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Solution: Let r_i denote the continuously compounded monthly returns

Step 1:

Month	Stock price	$\ln\left(\frac{S_t}{S_{t-1}}\right)$
1	80	
2	64	$r_1=\ln\left(\frac{64}{80}\right)=-0.22314$
3	80	$r_2=\ln\left(\frac{80}{64}\right)=0.22314$
4	64	$r_3=\ln\left(\frac{64}{80}\right)=-0.22314$
5	80	$r_4=\ln\left(\frac{80}{64}\right)=0.22314$
6	100	$r_5=\ln\left(\frac{100}{80}\right)=0.22314$
7	80	$r_6=\ln\left(\frac{80}{100}\right)=-0.22314$
8	64	$r_7=\ln\left(\frac{64}{80}\right)=-0.22314$
9	80	$r_8=\ln\left(\frac{80}{64}\right)=0.22314$

$$\bar{r}=\frac{r_1+r_2+\cdots+r_8}{8}=0$$

Step 2) The unbiased sample variance of the non-annualized monthly returns is:

$$=\frac{1}{n-1}\sum_{j=1}^{n}(r_j-\bar{r})^2$$

$$=\frac{1}{8-1}\cdot\sum_{j=1}^{8}(r_j-0)^2=\frac{1}{7}\cdot\sum_{j=1}^{8}r_j^2=\frac{1}{7}\times(8\times 0.22314^2)=0.0569045$$

The Annualized historical volatility $=\sqrt{0.0569045}\times\sqrt{12}$

$$=0.826=82.6\%$$

Thus, A is the correct answer

#17. Alternative Solution :

The Annualized historical Volatility $= \sqrt{P} \cdot \sqrt{\frac{n}{n-1}\left(\frac{\sum_i r_i^2}{n} - (\bar{r})^2\right)}$

where P is number of Periods Per year (annualized coefficient)

n is number of returns (# of months − 1)

$\because \bar{r} = 0$

$\sum_i r_i^2 = 0.1398344356$

$$\sqrt{12} \cdot \sqrt{\frac{8}{7} \cdot \left(\frac{0.13983}{8} - 0^2\right)} = 0.826363$$

Note constraints of the cropping requirements.

$\therefore$ A is the answer.