Bellwork Alg 2 Monday, September 16, 2019

1. There is an arithmetic sequence whose 3rd term is 25 and 6th term is 43. Write the explicit formula for this sequence.

2. There is a geometric sequence whose 2nd term is 18 and whose 4th term is 162. Write the recursive formula for this sequence.

3. After graduating college you take a job with a starting salary of $42,000. Each year you will get a 2% raise. This situation creates a geometric sequence.
The explicit formula that models this situation is: $t_n = 42000(1.02)^{n-1}$ where $n \geq 1$

a. How much will your salary be in year 10?

b. How much total money will you have earned in your first ten years?

Bellwork Alg 2 Monday, September 16, 2019 ANSWERS

1. There is an arithmetic sequence whose 3rd term is 25 and 6th term is 43. Write the explicit formula for this sequence.

$-d$ $-d$ $+d$ $+d$ $+d$

$\underline{\quad}_{t_1}, \underline{\quad}_{t_2}, \underline{25}_{t_3}, \underline{\quad}_{t_4}, \underline{\quad}_{t_5}, \underline{43}_{t_6}$

EXPLICIT FORMULA:

$t_n = 13 + 6(n-1)$

$25 + d + d + d = 43$

$25 + 3d = 43$

$-25 \quad -25$

$\frac{3d}{3} = \frac{18}{3}$

$d = 6$

$t_1 = 25 - d -$

$t_1 = 25 - 6$

$t_1 = 13$

2. There is a geometric sequence whose 2nd term is 18 and whose 4th term is 162. Write the recursive formula for this sequence.

$\div r$ $\times r$ $\times r$

$\underline{\quad}_{t_1}, \underline{18}_{t_2}, \underline{\quad}_{t_3}, \underline{162}_{t_4}$

Recursive Formula:

$t_1 = \pm 6$

$t_n = (t_{n-1})(\pm 3)$

either $t_1 = 6$ and $r = 3$ or $t_1 = -6$ and $r = -3$

$18 \cdot r \cdot r = 162$

$\frac{18r^2}{18} = \frac{162}{18}$

$\sqrt{r^2} = \sqrt{9}$

$r = \pm 3$

$t_1 = \frac{18}{\pm 3} = \pm 6$

$t_1 = 6$ or -6

3. After graduating college you take a job with a starting salary of \$42,000. Each year you will get a 2% raise. This situation creates a geometric sequence.
The explicit formula that models this situation is: $t_n = 42000(1.02)^{n-1}$ where $n \geq 1$

a. How much will your salary be in year 10?

$t_{10} = 42000(1.02)^{10-1} =$ \$50,193.89

b. How much total money will you have earned in your first ten years?

= Sum of first 10 terms

$n = 10$
$t_1 = 42{,}000$
$r = 1.02$

$S_{10} = t_1\left(\frac{1-r^n}{1-r}\right) = 42{,}000\left(\frac{1-1.02^{10}}{1-1.02}\right)$

$S_{10} =$ \$459,888.28