Math 303

p. 18 #1. (a) $S = 1 + 2 + 3 + 4 + \dots + 99$

$S = 99 + 98 + 97 + 96 + \dots + 1$

$2S = 100 + 100 + 100 + 100 + \dots + 100$

$S = \frac{99(100)}{2} = 4{,}950$

(b) $S = 1 + 3 + 5 + 7 + \dots + 1001$

$S = 1001 + 999 + 997 + 995 + \dots + 1$

$2S = 1002 + 1002 + 1002 + 1002 + \dots + 1002$

$S = \frac{501(1002)}{2} = 251{,}001$

#2. $S = 36 + 37 + 38 + 39 + \dots + 146 + 147$

$S = 147 + 146 + 145 + 144 + \dots + 37 + 36$

$2S = 183 + 183 + 183 + 183 + \dots + 183 + 183$

$S = \frac{(147 - 35)(183)}{2} = \frac{112(183)}{2} = 10{,}248$

#16.

	Fall	Winter	Spring	Summer
Betty				Since not in fall
Carl			born in Spring	
Dan	only one left.			
Al		Since born in Feb.		

p. 20 #18. (An alterate solution to the one given in the book)

7	4
7	0
3	4
0	3
7	3
6	4
6	0
2	4
0	2
7	2
(5)	4

Fill 7-cup: Pour into 4-cup (Now 3+4 cups): Empty 4-cup + pour the 3 cups in the 7-cup into the 4-cup (Now 0+3): Fill 7-cup: Pour 1 cup of 7-cup into the 4-cup and empty the 4-cup (Now 6+0): Pour 4 cups from the 7-cup into the 4-cup and empty the 4-cup (Now 2+0): Pour the 2-cups in the 7-cup into the 4-cup and refill the 7-cup (Now 7+2): Pour 2-cups of the 7-cup into the 4-cup to fill it. Now we have 5 cups in the 7-cup.

p. 21. TIMSS

4	11	6	21
9		5	
8	3	10	21
21		21	

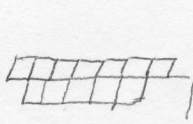
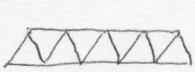
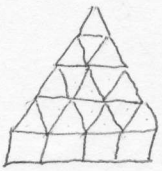
$21 - (11 + 3) = 7$

NAEP

$\frac{\text{Total \# of eggs}}{\text{\# eggs in a carton}} = \frac{58(2)}{12} = 9 \text{ R. } 8$

There would need to be 10 cartons of eggs.

Math 303

p. 37 #1. (a)  6 / 5 (b)  4 5 (c)  1 3 5 7 4

#2. (a) 1, 3, 5, 7, 9, 11, 13, 15, ..., $2n-1$, ... arithmetic [add 2]

(b) 0, 50, 100, 150, 200, 250, 300, 350, ..., $50(n-1)$ arithmetic [add 50]

(c) 3, 6, 12, 24, 48, 96, 192, 384, ..., $3 \cdot 2^{n-1}$ geometric [mult.'s by 2]

(d) 10, 100, 1000, 10000, 100000, 1000000, 10^7, 10^8, ..., 10^n geometric [mult.'s by 10]

(e) 9, 13, 17, 21, 25, 29, 33, 37, 41, ..., $4n+5$ arithmetic [add 4]

(f) 1, 8, 27, 64, 125, 216, 7^3, 8^3, ..., n^3, neither

#3. (a) $2(100)-1 = 199$, $2n-1$

(b) $50(100-1) = 4950$, $50(n-1)$

(c) $3 \cdot 2^{100-1} = 3 \cdot 2^{99}$, $3 \cdot 2^{n-1}$

(d) 10^{100} [googol], 10^n

(e) $4(100)+5 = 405$, $4n+5$

(f) $100^3 = 1000000$, n^3

#6. (a) $5(6) = 30$, $6(7) = 42$, $7(8) = 56$

(b) $100(101) = 10{,}100$

(c) $n(n+1)$

#7. (a) 5, 9, 13, 17, 21, ..., $10(4)+1 = 41$

(b) $4n+1$

(c) Each new square requires 3 matchsticks. The 1st square needed 4 matchsticks, so, each new diagram adds 4 squares or 12 matchsticks.

$4(3)n + 4 = 12n + 4$.

