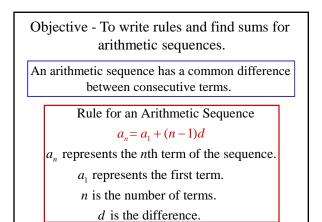
Lesson 12-3



Decide if each series is an arithmetic series.	
1) -5, -1, 3, 7, 11,	Yes, difference $= 4$.
2) 4, 5, 7, 10, 14,	No common difference.
3) 1, 4, 8, 12, 16,	No common difference.
4) -4 , -8 , -12 , -16 , -20 , Yes, difference = -4.	

Write a rule for the *n*th term of each sequence. Then find a_{25} . 1) 48, 53, 58, 63,... $a_n = a_1 + (n-1)d$ $a_n = 48 + (n-1)(53-48)$ $a_n = 5n + 43$ $a_{25} = 5(25) + 43 \neq 168$ 2) -21, -39, -57, -75,... $a_n = a_1 + (n-1)d$ $a_n = -21 + (n-1)(-39 - (-21))$ $a_n = -18n - 3$ $a_{25} = -18(25) - 3 = 453$

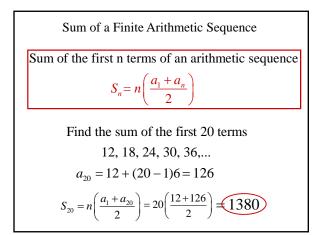
Write a rule for the *n*th term.
1)
$$a_{15} = 10$$
, $a_{20} = 25$
 $d = \frac{25 - 10}{20 - 15} = 3$
 $a_{15} = a_1 + (15 - 1)3$
 $10 = a_1 + 42$
 $a_1 = -32$
 $a_n = -32 + (n - 1)3$
 $a_n = 3n - 35$

Write a rule for the *n*th term.
1)
$$a_{12} = -23$$
, $a_{27} = 37$ $d = \frac{37 - (-23)}{27 - 12} = 4$
 $a_{12} = a_1 + (12 - 1)4$
 $-23 = a_1 + 44$
 $a_1 = -67$
 $a_n = -67 + (n - 1)4$
 $a_n = 4n - 71$

Write a rule for the *n*th term.
1)
$$a_{17} = 22$$
 $d = -4$
 $a_{17} = a_1 + (17 - 1)(-4)$
 $22 = a_1 - 64$
 $a_1 = 86$
 $a_n = 86 + (n - 1)(-4)$
 $a_n = -4n + 90$

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Lesson 12-3 (cont.)



Find the sum of the first 50 terms of this series,

$$34 + 45 + 56 + 67 + 78 + ...$$

 $a_{50} = 34 + (50 - 1)11$
 $a_{50} = 573$
 $S_{50} = n\left(\frac{a_1 + a_{50}}{2}\right)$
 $S_{50} = 50\left(\frac{34 + 573}{2}\right)$
 $S_{50} = 15,175$

Find *n* if
$$S_n = 20$$
 for the following series,
 $-16 + (-12) + (-8) + (-4) + 0 + ...$
 $a_n = a_1 + (n-1)d$ $S_n = n\left(\frac{a_1 + a_n}{2}\right)$
 $a_n = -16 + (n-1)4$
 $a_n = 4n - 20$ $20 = n\left(\frac{-16 + 4n - 20}{2}\right)$
 $20 = 2n^2 - 18n$
 $0 = 2n^2 - 18n - 20$
 $0 = n^2 - 9n - 10$
 $0 = (n - 10)(n + 1)$
 $n = 10$ $n = 10$

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