Please PRINT your name _____

No calculators, cell phones, computers, notes, etc.

Circle your answer. Make your work **correct**, **complete** and **coherent**.

The quiz is worth 5 points. The solutions will be posted on my website later today.

Quiz 13, October 16, 2019

Find the length of the curve

$$\vec{r}(t) = (2\cos t)\,\vec{i} + (2\sin t)\,\vec{j} + \sqrt{5}\;t\,\vec{k}, \qquad \text{for } 0 \le t \le \pi.$$

ANSWER:

The arc length is equal to

$$\int_0^\pi |\vec{r}\,'(t)|\,dt = \int_0^\pi |(-2\sin t)\,\vec{i} + (2\cos t)\,\vec{j} + \sqrt{5}\,\vec{k}\,|\,dt$$

$$= \int_0^\pi \sqrt{4\sin^2 t + 4\cos^2 t + 5}\,dt = \int_0^\pi \sqrt{4(\sin^2 t + \cos^2 t) + 5}\,dt = \int_0^\pi \sqrt{4+5}\,dt$$

$$= \int_0^\pi \sqrt{9}\,dt = \int_0^\pi 3\,dt = 3t\Big|_0^\pi = \boxed{3\pi}.$$