

### Special Topics from Chapter 1

1. List three more terms that complete a pattern for each of the following:
  - a. 14, 18, 22, 26, 30, 34, 38, ...
  - b. 6, 30, 150, 750, 3750, 18750, 93750, ...
  - c. -4, -1, 4, 17, 44, 91, 164, 269, ...
  - d. 6, -3, 3, 0, 3, 3, 6, 9, ...
  
2. Find a possible  $n^{\text{th}}$  term in each part of problem #1.
  - a.  $a_n = 4n + 10$
  - b.  $a_n = 6 * 5^{n-1}$
  - c.  $a_n = a + (n-1)b + \frac{(n-1)(n-2)}{1*2}c + \frac{(n-1)(n-2)(n-3)}{1*2*3}d$ , where a is the first term, and b,c and d are the first differences on the second, third and fourth rows!
  - d.  $a_n = a_{n-1} + a_{n-2}$ , for  $n > 2$ , and  $a_1 = 6$ ,  $a_2 = -3$
  
3. Given  $a_n = 2n - 4$ , list the first 4 terms of the sequence.
 

-2, 0, 2, 4
  
4. Find the sum of the sequence:  $8 + 15 + 22 + 29 + \dots + 176$ 

2300
  
5. Complete the following magic square:
 

24	11	10	21
13	18	19	16
17	14	15	20
12	23	22	9
  
6. A pencil and a pen together cost \$1.10. The pen costs \$1 more than the pencil. What is the cost of each?
 

The pencil costs 5¢ and the pen costs \$1.05.
  
7. If fence posts are placed in a straight row, every 5 ft, how many will it take to cover 50 feet?
 

It will take 11 fence posts.

8. Given the six prime numbers 2, 3, 5, 7, 11, and 13 pick five of them such that when multiplied together the product is 10010.

$$2 \cdot 5 \cdot 7 \cdot 11 \cdot 13$$

9. How many different ways can you make change for 85 cents, using quarters, dimes, and nickels?

22 ways

	Q	D	N		Q	D	N
	0	0	17		1	2	8
	0	1	15		2	0	7
	0	2	13		1	3	6
	0	3	11		2	1	5
	0	4	9		1	4	4
	0	5	7		2	2	3
	0	6	5		3	0	2
	0	7	3		1	5	2
	0	8	1		2	3	1
	1	0	12		3	1	0
	1	1	10		1	6	0

10. A baseball team played 58 complete games last season. They had 12 fewer losses than wins. How many games did the team win?

They won 35 games.

11. Write a valid conclusion based on the following statements:

*We will have a quiz today if and only if it is Monday, Wednesday, or Friday..*

*Today is not Monday, Wednesday or Friday.*

*We will not have a quiz today.*

12. The students in Mr. Mead's class are standing in a circle. They are evenly spaced and are numbered in order. The student with number 8 is directly across from the student with number 20. How many students are in the class? (Explain how you get your solution.)

There are 24 students in the class. There are 11 students between the one holding the 8 and the 20. So there must be 11 on each side of 8, plus the one holding 8, plus the student holding 20.

13. Write the negation of each of the following:

- |                                    |   |
|------------------------------------|---|
| a. Some cats are short haired.     | No cat is short haired.                               |
| b. All students like recess.       | Some students do not like recess.                     |
| c. Some pets are not well-behaved. | All pets are well-behaved.                            |
| d. No speeding is allowed.         | Some speeding is allowed.<br>(police and ambulances!) |

- e. There exists a counting number  $x$  such that  $5x - 12 = 33$ .  
There is no counting number such that  $5x - 12 = 33$ .  
Or For all counting numbers  $x$ ,  $5x - 12 \neq 33$ .

14. State whether each of the following is a statement or not, and if it is a statement, tell whether it is *true* or *false*.

- a. He lives around the corner from the University. Not a statement.  
b.  $4x + 19 = 2(6 + 2x)$  False statement.  
c. Your MATH 365 instructor is an experienced teacher. True statement.

15. Toma's team entered a mathematics contest where teams of students compete by answering questions that are worth either 3 points or 5 points. No partial credit was given. Toma's team scored 50 points on 12 questions. How many 5-point questions did the team answer correctly?

They got seven five point questions right.

16. Find the 49<sup>th</sup> term in the sequence 23, 27, 31, 35, ...