

Show all work on this sheet, including indications of mental steps, in a clearly organized way that speaks for itself. Use proper mathematical notation/syntax. Label parts, Box final short answers.

11.2.52 a). A certain ball has the property that each time it falls from a height h onto a hard level surface, it rebounds to a height rh , where $0 < r < 1$. Suppose the ball is dropped from an initial height of H meters. Assuming the ball continues to bounce indefinitely, find the total distance that it travels.

- Make a diagram showing the motion steps (down, up/down, ...) through at least the first two bounces, labeling each height.
- Write down the corresponding terms of the infinite series at least through the 3rd bounce, term by term.
- Finish the problem.

11.2.53 What is the value of c if $\sum_{n=2}^{\infty} (1+c)^{-n} = 2$?

- Write out the terms in this series at least through the first 4 terms.
- What is the first term?
- What is the ratio of this geometric series?
- Finish the problem. Be sure to check that all values of c you find are actually valid solutions of this equation.