1. a quantum state can be represented as a ket $|\psi\rangle$ in hilbert space
2. Hermitian operator
3. The eigenvalue of $\hat{A}$
4. taking the inner product of $|\psi\rangle$ and $|a_i\rangle$
5. determined by the action of a unitary operator $\hat{U}(t)$ that preserves the normalization of the state
6. $\alpha, \beta, \gamma, \delta$
7. $P(\alpha) = |\langle\psi|\alpha\rangle|^2$
   $= |\alpha|^2$
   $= (\frac{1}{\sqrt{6}})^2$
   $= \frac{1}{6}$
8. $P(\beta) = |\langle\psi|\beta\rangle|^2$
   $= |\beta|^2$
   $= (\frac{1}{\sqrt{3}})^2$
   $= \frac{1}{3}$
9. $P(\gamma) = |\langle\psi|\gamma\rangle|^2$
   $= |\gamma|^2$
   $= (0)^2$
   $= 0$
10. $P(\delta) = |\langle\psi|\delta\rangle|^2$
    $= |\delta|^2$
    $= (\frac{1}{\sqrt{2}})^2$
    $= \frac{1}{2}$
11. $|\psi\rangle = |D\rangle$
12. $|\psi\rangle = |A\rangle$

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