Math 10 - Exercises for Lecture 1

Summation Notation Practice

$X_1 = 1, \quad X_2 = 2, \quad X_3 = 3, \quad X_4 = 4, \quad X_5 = 5$

1. Calculate $\sum_{i=1}^{5} X_i$.

2. Calculate $\sum_{i=1}^{3} X_i$.

3. Calculate $\sum_{i=1}^{3} X_i^2$.

4. Calculate $\left(\sum_{i=1}^{2} X_i \right)^2$.

5. Calculate $\left(\sum_{i=1}^{2} X_i^2 \right)^2$.

$Y_1 = 1, \quad Y_2 = 2$

6. Calculate $\sum_{i=1}^{2} X_i Y_i$.

7. Calculate $\sum_{i=1}^{2} X_i^2 Y_i$.

Linear Transformation Practice

$X_1 = 1, \quad X_2 = 2, \quad X_3 = 3, \quad X_4 = 4, \quad X_5 = 5$

8. Calculate Z_1 and Z_2, where $Z_i = 2X_i + 1$.

9. Is $Z_i = 5X_i^2 - 7$ a linear transformation of the X_is?

10. If you plotted $Z_i = 10X_i - 2$ with Z_i on the vertical axis and X_i on the horizontal axis, then connect all the points with an infinitely long line, where would the vertical intercept be?

Logarithm Practice

11. What is the value of $\log_{10}(10000)$?

12. What is the value of $\log_2(16)$?

13. What is the value of $\log_3(27)$?

$W_1 = 4, \quad W_2 = 16, \quad W_3 = 64, \quad W_4 = 256$

14. If you plotted the value of W_i on the vertical axis and corresponding i on the horizontal axis, would you be able to connect the resulting (i, W_i) points with a line? *(note: "lines" in mathematics are always straight, unless specified otherwise)*

15. Calculate $U_i = \log_4(W_i)$ for $i = 1, 2, 3, 4$.

16. If you plotted the value of U_i on the vertical axis and corresponding i on the horizontal axis, would you be able to connect the resulting (i, U_i) points with a line?

17. Is $U_i = \log_4(W_i)$ a linear transformation of the W_is?

Answers

1) 15
2) 6
3) 14
4) 9
5) 25
6) 5
7) 9
8) 3, 5
9) No
10) -2
11) 4
12) 4
13) 3
14) No
15) 1, 2, 3, 4
16) Yes
17) No