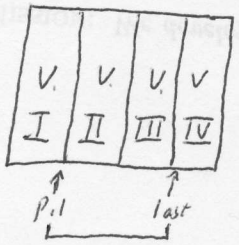
#13. (a) 51, 52, 53, ..., 151 Has $151-50 = 101$ terms.

(b) $2^0=1$, 2^1, 2^2, 2^3, ..., 2^{60} Has $60+1 = 61$ terms.

(c) 10, 20, 30, 40, ..., 2000 Has $\frac{2000}{10} = 200$ terms.

(d) $2^0=1$, 2^1, 2^2, 2^3, 2^4, 2^5, ..., 2^{10} Has $10+1 = 11$ terms.

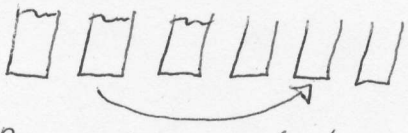
Polya Worksheet

1. 

6 covers
2 sets of pages
$6\left(\frac{1}{6}\right)+2(2)=5$

The bookworm traveled 5 inches.

2. The hunter's camp is at the North Pole. The bear is white, since it is a polar bear.

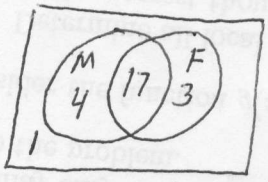
3. 

Pour the second glass into the fifth glass, then return it to its original position.

4. Let L represent the list price.
Let S represent the sale price.

Pat	Kim
$S=\frac{4}{5}L$	$L=\frac{5}{4}S$

Note that the two equations are equivalent. Hence, Pat & Kim paid the same price.

5. 

One student lived with neither parent.

6. $(156+5)\div 40=161\div 40$
$=4\ R1$

Five buses are needed for the field trip.

7. $100¢\div 3=33\frac{1}{3}¢$

One can of soup would cost 34¢.

8. $LCM(5,6)=30$.

They would have the same night off every 30th night.

9. $1\times 12=12$
$2\times 6=12$
$3\times 4=12$

Three different rectangles may be formed with an area of 12 sq. units.

10. $28(27)=756$

There were 756 "hellos" stated at the party.

11. Only the amount of dust in the air is the dirt in a hole.

12. The coins are a half dollar and a nickel.

13. Walter has four apples left.

14. Fill and empty the containers as in the following table.

5L	3L
0	3
3	0
3	3
5	1
0	1
1	0
1	3
(4)	(0)

15. Twenty-five pitches by the losing pitcher for the visiting team who gives up a home run, since only eight innings would be pitched.

16. 1 hr. 20 min = 80 min.
There is no discrepancy.

Halloween Patterns

1. (a) 6 hats, 7 bats

(b) 100th – 100 hats
101st – 101 bats

(c) n hats when n is even,
n bats when n is odd.

2. (a) 5 female vampires, 5 male vampires

(b) 100th – 50 male vampires
101st – 51 female vampires

(c) $\frac{n}{2}$ male vampires when n is even
$\frac{n+1}{2}$ female vampires when n is odd

3. (a) 2 jack o'lanterns, 5 ghosts

(b) 100th – 2 jack o'lanterns
101st – 51 ghosts

(c) 2 jack o'lanterns when n is even
$\frac{n+1}{2}$ ghosts when n is odd

4. (a) 4 pots, 9 cats

(b) 100th – 50 pots
101st – 101 cats

(c) $\frac{n}{2}$ pots when n is even
n cats when n is odd

5. (a) 10 skulls, 7 monsters

(b) 100th – 99 monsters
101st – 151 skulls

(c) $n-1$ monsters when n is even
$3\left(\frac{n+1}{2}\right)-2$ skulls when n is odd.

6. (a) 8 candy corns, 27 candy rolls

(b) 100th – 3^{49} candy rolls
101st – 2^{50} candy corns

(c) $\left(\frac{n}{2}-1\right)$
3 candy rolls when n is even

$2^{\left(\frac{n-1}{2}\right)}$ candy corns when n is odd.

7. (a) 16 lizards, 25 spiders

(b) 100th – 10,000 lizards
101st – 10,201 spiders

(c) n^2
lizards when n is even
spiders when n is odd.

8. (a) 13 pumpkins, 21 vampires

(b) 100th – 354,224,848,179,261,915,075 vampires
101st – 573,147,844,013,817,084,101 pumpkins

(c) This is the
Fibonacci sequence.
where the group
is pumpkins when n is odd
and vampires when n is even.
$a_{n+2} = a_{n+1} + a_n$