

Various Sneaky Mathematicians 2

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This activity builds on IOLA materials on introductory linear algebra, available here:

<http://iola.math.vt.edu> and discussed here:

<https://www.tandfonline.com/doi/abs/10.1080/10511970.2012.667516>.

Question 3

You have a dodgy enchanted portal that can take you to the point $(3, 5, -7)$. Right when you step out of the portal you find your hoverboard and magic carpet. Your hoverboard travels along $\begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}$

and your magic carpet along $\begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}$.

1. Sunzi has hidden at the point $(36, 36, 0)$. Can you reach him? If yes, then how long do you need on each mode of transport? If no, then show why this is not possible.
2. Where can Sunzi hide so you cannot find him?

Question 4

Maryam Mirzakhani is also in \mathbb{R}^3 and is hidden at a point satisfying the equation $3x + 2y - z = 4$. You have a new hoverboard and magic carpet ready to be programmed (and again you can only program each once). You also have a single use portal available to jump anywhere in \mathbb{R}^3 .

1. How should you program your hoverboard and magic carpet and how should you use your portal to ensure you can find Mirzakhani? (Note: remember we are now in \mathbb{R}^3 so you will need to specify 3-dimensions for travel points.)
2. Ask your instructor to learn the exact point (x, y, z) where she is hiding. Based on the point and direction you chose in (1), when will you reach her?

Question 5

Bhāskara II is standing on yet another plane in \mathbb{R}^3 . He tells us he is perpendicular to the plane with his feet at the point $(26, 22, 12)$ and the tip of his head at $(29, 30, 7)$.

1. Where can Bhāskara walk around?