Math 34: Spring 2015

Mixed Sequence Practice (Arithmetic and Geometric)

Answers

Answer the following questions with sequence. Note that you’ll have to decide if the sequence involved is Arithmetic or Geometric.

1. A growing business spent $24,000 on insurance this year (2015). They’ve just been informed their insurance will increase by 6.5% for 2016. If they assume this trend continues how much will they spend on insurance over the 7 years from 2015-2021?

Geo. $a_0 = 24,000, r = 1.065$
Amount they spend on insurance over 7 year period $= S_7 = $204,548.88 (rounded)

2. A business had a monthly profit of $5038.53 in October 2014. They found their profits increased by $282.39 in November. If they assume this pattern continues, what will their monthly profit be next November (November 2015)?

Arith. $a_1 = 5038.53, d = 482.39$
Monthly profit next november $= a_{14} = 8,709.6$

3. Paula really likes chocolate, and she enjoys eating chocolates as she studies. The first day she had chocolate she ate $0.50 of chocolate as she studied. The next day she found she had eaten $0.65 worth of chocolate and on day three she found she had eaten $0.80 of chocolate. If this pattern continues and the end of the semester is day 65, how much will Paula have spent on chocolate for the semester?

Arith. $a_1 = 0.50, d = 0.15$
Total Amt Paula will spend for the semester $= S_{65} = $344.50

4. Pavan recently realized that his coffee intake is increasing. In January he spent $30 on coffee, in February he spent $33.00 and in March he spent $36.30. If this pattern continues, how much will Pavan spend on coffee in December?

Geo. $a_0 = 30, r = 1.1$
Amount Pavan will spend on coffee in Dec $= a_{11} = $85.59 (rounded)
5. Your aunt owns a local coffee shop currently has a monthly profit of $4,000 (in May). She started a new marketing campaign that included loyalty perks and found that her profit increased by 1 1/2% in June. She wants to understand if the program is worth continuing, so she asks you the following questions:

(a) What will her monthly profit be the following October (18 months later)?
(b) What will her total profits be in the 18 month period this May to the following October?
(c) How much more will she make if she continues the marketing campaign than if she just continued to have a $4000 per month profit?

Geo. $a_0 = 4,000, r = 1.015$

(a) Monthly profit be the following October $= a_{17} = 5,152.08$ (rounded)
(b) Total profits May to following October $= S_{18} = 81,957.50$
(c) $81,957.50 - 72,000 = 9,957.5$

6. Peter hasn’t been in the habit of saving, so he decided to start a savings plan. The first week of the year he saved $5, and he promised himself he’d save $0.50 more each subsequent week.

(a) How much will be in Peter’s savings account at the end of the year?
(b) How much will Peter add to his savings account on the last week of the year?

Arith. $a_1 = 5, d = 0.5$

(a) Amt account at the end of the year $= S_{52} = 923.00$
(b) Amt deposited last week $= a_{52} = 30.5$