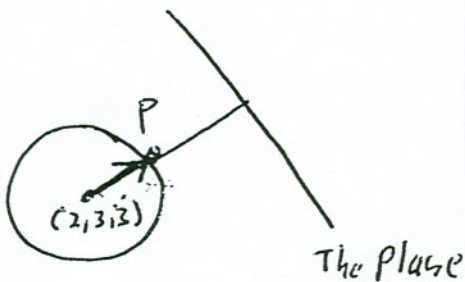


9. Find the distance between $3x + 2y + 3z = 2$ and $3x + 2y + 3z = 4$.

$(0, 1, 0)$ is on the first plane. The distance from $(0, 1, 0)$ to the second plane is $\frac{|2-4|}{\sqrt{22}} = \frac{2}{\sqrt{22}}$

10. Find the point on $(x-2)^2 + (y-3)^2 + (z-3)^2 = 16$ which is closest to $2x + 3y + 4z = 1000$.



The vector has length 4 and is $\parallel 2\vec{i} + 3\vec{j} + 4\vec{k}$

so the vector is $\pm \frac{4}{\sqrt{29}} (2\vec{i} + 3\vec{j} + 4\vec{k})$

So $\overrightarrow{(2, 3, 3)P} = \frac{4}{\sqrt{29}} (2\vec{i} + 3\vec{j} + 4\vec{k})$ or $-\frac{4}{\sqrt{29}} (2\vec{i} + 3\vec{j} + 4\vec{k})$

so P is $(\frac{8}{\sqrt{29}} + 2, \frac{12}{\sqrt{29}} + 3, \frac{16}{\sqrt{29}} + 3)$ or $(\frac{-8}{\sqrt{29}} + 2, \frac{-12}{\sqrt{29}} + 3, \frac{-16}{\sqrt{29}} + 3)$



This one is closer to the plane

so P is $(\frac{8}{\sqrt{29}} + 2, \frac{12}{\sqrt{29}} + 3, \frac{16}{\sqrt{29}} + 3)$