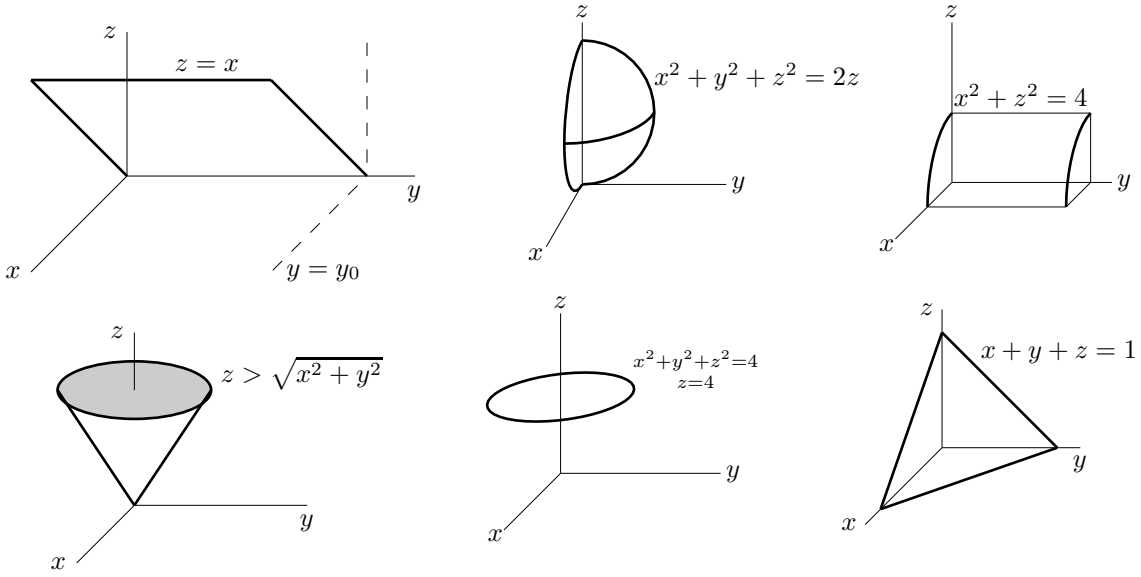
b) The sphere of radius 1 centred on $(0,0,1)$.

c) The surface is the cylinder of radius 2 centred on the y–axis.

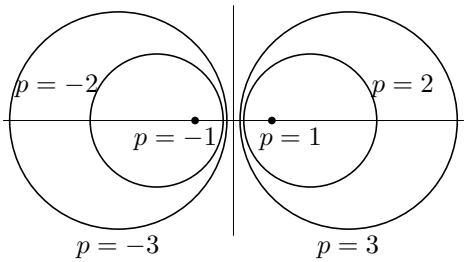
d) It is a solid cone centered on the z–axis.

e) This is the circle of radius $\sqrt{3}$ centred on $(0,0,1)$ that lies parallel to the xy–plane.

f) This is the plane which passes through the opints $(1,0,0)$, $(0,1,0)$ and $(0,0,1)$.



5)



6)

a) $\vec{a}\cdot\vec{b}=4 \quad \theta=60.25°$

b) $\vec{a}\cdot\vec{b}=0 \quad \theta=90°$

c) $\vec{a}\cdot\vec{b}=4 \quad \theta=0°$

d) $\vec{a}\cdot\vec{b}=2 \quad \theta=61.87°$

e) $\vec{a}\cdot\vec{b}=0 \quad \theta=90°$

7) The triangle does contain a right angle.

9) $-3\hat{\boldsymbol{\imath}}+6\hat{\boldsymbol{\jmath}}-3\hat{\mathbf{k}}$

11 c) $(\vec{a}\cdot\vec{c})(\vec{b}\cdot\vec{d})-(\vec{a}\cdot\vec{d})(\vec{b}\cdot\vec{c})$