1. Run hypothesis test if Sony stock prices are equal to 15 or not? State your null and alternative hypotheses clearly. Do you accept or reject your hypothesis? If reject, which level of alpha? Are you going to use t-test or z-test in this case? Make your interpretation on you decision.

2. Run hypothesis test if Hitachi stock prices are equal to 20 or not? State your null and alternative hypotheses clearly. Do you accept or reject your hypothesis? If reject, which level of alpha? Are you going to use t-test or z-test in this case? Make your interpretation on you decision.

3. Run hypothesis test if Sony stock prices significantly differ from Hitachi stock prices or not (are they the same or not?)? State your null and alternative hypotheses clearly. Do you accept or reject your hypothesis? If reject, which level of alpha? Are you going to use t-test or z-test in this case? Make your interpretation on you decision.
4. Run hypothesis test if variation in Sony stock prices (stock price fluctuations) significantly differ from variation in Hitachi (stock price fluctuations)? (Are both stock price fluctuations the same over time or not?). State your null and alternative hypotheses clearly. Do you accept or reject your hypothesis? If reject, which level of alpha? Are you going to use t-test, z-test or F-test in this case? Make your interpretation on you decision.

5. You are given the following information about annual IBM stock returns:

\[ H_0: \mu < 2.3\% \]
\[ H_1: \mu = 2.3\% \]

\[ n = 35 \text{ years} \]
\[ t = 2.05 \quad (t\text{-prob: 0.055}) \]

Please answer the following questions based on the above information:

a. Explain the null and the alternative hypotheses very briefly! What do the null and the alternative hypotheses suggest for IBM?

b. Having t-test information, do you accept or reject your hypothesis? At what level and why?

c. Make your interpretation on your decision. What do you mean by accepting (or rejecting) the above hypothesis?

**FORMULAS TO BE USED:**

\[
\bar{x} = \frac{\sum X}{N} \quad \sigma = \sqrt{\frac{\sum (X - \mu)^2}{N}} \quad s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}
\]

\[
t = \frac{\bar{x} - \mu}{s / \sqrt{n}} \quad Z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}
\]

\[
z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s_1^2 + s_2^2 \over n_1 - n_2}} \quad s_{p^2} = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2} \quad t = \frac{\bar{x}_1 - \bar{x}_2}{s_{p} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}
\]

\[
F = \frac{s_1^2}{s_2^2}
\]