

1. One minute after it is released, a gas-filled balloon has risen 100 feet. In each succeeding minute, the balloon rises only 50% as far as it rose in the previous minute. How far will it rise in 5 minutes?

Geo. seq. $a_1 = 100$ $r = 1.5$ $n = 5$

$$a_n = 100 \cdot (1.5)^{n-1}$$

$$a_5 = 100 \cdot (1.5)^{5-1}$$

$$a_5 = 506.25$$

After 5 minutes, the balloon will have risen 506.25 feet.

2. Miranda arranges some rows of dominoes so that after she knocks over the first one, each domino knocks over two more dominoes when it falls. If there are ten rows, how many dominoes does Miranda use?

Geo. series $a_1 = 1$ $r = 2$ $n = 10$

$$S_{10} = 1 \cdot \left(\frac{1-2^{10}}{1-2} \right)$$

$$S_{10} = 1,023$$

Miranda will have 1,023 dominoes in ten rows.

3. High Tech Electronics advertises a weekly installment plan for the purchase of a popular brand of high definition television. The buyer pays \$5 at the end of the first week, \$5.50 at the end of the second week, and \$6.50 at the end of the third week, and so on for one year. (Assume 1 year = 52 weeks.)

- Geo. seq. a. What will the payments be at the end of the 10th, 20th, and 40th weeks?

$$a_1 = 5 \quad r = 1.1$$

$$a_n = 5(1.1)^{n-1}$$

$$a_{10} = 5(1.1)^{10-1}$$

$$a_{10} = 11.7897$$

$$a_{20} = 5(1.1)^{20-1}$$

$$a_{20} = 30.5795$$

$$a_{40} = 5(1.1)^{40-1}$$

$$a_{40} = 265.724$$

At 10 weeks \$11.79
At 20 weeks \$30.58
At 40 weeks \$265.72

- Geo. Series b. Find the total cost of the TV.

$$a_1 = 5 \quad r = 1.1 \quad n = 52$$

$$S_{52} = 5 \left(\frac{1-1.1^{52}}{1-1.1} \right)$$

$$S_{52} = 7,052.15$$

The total cost of the TV is \$7,052.15.

4. Gina received a 5 year loan of \$10,000 with a 32% annual interest rate compounded quarterly from a bank.

- a. How much will Gina's monthly payment be?

$$5 \text{ yrs} = 60 \text{ months}$$

$$\frac{\$46,609.57}{60 \text{ months}} = 776.826$$

Gina's monthly payment will be \$776.83.

- b. How much will Gina have paid the bank at the end of the loan?

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = 10000 \left(1 + \frac{.32}{4} \right)^{4(5)}$$

$$A = 46,609.57$$

Gina will have paid the bank \$46,609.57 after 5 years.