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

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

$a.$ $\begin{bmatrix} 0.8 \\ 0.6 \end{bmatrix}$
$b.$ $\begin{bmatrix} 0.6 \\ 0.8 \end{bmatrix}$
$c.$ $\begin{bmatrix} \sqrt{0.8} \\ \sqrt{0.6} \end{bmatrix}$
$d.$ $\begin{bmatrix} \sqrt{0.6} \\ \sqrt{0.8} \end{bmatrix}$

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

Vector notation:
$$\begin{bmatrix} \dfrac{1}{\sqrt{5}} \\[2ex] \dfrac{2}{\sqrt{5}} \end{bmatrix}$$

Choose the correct equivalent in bra-ket notation.

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

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

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

What is the correct vector notation for a black ball?

$a.\quad \begin{bmatrix} \frac{1}{\sqrt{5}} \\ \frac{2}{\sqrt{5}} \end{bmatrix}$ $b.\quad \begin{bmatrix} 0.8 \\ 0.6 \end{bmatrix}$ $c.\quad \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ $d.\quad \begin{bmatrix} 0 \\ 1 \end{bmatrix}$

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

$a.\quad \begin{bmatrix} \frac{1}{\sqrt{5}} \\ \frac{2}{\sqrt{5}} \end{bmatrix}$ $b.\quad \begin{bmatrix} \frac{1}{2} \\ -\frac{1}{2} \end{bmatrix}$ $c.\quad \begin{bmatrix} \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} \end{bmatrix}$ $d.\quad \begin{bmatrix} 1 \\ 1 \end{bmatrix}$