

For each qubit represented in bra-ket notation, choose the correct equivalent in vector notation.

Bra-ket notation:  $0.8 |0\rangle + 0.6 |1\rangle$

*a.*  $\begin{bmatrix} 0.8 \\ 0.6 \end{bmatrix}$

*b.*  $\begin{bmatrix} 0.6 \\ 0.8 \end{bmatrix}$

*c.*  $\begin{bmatrix} \sqrt{0.8} \\ \sqrt{0.6} \end{bmatrix}$

*d.*  $\begin{bmatrix} \sqrt{0.6} \\ \sqrt{0.8} \end{bmatrix}$

Bra-ket notation:  $0.6 |0\rangle + 0.8 |1\rangle$

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*d.*  $\begin{bmatrix} \sqrt{0.6} \\ \sqrt{0.8} \end{bmatrix}$

For the following questions, consider this qubit represented in vector notation.

Vector notation:

$$\begin{bmatrix} \frac{1}{\sqrt{5}} \\ \frac{2}{\sqrt{5}} \end{bmatrix}$$

Choose the correct equivalent in bra-ket notation.

$a. \frac{2}{\sqrt{5}} |0\rangle + \frac{1}{\sqrt{5}} |1\rangle$      $b. \frac{1}{\sqrt{2}} |0\rangle + \frac{1}{\sqrt{2}} |1\rangle$      $c. \frac{1}{\sqrt{5}} |0\rangle + \frac{2}{\sqrt{5}} |1\rangle$      $d. \frac{1}{2} |0\rangle + \frac{\sqrt{3}}{2} |1\rangle$

What is the probability of measuring  $|1\rangle$ ?

$a. \frac{2}{\sqrt{5}}$      $b. \frac{4}{5}$      $c. \frac{1}{5}$      $d. \frac{1}{\sqrt{5}}$

What is the correct vector notation for a black ball?

$$a. \begin{bmatrix} \frac{1}{\sqrt{5}} \\ \frac{2}{\sqrt{5}} \end{bmatrix}$$

$$b. \begin{bmatrix} 0.8 \\ 0.6 \end{bmatrix}$$

$$c. \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

$$d. \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

What is the state in vector notation of:  $\frac{1}{\sqrt{2}}|0\rangle - \frac{1}{\sqrt{2}}|1\rangle$

$$a. \begin{bmatrix} \frac{1}{\sqrt{5}} \\ \frac{2}{\sqrt{5}} \end{bmatrix}$$

$$b. \begin{bmatrix} \frac{1}{2} \\ -\frac{1}{2} \end{bmatrix}$$

$$c. \begin{bmatrix} \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} \end{bmatrix}$$

$$d. \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$