Cosenos directores, ejercicio caso 1
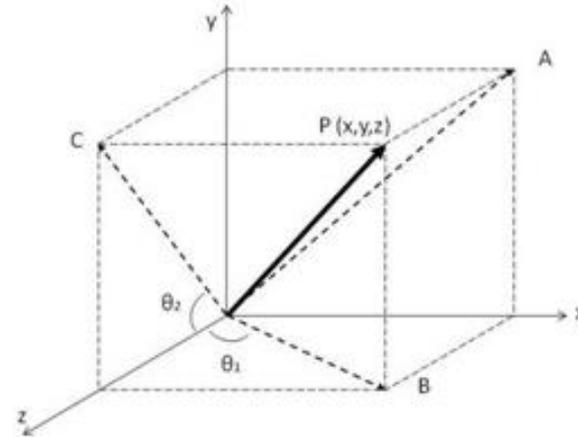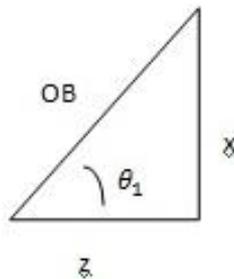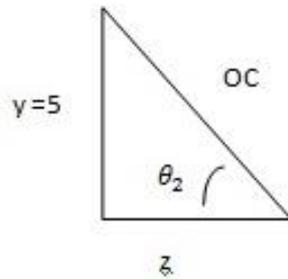
De acuerdo al gráfico, dados $\theta_1 = 42°$, $\theta_2 = 36°$ y el valor de y es 5, hallar los ángulos directores con los ejes coordenados, utilizando cosenos directores.

$$\tan \theta_2 = \frac{y}{z} = \frac{5}{z}$$

$$z = \frac{5}{\tan\theta_2} = \frac{5}{\tan 36}$$

$$z = 6.8819$$

$$\tan \theta_1 = \frac{x}{z}$$

$$x = (\tan 42)(z) = (\tan 42)(6.8819)$$

$$x = 6.1965$$

$$\overline{OP} = 6.1965i + 5j + 6.8819k$$

$$|OP| = \sqrt{110.7571}$$

$$\cos \alpha = \frac{6.1965(1)}{(\sqrt{110.7571})(1)} \qquad \alpha = 53.9288°$$

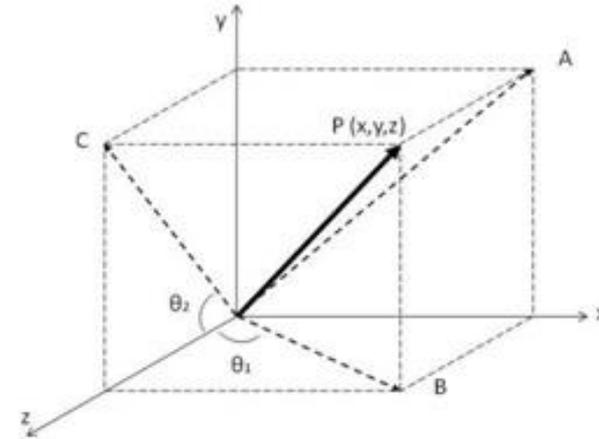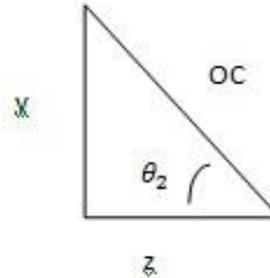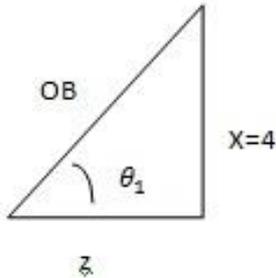$$\cos \beta = \frac{5(1)}{(\sqrt{110.7571})(1)} \qquad \beta = 61.6342°$$

$$\cos \gamma = \frac{6.8819(1)}{(\sqrt{110.7571})(1)} \qquad \gamma = 49.1624°$$

Cosenos directores, ejercicio caso 2

De acuerdo al gráfico, dados $\theta_1 = 32°$, $\theta_2 = 55°$ y el valor de x es 4, hallar los ángulos directores con los ejes coordenados, utilizando cosenos directores.

