

Answer on Question #73819 – Math – Trigonometry

Question

Evaluate $\sin \left[\cos^{-1} \left(\frac{-2}{7} \right) \right]$

- a. $\frac{\sqrt{53}}{7}$ b. $\frac{-\sqrt{53}}{7}$ c. $\frac{3\sqrt{5}}{7}$ d. $\frac{-3\sqrt{5}}{7}$ e. *None of these*

Solution

Let $\varphi = \cos^{-1} \left(\frac{-2}{7} \right)$ then $\cos(\varphi) = \frac{-2}{7}$, hence $\frac{\pi}{2} \leq \varphi \leq \pi$.

Find $\sin(\varphi)$: $\sin(\varphi) = \pm \sqrt{1 - \cos^2(\varphi)} = \pm \frac{3\sqrt{5}}{7}$

Because of $\frac{\pi}{2} \leq \cos^{-1} \left(\frac{-2}{7} \right) \leq \pi$, then $\sin \left[\cos^{-1} \left(\frac{-2}{7} \right) \right] = \frac{3\sqrt{5}}{7}$

Answer: c. $\frac{3\sqrt{5}}{7}$.