

128

Question: Write the sequence in recursive notation.

4, 8, 12, 16, 20, ...

$$d=4$$

$$\begin{cases} a_1=4 \\ a_n = a_{n-1} + 4; n > 1 \end{cases}$$

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Question: Write the sequence in explicit notation.

102, 97, 92, 87, 82, 77, ...

$$d = -5$$

$$a_n = -5n + (102 - -5)$$

$$a_n = -5n + 107$$

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Question: Write the sequence in explicit notation.

1, 4, 9, 16, 25, 36, 49, ...

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1^2 2^2 3^2 4^2 5^2 6^2 7^2

$$a_n = n^2$$

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Question: Write the sequence in explicit notation.

$$\frac{1}{2}, \frac{4}{5}, 1, \frac{8}{7}, \frac{5}{4}, \frac{4}{3}, \dots$$

Hint: The sequence could be written in unsimplified fractions as

$$\frac{2}{4}, \frac{4}{5}, \frac{6}{6}, \frac{8}{7}, \frac{10}{8}, \frac{12}{9}, \dots \quad a_n = \frac{2n}{n+3}$$

$n = 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6$

$$a_n = \frac{2n}{n+3}$$

Write the sequence in recursive notation:

10000, 1000, 100, 10, 1, $\frac{1}{10}$, $\frac{1}{100}$, ...

$\cdot \frac{1}{10}$ $\cdot \frac{1}{10}$ $\cdot \frac{1}{10}$

$$\begin{cases} a_1 = 10,000 \\ a_n = \frac{1}{10} a_{n-1} \quad ; n > 1 \end{cases}$$

$$\begin{cases} a_1 = 10,000 \\ a_n = \frac{1}{10} a_{n-1}; n > 1 \end{cases}$$

What is the 17th term of the arithmetic sequence?

-9, -1, 7, 15, ...

$$d=8$$

$$a_n = 8n + (-9 - 8)$$

$$a_n = 8n - 17$$

$$\begin{aligned} a_{17} &= 8(17) - 17 \\ &= 119 \end{aligned}$$

119

Question: Find the third term in the arithmetic sequence whose common difference is 6 and $a_{17} = 20$.

$$20 = 6(17) + a_1 - 6$$

$$20 = 102 + a_1 - 6$$

$$20 = 96 + a_1$$

$$-76 = a_1$$

$$a_n = 6n + (-76 - 6)$$

$$a_n = 6n - 82$$

$$a_3 = 6(3) - 82$$

$$= 18 - 82$$

$$= -64$$

-64

Question: Write the arithmetic sequence whose common difference is 2 and $a_{17} = 50$ in recursive notation.

$$50 = 2(17) + a_1 - 2$$

$$50 = 34 + a_1 - 2$$

$$50 = 32 + a_1$$

$$18 = a_1$$

$$\left\{ \begin{array}{l} a_1 = 18 \end{array} \right.$$

$$\left\{ \begin{array}{l} a_n = a_{n-1} + 2; n > 1 \end{array} \right.$$

$$\begin{cases} a_1 = 18 \\ a_n = a_{n-1} + 2; n > 1 \end{cases}$$

Question: Write the sequence above in explicit notation.

$$a_n = 2n + (18 - 2)$$

$$a_n = 2n + 16$$

$$a_n = 2n + 16$$

Question: Write the sum of the first 10 terms of the sequence a_n defined above in summation notation.

$$\sum_{n=1}^{10} 2n + 16$$

$$\sum_{n=1}^{10} 2n + 16$$

Question: Evaluate the series.

$$\sum_{n=1}^{10} 2n + 16$$

$$\left(\frac{10}{2}\right)(18 + 36)$$

270

Question: Write the arithmetic sequence where $a_8 = 83$ and $a_{25} = 236$ in explicit notation.

$$d = \frac{236 - 83}{25 - 8} = \frac{153}{17} = 9$$

$$a_n = 9n + (20 - 9)$$

$$a_n = 9n + 11$$

$$83 = 9(8) + a_1 - 9$$

$$83 = 72 + a_1 - 9$$

$$83 = 63 + a_1$$

$$20 = a_1$$

$$a_n = 9n + 11$$

Question: Find the thirteenth term of the sequence.

$$74, 69, 64, 59, 54, \dots$$

$$d = -5$$

$$a_n = -5n + (74 + 5)$$

$$a_n = -5n + 79$$

$$a_{13} = -5(13) + 79 = 14$$

14

Question: Evaluate the series.

$$\sum_{n=1}^{72} 10 - 3n = \left(\frac{72}{2}\right)(7 + -206)$$

=

-7164

Question: Evaluate the series.

$$\sum_{i=1}^{239} 6i + 4 = \left(\frac{239}{2}\right)(10 + 1438)$$

173, 036

Question: Evaluate the series.

$$\sum_{n=8}^{52} 4n + 1 = \left(\frac{45}{2}\right)(33 + 209)$$

↙
45 terms

5445

Question: Bingo dropped \$1.00 on May 1 in his piggy bank, \$1.75 on May 2, \$2.50 on May 3 and so on until the last day of May. How much did he drop in his piggy bank on May 19?

1, 1.75, 2.50, ...

$$a_n = 0.75n + (1 - 0.75)$$

$$a_n = 0.75n + 0.25$$

$$a_{19} = \$14.50$$

~~\$2000~~ \$ 14.50

Question: What was his total deposit in his piggy bank for the month of May? (There are 31 days in May)

$$S_{31} = \left(\frac{31}{2}\right)(1 + 23.50) \\ = \$379.75$$

\$ 379.75

Question: After knee surgery, your trainer tells you to return to your jogging program slowly. He suggests jogging for 12 minutes each day for the first week. Each week thereafter, he suggests you increase that time by 6 minutes. How many weeks will it be before you are up to jogging for one hour per day?

12, 18, 24, 30, 36, 42, 48, 54, 60

↓
9

9

Question: Sonia is practicing mindfulness as a means to tend to her mental well-being. She sets a goal to meditate for 30 straight minutes. The first day she can only meditate for 2 minutes without getting distracted. She sets a goal to increase her time by 4 minutes each day. At the end of reaching her goal, how many total minutes will Sonia have spent meditating?

2, 6, 10, ...

$$a_n = 4n - 2$$

$$30 = 4n - 2$$

$$32 = 4n$$

$$\frac{32}{4} = n$$

8 days

$$\sum_{n=1}^8 4n - 2 =$$

$$n=1 \quad \left(\frac{8}{2}\right)(2+30)$$

$$= \boxed{128}$$

