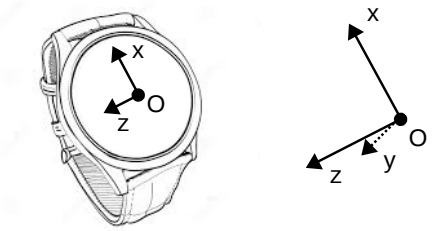
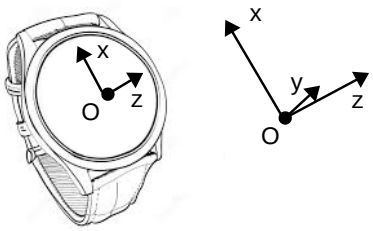
Conceptual questions

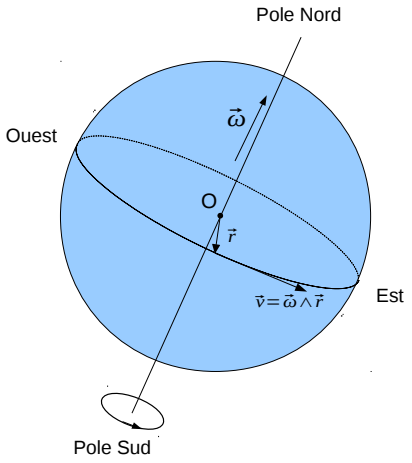
(Solution)

a) To form a direct orthonormal coordinate system $Oxyz$ with the x and z axes, the y-axis must be perpendicular to the other two. Therefore, it is perpendicular to the watch face's plane. At 9 am, the y-axis points to the back of the watch, while at 3 pm it points to the front.





b) Since the sun rises East and sets West, the Earth is rotating from West to East (cf. $\vec{v}$ on the diagram). The angular velocity vector $\vec{\omega}$ is defined such that: $\vec{v} = \vec{\omega} \wedge \vec{r}$. $\vec{\omega}$ is parallel to the Earth's rotational axis, and its direction is the Earth's direction of rotation. Using the right-hand rule, we find that the angular velocity vector must be directed from the South Pole to the North Pole.



Projet ExoSet La section de physique de l'EPFL met à disposition de ses étudiants une collection de problèmes puisés dans les séries des enseignants de première année. Les utilisateurs de cette plateforme sont tenus de faire un usage loyal (fair use) des ressources documentaires en ligne mises à leur disposition, reproduction et diffusion interdite.

Soumis par: F. Blanc, O. Schneider, J.-Ph. Brantut , J.-M. Fürbringer