$$\tan \theta_1 = \frac{x}{z} = \frac{4}{z}$$

$$z = \frac{4}{\tan 32}$$

$$z = 6.4013$$

$$\tan \theta_2 = \frac{y}{z}$$

$$y = (\tan 55)z = (\tan 55)(6.4013)$$

$$y = 9.1420$$

$$\overline{OP} = 4i + 9.1420j + 6.4013k$$

$$|OP| = \sqrt{140.5528}$$

$$\cos \alpha = \frac{4(1)}{(\sqrt{140.5528})(1)} \qquad \alpha = 70.2818°$$

$$\cos \beta = \frac{9.1420(1)}{(\sqrt{140.5528})(1)} \qquad \beta = 39.5455°$$
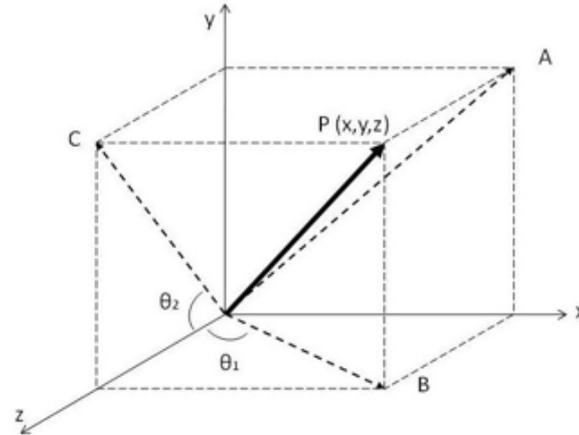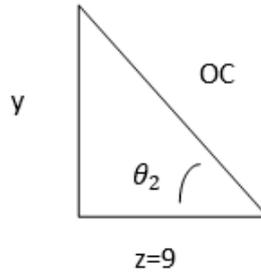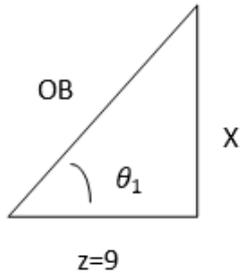
$$\cos \gamma = \frac{6.4013(1)}{(\sqrt{140.5528})(1)} \qquad \gamma = 57.3202°$$

Cosenos directores, ejercicio caso 3

De acuerdo al gráfico, dados $\theta_1 = 33°$, $\theta_2 = 64°$ y el valor de z es 9, hallar los ángulos directores con los ejes coordenados, utilizando cosenos directores.

$$\tan \theta_1 = \frac{x}{z} = \frac{x}{9} \qquad\qquad \tan \theta_2 = \frac{y}{z} = \frac{y}{9}$$

$$x = (\tan 33)z = (\tan 33)(9) \qquad y = (\tan 64)z = (\tan 64)(9)$$

$$x = 5.8447 \qquad\qquad\qquad y = 18.4527$$

$$\overline{OP} = 5.8447i + 18.4527j + 9k$$

$$|OP| = \sqrt{455.6635}$$

$$\cos \alpha = \frac{5.8447(1)}{(\sqrt{455.6635})(1)} \qquad \alpha = 74.1093°$$

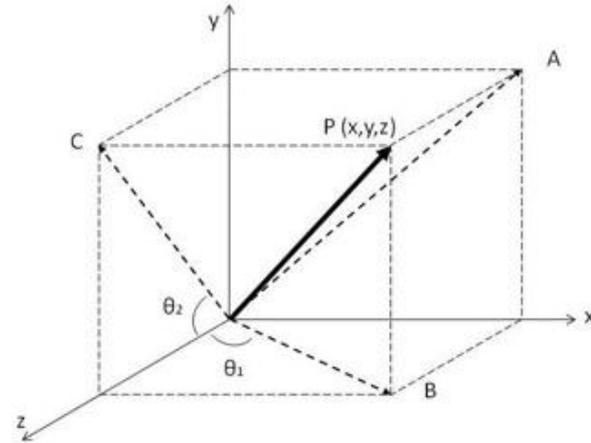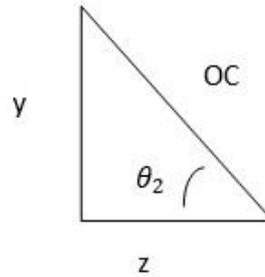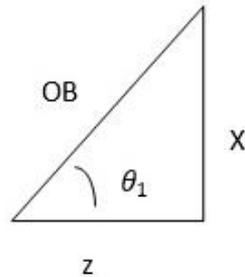$$\cos \beta = \frac{18.4527(1)}{(\sqrt{455.6635})(1)} \qquad \beta = 30.1803°$$

$$\cos \gamma = \frac{9(1)}{(\sqrt{455.6635})(1)} \qquad \gamma = 65.0631°$$

Cosenos directores, ejercicio caso 4

De acuerdo al gráfico, dados $\theta_1 = 30°$, $\theta_2 = 26°$ y el valor de OP es 22, hallar los ángulos directores con los ejes coordenados, utilizando cosenos directores.

$$\tan \theta_1 = \frac{x}{z} \qquad\qquad \tan \theta_2 = \frac{y}{z}$$

$$x = (\tan 30)z \qquad\qquad y = (\tan 26)z$$

$$|\overline{OP}| = \sqrt{\left((\tan 30)z\right)^2 + \left((\tan 26)z\right)^2 + z^2}$$

$$22 = \sqrt{(0.5773)^2(z^2) + (0.4877)^2(z^2) + z^2}$$

$$22 = \sqrt{1.5711 z^2}$$

$$z = \sqrt{\frac{22^2}{1.5711}} = 17.5511$$

$$x = (\tan 30)17.5511 = 10.1331$$

$$y = (\tan 26)17.5511 = 8.5603$$

...ejercicio caso 4

$$\overline{OP} = 10.13317i + 8.5603j + 17.5511k$$

$$\cos\alpha = \frac{10.1337(1)}{22(1)} \qquad \alpha = 62.5743°$$

$$\cos\beta = \frac{8.5603(1)}{22(1)} \qquad \beta = 67.1013°$$

$$\cos\gamma = \frac{17.5511(1)}{22(1)} \qquad \gamma = 37.0816°$$