Conceptual Question C2.1

Given: A plate is supported by a hinge joint along edge AD and by cable CE. Cable CE carries a tension of F_{CE} as a result of the weight of the plate. Let $\vec{F}_{CE}$ represent the force on the plate due to cable CE: $\vec{F}_{CE} = F_{CE}\left(cos\alpha_1\hat{i} + cos\alpha_2\hat{j} + cos\alpha_3\hat{k}\right)$.

Find: Add a sketch of the three direction angles for $\vec{F}_{CE}$ to the diagram below.

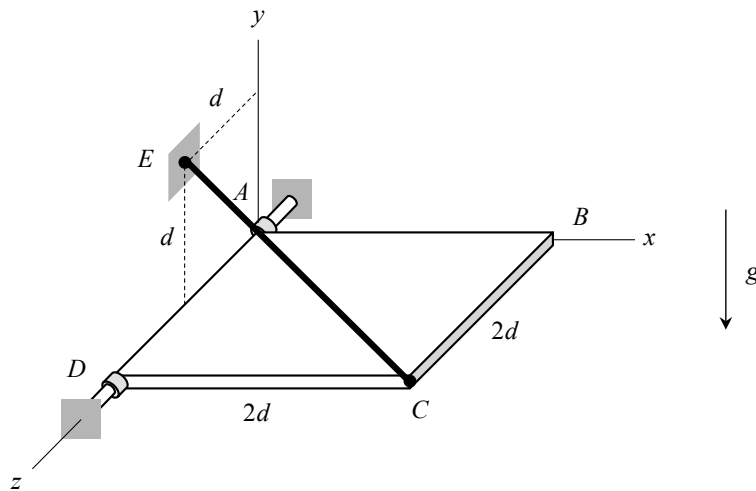Regarding the direction angle α_1, circle the correct response below:
- $\alpha_1 = 0$
- $0 < \alpha_1 < 90°$
- $\alpha_1 = 90°$
- $90° < \alpha_1 < 180°$
- $\alpha_1 = 180°$

Regarding the direction angle α_2, circle the correct response below:
- $\alpha_2 = 0$
- $0 < \alpha_2 < 90°$
- $\alpha_2 = 90°$
- $90° < \alpha_2 < 180°$
- $\alpha_2 = 180°$

Regarding the direction angle α_3, circle the correct response below:
- $\alpha_3 = 0$
- $0 < \alpha_3 < 90°$
- $\alpha_3 = 90°$
- $90° < \alpha_3 < 180°$
- $\alpha_3 = 180°$

Conceptual Question C2.2

Given: Two forces $\vec{F}_1$ and $\vec{F}_2$ are written in terms of a set of Cartesian components as: $\vec{F}_1 = \left(a\hat{i} - 2b\hat{j}\right)$kN and $\vec{F}_2 = \left(4b\hat{i} + 2a\hat{j} - 10\hat{k}\right)$kN, where a and b are parameters having unknown numerical values. Let θ represent the angle between these two force vectors.
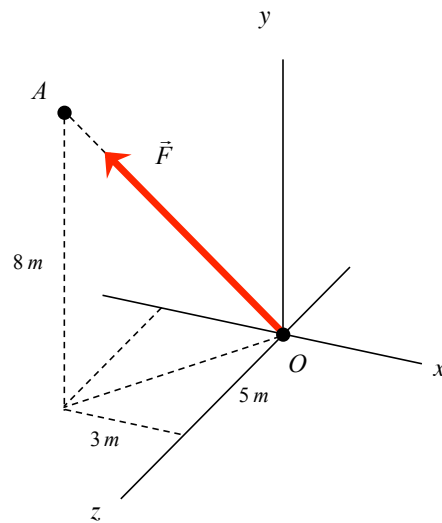
Find:

Regarding the angle θ, circle the correct response below:

- $\theta = 0$
- $0 < \theta < 90°$
- $\theta = 90°$
- $90° < \theta < 180°$
- $\theta = 180°$

Conceptual Question C2.3

Given: A force $\vec{F}$ acting in the direction shown.

Find: Determine the three direction angles θ_x, θ_y and θ_z for $\vec{F}$.

Find the coordinate direction angles θ_x, θ_y, θ_z for the vector shown.

Conceptual Question C2.4

Given: A force $\vec{F}$ acting in the direction shown.

Find: Determine the three direction angles θ_x, θ_y and θ_z for $\vec{F}$.

Find the coordinate direction angles θ_x, θ_y, θ_z for the vector shown.