

Advanced Algebra

Unit 1 Sequence and Series Assignment #10

$U_n = U_1 + (n-1)d$

$S_n = \frac{n(U_1 + U_n)}{2}$

1) Given the arithmetic sequence with $U_{11} = 38$ and $U_{20} = 74$, What is S_{30} ?

$U_1 = -2$

$U_{30} = 114$

$38 = U_1 + 10(4)$

$-2 = U_1$

$U_{30} = -2 + 29(4)$
 114

$\frac{74 - 38}{20 - 11} = (4)cd$

$S_{30} = \frac{30(-2 + 114)}{2}$ **1680**

2) Given the arithmetic Sequence $\begin{cases} U_1 = 22 \\ U_n = U_{(n-1)} - 3 \\ n \geq 2 \end{cases}$

What is S_{50} ?

$U_1 = 22$

$U_{50} = -125$

$U_{50} = 22 + 49(-3)$

$S_{50} = -125$

$\frac{50(22 + -125)}{2}$ **-2575**

3) What is the sum of the given sequence 4,8,12,16,20,24

Final Sum 84

$4 + 8 + 12 + 16 + 20 + 24$

4) Given $\sum_{n=1}^{50} 3x + 5$ What is S_{50} ?

$U_1 = 8$
 $U_{50} = 155$

$S_{50} = \frac{50(8 + 155)}{2}$ **4075**

I have a **DIRECT** formula which makes it very easy to find U_1 and U_{50} just substitute in for x

5) Given the Sequence 3,6,9,.... What is S_{120} ?

$U_1 = 3$

$U_{120} = 3 + 119(3) = 360$

$S_{120} = \frac{120(3 + 360)}{2}$ **21780**

For the following problems, write the direct formula ($y = U_0 \cdot r^x$) and then answer the question.

5) You buy a boat for \$12,000. The boat depreciates 4% every year. What is the value of the boat in 7 years?

Direct formula

$y = 12,000(1 - .04)^x$

$12,000(1 - .04)^7$

Final Answer

9017.37

6) You deposit \$8,000 into an account that earns 4.25% compounded annually. What will the balance of this account be in 4 years?

$$8000 \left(1 + \frac{.0425}{1}\right)^4$$

Direct Formula

$$y = 8000 \left(1 + \frac{.0425}{1}\right)^x$$

Final answer

$$\$9,449.18$$

7) You take out a loan for \$10,000. The APR is 6% compounded monthly. You make NO payments on this loan for 4 years while you are in school. What will the balance of the account be after the 4 years?

Direct Formula

$$y = 10,000 \left(1 + \frac{.06}{12}\right)^x$$

Final answer

$$y = 10,000 \left(1 + \frac{.06}{12}\right)^{48} \quad \$12,704.89$$

8) You take out a loan for \$25,000. The APR on the loan is 4.5% compounded monthly. You make payments of \$450 a month.

Write the shifted geometric sequence:

$$U_0 = 25,000$$

$$U_n = \left(1 + \frac{.045}{12}\right) \cdot U_{(n-1)} - 450$$

Make sure
you write
the proper
Recursive!!

How much do you owe after 1 year?

$$U(12) = \$20,635.77$$

12 clicks or 12 in your table

How many months does it take to repay the loan? Show the 2 table values you find to answer this question.

63 Total Months

$$\begin{array}{r|l} 62 & 185.82 \\ \hline 63 & -263.50 \end{array}$$

What was the total amount you ended up paying?

$$\begin{array}{l} 62 \times 450 \\ 1 \times 185.82 \end{array}$$

$$\boxed{\$28,085.82}$$