

Collaborative Project — Sequences, Series, and Probability

Inventrepreneur is a small startup company that aims to help inventors get their products to market.

- The sales for Inventrepreneur were \$700,000 in its second year and \$1.9 million in its fifth year. The firm experienced constant growth in each year consistent with an arithmetic sequence.
 - Write the n th term of the sequence.
 - Use the sequence from part (a) to project the total sales for the company in its first 8 years.
- The company lands a deal for a \$50,000 investment, which is placed in an account at 4% interest, compounded monthly.
 - Find the balance in the account at the end of each of the first 6 months.
 - Find the balance in the account after the fifth year.
- Inventrepreneur receives a \$100,000 tax rebate from the state at the end of each year. The company then spends 20% of this rebate at a number of small businesses. In turn, each of these companies spends 20% of the amount it receives at other small companies and so on. Assuming this effect continues without end, what is the total amount of spending that occurs?
- The company is creating a toll-free telephone number. The telephone number must consist of 10 digits, beginning with 888. When entered using a telephone keypad (see figure below), the last four digits will spell out “UCAN.” How many possible telephone numbers are there? (Note that the fourth digit cannot be 0 or 1.)

1	2 ABC	3 DEF
4 GHI	5 JKL	6 MNO
7 PQRS	8 TUV	9 WXYZ
*	0	#

- The company wishes to create a new management structure by hiring a CEO, CFO, and COO. If 14 people interview, in how many ways can they hire these three positions?
- The new management team wishes to create a marketing team by choosing 5 employees from a list of 23 that have more than 5 years of experience. In how many ways can this be done?
- In surveying demographics, the company finds the following data regarding years of service of the employees.

Years of Service	< 1	1 – 3	4 – 5	> 5
Number of Employees	9	21	15	23

What is the probability that an employee chosen at random has more than 3 years of service?

- A consulting firm hired by Inventrepreneur promotes its mobile app and asserts that 65% of its clients use the app to check on their investments and their retirement plans. What is the probability that all 9 of Inventrepreneur’s employees that have been with the company for less than a year will use this mobile app?