

**Answer on Question#39942 – Math - Geometry**

**Question.**

Find the angles that the diagonal of a rectangular parallelepiped 2 in. by 3 in. by 4 in. makes with the faces.

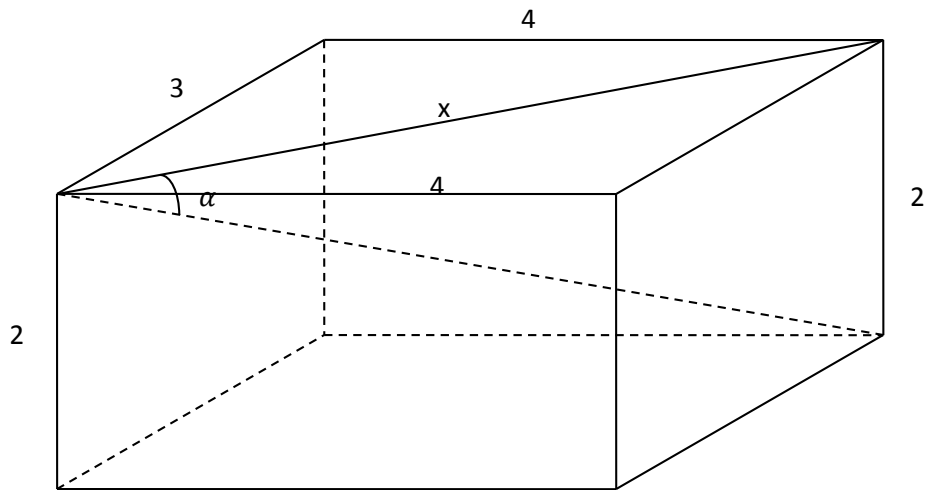
**Solution:**

a) We have

$$\tan \alpha = \frac{2}{x},$$

$$\tan \alpha = \frac{2}{\sqrt{3^2 + 4^2}} = \frac{2}{5},$$

$$\alpha = \tan^{-1}\left(\frac{2}{5}\right) \approx 0.38051 \text{ (radians)}$$

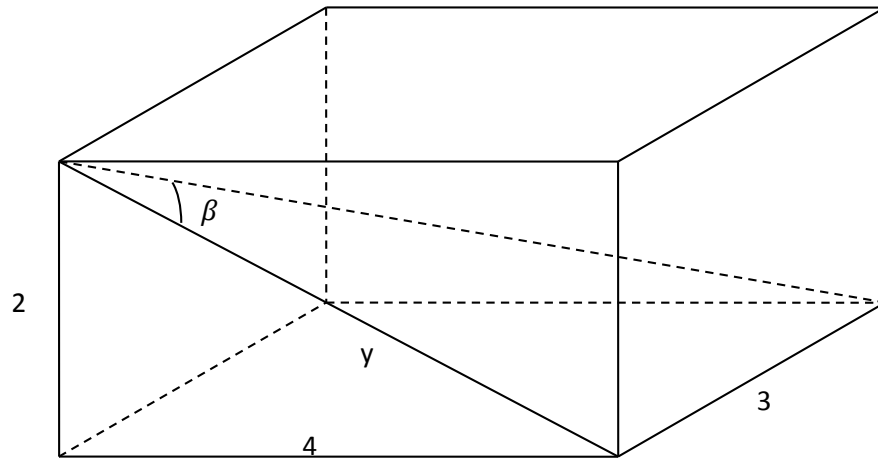


b) We have

$$\tan \beta = \frac{3}{y},$$

$$\tan \beta = \frac{3}{\sqrt{2^2 + 4^2}} = \frac{3}{\sqrt{20}} = \frac{3}{2\sqrt{5}}$$

$$\beta = \tan^{-1}\left(\frac{3}{2\sqrt{5}}\right) \approx 0.59087 \text{ (radians)}$$

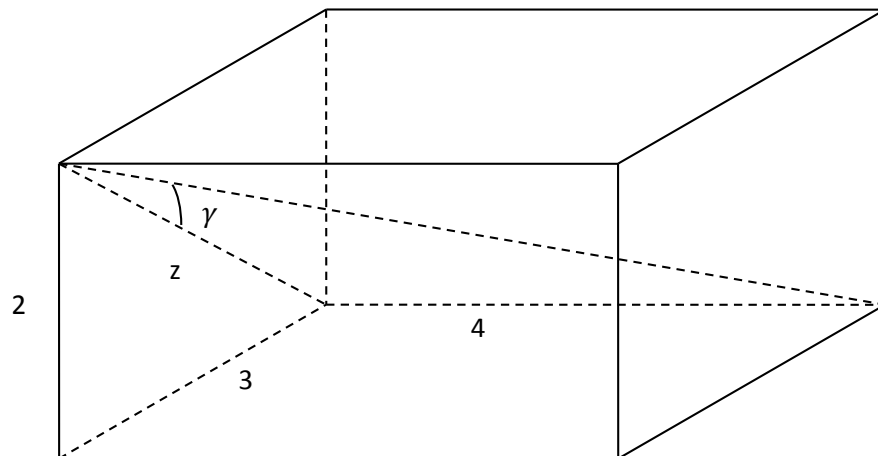


c) We have

$$\tan \gamma = \frac{4}{y'}$$

$$\tan \gamma = \frac{4}{\sqrt{2^2 + 3^2}} = \frac{4}{\sqrt{13}}$$

$$\gamma = \tan^{-1}\left(\frac{4}{\sqrt{13}}\right) \approx 0.83722 \text{ (radians)}$$



**Answer:**

$$\alpha \approx 0.38051 \text{ (radians)}$$

$$\beta \approx 0.59087 \text{ (radians)}$$

$$\gamma \approx 0.83722 \text{ (radians)}$$