Practice 09.04 Quiz

Try each problem on a new sheet of paper. Show all work. Check your answers and make sure you are ready for the quiz. Call your teacher if you have questions.

Find the value to each question, then cross off that answer and letter below it. You will discover the hidden message from your FLVS teacher!

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<th>95</th>
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[1] What is the 10th term of the arithmetic sequence 3, -2, -7, ... ?

[2] What is the 21st term of the arithmetic sequence 15, 19, 23, ... ?

[3] What is the 23rd term of the arithmetic sequence where \(a_1 = 3\) and \(a_5 = 11\)?

[4] What is the 33rd term of the arithmetic sequence where \(a_1 = 10\) and \(a_{16} = -50\)?

[5] What is the sum of a 24-term arithmetic sequence that starts at 9 and ends at 78?

[6] What is the sum of a 31-term arithmetic sequence that starts at 90 and ends at -120?

[7] What is the sum of the arithmetic sequence 4, 10, 16 ..., if there are 24 terms?

[8] What is the sum of the arithmetic sequence 220, 217, 214..., if there are 21 terms?

[9] On average, an amusement park ticket has increased $3 each year. If the initial cost was $11. What will cost be in thirty first year?

[10] A structure at a grocery store has 1 can of soup on the top level, 4 on the next level, 7 cans on the next level. This arithmetic pattern continues throughout the entire 20 level display. How many soup cans are used to create this sales display?

The page below has answers! Hide it until you have tried all these problems.
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Find the answer to each question, then cross off that answer and letter below it. You will discover the hidden message from your FLVS teacher!

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**Hidden Message:** Oh! I see you are an A plus! O I C U R an A+

[1] What is the 10th term of the arithmetic sequence 3, -2, -7, ... ?
\[ a_n = a_1 + d(n-1) \]
\[ a_{10} = 3 + -5(10-1) \]
the negative five is found by -2 -3= or -7 - -2 = -5
\[ a_{10} = 3 + -5(9) \]
\[ a_{10} = 3 + -45 \]
\[ a_{10} = -42 \]

[2] What is the 21st term of the arithmetic sequence 15, 19, 23, ... ?
\[ a_n = a_1 + d(n-1) \]
\[ a_{21} = 15 + 4(21-1) \]
the four is found by 19 - 15= or 23 - 19 = 4
\[ a_{21} = 15 + 4(20) \]
\[ a_{21} = 15 + 80 \]
\[ a_{21} = 95 \]

[3] What is the 23nd term of the arithmetic sequence where \( a_1 = 3 \) and \( a_5 = 11 \)?
First find the d using \( a_n = a_1 + d(n-1) \) with \( a_5 = 3 + d(5-1) \) then 11 = 3 + d(4) then 8 = 4d or d = 2
\[ a_n = a_1 + d(n-1) \]
\[ a_{23} = 3 + 2(23-1) \]
\[ a_{23} = 3 + 2(22) \]
\[ a_{23} = 3 + 44 \]
\[ a_{23} = 47 \]

[4] What is the 33rd term of the arithmetic sequence where \( a_1 = 10 \) and \( a_{16} = -50 \)?
First find the d using \( a_n = a_1 + d(n-1) \)
This is \( a_{16} = 10 + d(16-1) \) then -50 = 10 + d(15) then -60 = 15d or d = -4
\[ a_n = a_1 + d(n-1) \]
\[ a_{33} = 10 + -4(33-1) \]
\[ a_{33} = 10 + -4(32) \]
\[ a_{33} = 10 + -128 \]
\[ a_{33} = -118 \]

[5] What is the sum of a 24-term arithmetic sequence that starts at 9 and ends at 78?
\[ S_n = (n/2)(a_1 + a_n) \]
\[ S_{24} = (24/2)(9 + 78) \]
\[ S_{24} = (12)(87) \]
\[ S_{24} = 1044 \]

[6] What is the sum of a 31-term arithmetic sequence that starts at 90 and ends at -120?
\[ S_n = (n/2)(a_1 + a_n) \]
\[ S_{31} = (31/2)(90 + -120) \]
\[ S_{31} = (15.5)(-30) \]
\[ S_{31} = -465 \]
[7] What is the sum of the arithmetic sequence 4, 10, 16 ..., if there are 24 terms?

\[ S_n = \frac{n}{2} [2(a_1) + (n - 1)(d)] \]

\[ S_{24} = \frac{24}{2} [2(4) + (24 - 1)(6)] \]

\[ S_{24} = 12 [8 + (23)(6)] \]

\[ S_{24} = 12 [8 + 138] \]

\[ S_{24} = 12 [146] \]

\[ S_{24} = 1752 \]

[8] What is the sum of the arithmetic sequence 220, 217, 214..., if there are 21 terms?

\[ S_n = \frac{n}{2} [2(a_1) + (n - 1)(d)] \]

\[ S_{21} = \frac{21}{2} [2(220) + (21 - 1)(-3)] \text{ Find negative three by subtracting 217 from 220.} \]

\[ S_{21} = 10.5 [440 + (20)(-3)] \]

\[ S_{21} = 10.5 [440 + -60] \]

\[ S_{21} = 10.5 [380] \]

\[ S_{21} = 3990 \]

[9] On average, an amusement park ticket has increased $3 each year. If the initial cost was $11. What will cost be in thirty first year?

The initial cost \( a_1 \) was $11 and an annual increase \( d \) is $3. After 31 years the cost will be equal to

\[ a_n = a_1 + d(n-1) = 11 + 3(31 - 1) = 11 + 3(30) \]

which is $101.

[10] A structure at a grocery store has 1 can of soup on the top level, 4 on the next level, 7 cans on the next level. This arithmetic pattern continues throughout the entire 20 level display. How many soup cans are used to create this sales display?

The formula used is \[ S_n = \frac{n}{2} [2(a_1) + (n - 1)(d)] \], where \( n \) is 20, \( d \) is 3 (4-1) or (7-4), and \( a_1 \) is 1. Answer: \[ (20/2)[2(1) + (20 - 1)(3)] = 10[2 + 57] = 10[114] = 1,140 \].