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50.(a). divergent

(b). convergent

54. no

58. $\frac{196}{33}$

Mathematical induction is a method of mathematical proof typically used to establish that a given statement is true of all natural numbers. It is done by proving that the first statement in the infinite sequence of statements is true, and then proving that if any one statement in the infinite sequence of statements is true, then so is the next one.

1. Use mathematical induction to prove that the statement holds for all positive integers.

$$14+18+22+.....+(4n+10)=2n(n+6)$$

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2. State an explicit rule for the nth term of the recursively defined sequence. Then use mathematical induction to prove the rule.

$$a_n = 5a_{n-1}, \quad a_1 = 3$$