

Spiraling Through Pre-Algebra

SKILL	SKILL SEQUENCE	APPEARS IN THESE SPIRALS
1	Divisibility Rules	1, 2, 3, 4, 8, 20, 40
2	Prime and Composite Numbers	1, 2, 3, 4, 5, 6, 8, 21
3	Prime Factorization	2, 3, 4, 5, 6, 7, 8, 22
4	Greatest Common Factor	3, 4, 5, 6, 7, 8, 20
5	Least Common Multiple	6, 7, 8, 9, 10, 21
6	Powers and Exponents	7, 8, 9, 10, 11, 22
7	Comparing and Ordering Integers	9, 10, 11, 12, 13, 20
8	Addition of Integers	10, 11, 12, 13, 14, 21
9	Subtraction of Integers	11, 12, 13, 14, 15, 22, 40
10	Multiplication of Integers	12, 13, 14, 15, 16, 20, 40
11	Division of Integers	14, 15, 16, 17, 19, 21, 29
12	Evaluating Expressions	15, 16, 17, 18, 19, 22, 28, 39
13	Order of Operations	16, 17, 18, 19, 20, 29
14	Simplifying Expressions	17, 18, 19, 22, 23, 39
15	Translating Phrases into Mathematical Expressions	18, 19, 21, 23, 24, 28, 40
16	Equations Solved by Addition	23, 24, 25, 27, 29, 39
17	Equations Solved by Subtraction	24, 25, 26, 27, 29, 38, 39
18	Equations Solved by Multiplication	25, 26, 27, 28, 30, 37, 39
19	Equations Solved by Division	26, 27, 28, 30, 31, 36, 38
20	Writing Equations to Solve a Problem	30, 31, 32, 35, 36, 37
21	Two Step Equations	31, 32, 33, 35, 36, 38
22	Variables on Both Sides of an Equation	32, 33, 34, 35, 36, 37
23	Ratios and Proportions	33, 34, 35, 36, 38, 40
24	Percent	34, 35, 36, 37, 39, 40

SCORING

Communicate About Math

Each spiral concludes with an open-ended question designed to develop students' abilities to communicate about mathematical processes. The main objective of this question is to provide students with opportunities to draw upon problem-solving strategies, to map out a mathematical process, and to communicate that information in written form. Consistent with recent N.C.T.M. standards, this question should not be assessed solely on calculating a *correct* answer. The process used and the student's ability to communicate about the process are equally important. Therefore, the following rubric could be used to assess all ***Communicate About Math*** questions.

- 4 Process described is based upon sound mathematical principles.
 - Essay clearly defines each step of a carefully structured process.
 - Final computation is correct.
- 3 Process described is somewhat inefficient, yet demonstrates an understanding of mathematical principles.
 - Essay defines each step of the process. However, the steps are not presented in sequential order.
 - Final computation is correct.
- 2 Process described deviates from sound mathematical principles.
 - Gaps exist in the essay to the degree that it would be difficult to duplicate the process.
 - Final computation is incorrect.
- 1 Process described lacks mathematical foundation.
 - Essay is vague and unclear.
 - Final computation is incorrect.

SPIRAL  1

Determine whether the number is divisible by 2; by 5.

Answer 2; 5; 2 and 5; or neither.

- 1. 244 _____
- 2. 880 _____
- 3. 1,025 _____
- 4. 131 _____
- 5. 990 _____

State whether the number is divisible by 3; by 9; by 10. List all possibilities. . . .

- 6. 801 _____
- 7. 270 _____
- 8. 459 _____
- 9. 660 _____
- 10. 159 _____

List all the factors of the number. Classify it as *prime* or *composite*.

- 11. 42 _____
- 12. 83 _____
- 13. 51 _____
- 14. 119 _____
- 15. 203 _____

Write *true* or *false*.

- 16. A number that is divisible by 3 is also divisible by 9. _____
- 17. A number that is divisible by 2 and 5 must also be divisible by 10. _____
- 18. Every number has at least one set of factors. _____
- 19. An odd number is never a composite number. _____

Problem Solving

- 20. A baker made 204 muffins. She wants to divide them evenly in packages of three or more. What are four ways she can package the muffins?

Communicate About Math

Think about the process you would use to classify 201 as either *prime* or *composite*. Write an essay that describes your process.

SPIRAL  2

Determine whether the number is divisible by 3; by 5; by 7. List all possibilities.

1. 75 _____ 2. 84 _____ 3. 105 _____
4. 126 _____ 5. 210 _____

List all the factors of the number. Classify it as *prime* or *composite*.

6. 33 _____
7. 41 _____
8. 57 _____
9. 81 _____
10. 89 _____

Give the prime factorization of the number.

11. 56 _____ 12. 72 _____ 13. 91 _____
14. 120 _____ 15. 189 _____

Give the value in standard form.

16. $3^2 \times 5 \times 7$ _____ 17. $2^4 \times 5^2$ _____
18. 3×7^2 _____ 19. $2^2 \times 3^2 \times 5^2$ _____

Problem Solving

20. If $2 \times 3 = 3 \times 2$, does $2^3 = 3^2$?
Explain.

C *Communicate About Math*

Write a letter to a classmate explaining how to use a factor tree to determine the prime factors of a number.

SPIRAL  3

Determine whether the number is divisible by 2; by 3; by 5.

List all possibilities.

1. 168 _____ 2. 225 _____ 3. 390 _____

List all the factors of the number. Classify it as *prime* or *composite*.

4. 37 _____

5. 96 _____

6. 311 _____

7. 219 _____

Give the prime factorization of the number.

8. 48 _____

9. 90 _____

10. 245 _____

11. 441 _____

Find the Greatest Common Factor for each pair of numbers.

12. 15, 27 _____

13. 26, 65 _____

14. 54, 117 _____

15. 38, 95 _____

16. 40, 104 _____

17. 21, 105 _____

18. 31, 66 _____

19. 72, 96 _____

Problem Solving

20. Lynn needs 45 hot dogs for a picnic. Rolls are sold in packages of 12. Hot dogs are sold in packages of 8. What is the minimum number of packages of each that she must buy to have enough for the picnic?
- _____

Communicate About Math

Think about the process you would use to determine if 123 is divisible by either 3 or 7. Write an essay describing your process.

SPIRAL  4

Determine whether the number is divisible by 5; by 7; by 9.

List all possibilities.

1. 42 _____ 2. 105 _____ 3. 225 _____
4. 189 _____ 5. 315 _____

List all the factors of the number. Classify it as *prime* or *composite*.

6. 23 _____
7. 55 _____
8. 84 _____
9. 133 _____
10. 156 _____

Give the prime factorization of the number.

11. 44 _____ 12. 54 _____ 13. 60 _____
14. 81 _____ 15. 115 _____

Find the Greatest Common Factor for each group of numbers.

16. 16, 30, 42 _____ 17. 24, 56, 120 _____
18. 36, 54, 72 _____ 19. 39, 65, 117 _____

Problem Solving

20. Markers are sold in packs of 6. Pens are sold in packs of 8. What is the least number of packs of each that Mel should buy so that she has an equal number of markers and pens?

***C*ommunicate About Math**

Think about the process you would use to find the Greatest Common Factor of 25 and 30. Write an essay describing your process.