#2

Zoe Carver GEOM-F

9/1/17

1) `5, 10, 20, 40, 80, 160` doubbling.

3) `1, -1, 2, -2, 3, -3,4` counting up by one, every other number is negative.

6) `81, 27, 9, 3, 1, 1/3` deviding by three.

9) `1, 2, 6, 24, 120, 720, 5040` n `x` last answer.

LOGIC:

on the left is the answer the the one before it

on the right is the number of the problem (n)

- `1*1` = 1
- `1*2` = 2
- `2*3` = 6

12) `1, 1/2, 1/3, 1/4, 1/5, 1/6` adding one to the denominator.

15) Goerge, Thomas, Abe, Alexander, Andrew, Ulysses - Names of people on bills. NOTE: **I had to google this one**.

18) See paper - adding a square to the middle that is rotated by 90 degrees.

21) They are all divisible by two? (I was not quite sure how to do this one)

24) `123454321`

27) `1, 10` - the difference is `9` wich is more than `1`.

30) 10, 14, 19, 25... 160: the `n-1` value + *n* + `3`

33) `0.1, 0.01, 0.001, 0.0001, 0.00001` - `n/10`

36) ~~`0, 1/2, 3/4, 7/8, 15/16,`~~ ~~- The numorator is~~ ~~`(n * 2) - 1`~~ ~~and the denomonator is~~ ~~`n * 2`~~ wait that won't work. I have no idea, I have spent half an hour on this problem alone and I still have no idea.

39) H, He, Li, Be, B, C, N, O, F, Ne... - I know this one! Its the periodic table!

42) See paper - Add one more angle onto the figure in the circle.

45) See paper - Rotate by 90 Degrees and add one line to the oposite corner.

REFRENCE PAGE

4 EXAMPLE **Real-World Connection**

Business Sales A skateboard shop finds that over a period of five consecutive months, sales of small-wheeled skateboards decreased.

Use inductive reasoning. Make a conjecture about the number of small-wheeled skateboards the shop will sell in June.

The graph shows that sales of small-wheeled skateboards is decreasing by about 3 skateboards each month. By inductive reasoning you might conclude that the shop will sell 42 skateboards in June.

Quick Check 4 **a.** Make a conjecture about the number of small-wheeled skateboards the shop will sell in July.

b. **Critical Thinking** How confident would you be in using the graph to make a conjecture about sales in December? Explain.

EXERCISES

For more exercises, see *Extra Skill, Word Problem, and Proof Practice.*

Practice and Problem Solving

A Practice by Example

Example 1 (page 4) — **for Help**

Find a pattern for each sequence. Use the pattern to show the next two terms.

1. 5, 10, 20, 40, . . .
2. 3, 33, 333, 3333, . . .
3. 1, −1, 2, −2, 3, . . .
4. $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots$
5. 15, 12, 9, 6, . . .
6. 81, 27, 9, 3, . . .
7. O, T, T, F, F, S, S, E, . . .
8. J, F, M, A, M, . . .
9. 1, 2, 6, 24, 120, . . .
10. 2, 4, 8, 16, 32, . . .
11. $1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}, \ldots$
12. $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots$
13. George, John, Thomas, James, . . .
14. Martha, Abigail, Martha, Dolley, . . .
15. George, Thomas, Abe, Alexander, . . .
16. Aquarius, Pisces, Aries, Taurus, . . .

Draw the next figure in each sequence.

17. 
18. 

Example 2 (page 5)

Use the table and inductive reasoning. Make a conjecture about each value.

19. the sum of the first 6 positive even numbers
20. the sum of the first 30 positive even numbers
21. the sum of the first 100 positive even numbers

2	$= 2 = 1 \cdot 2$
2 + 4	$= 6 = 2 \cdot 3$
2 + 4 + 6	$= 12 = 3 \cdot 4$
2 + 4 + 6 + 8	$= 20 = 4 \cdot 5$
2 + 4 + 6 + 8 + 10	$= 30 = 5 \cdot 6$

22. Use the pattern in Example 2 to make a conjecture about the sum of the first 100 odd numbers.

Predict the next term in each sequence. Use your calculator to verify your answer.

23.
12345679 × 9 = 111111111
12345679 × 18 = 222222222
12345679 × 27 = 333333333
12345679 × 36 = 444444444
12345679 × 45 = ■

24.
1 × 1 = 1
11 × 11 = 121
111 × 111 = 12321
1111 × 1111 = 1234321
11111 × 11111 = ■

Example 3 (page 5)

Find one counterexample to show that each conjecture is false.

25. The sum of two numbers is greater than either number.
26. The product of two positive numbers is greater than either number.
27. The difference of two integers is less than either integer.
28. The quotient of two proper fractions is a proper fraction.

Example 4 (page 6)

29. **Weather** The speed with which a cricket chirps is affected by the temperature. If you hear 20 cricket chirps in 14 seconds, what is the temperature?

Chirps per 14 Seconds	
5 chirps	45°F
10 chirps	55°F
15 chirps	65°F

30. **Physical Fitness** Dino works out regularly. When he first started exercising, he could do 10 push-ups. After the first month he could do 14 push-ups. After the second month he could do 19, and after the third month he could do 25. Predict the number of push-ups Dino will be able to do after the fifth month of working out. How confident are you of your prediction? Explain.

B Apply Your Skills

Real-World Connection

Points along the yellow line are equal distances from both sides of the bike trail (Exercise 41).

Find a pattern for each sequence. Use the pattern to show the next two terms.

31. 1, 3, 7, 13, 21, . . .
32. 1, 2, 5, 6, 9, . . .
33. 0.1, 0.01, 0.001, . . .
34. 2, 6, 7, 21, 22, 66, 67, . . .
35. 1, 3, 7, 15, 31, . . .
36. $0, \frac{1}{2}, \frac{3}{4}, \frac{7}{8}, \frac{15}{16}, \ldots$
37. M, V, E, M, . . .
38. AL, AK, AZ, AR, . . .
39. H, He, Li, Be, . . .

40. **Writing** Choose two of the sequences in Exercises 31–36 and describe the patterns.

41. Draw two parallel lines on your paper. Locate four points on the paper, each an equal distance from both lines. Describe the figure you get if you continue to locate points, each an equal distance from both lines.

Draw the next figure in each sequence.

42. 
43. 
44. 
45. 

46. **Multiple Choice** Find the perimeter when 100 triangles are put together in the pattern shown. Assume that all triangle sides are 1 cm long.

(A) 100 cm (B) 102 cm (C) 202 cm (D) 300 cm