Name: Answer Key **Hour:**

MATH 7: CHAPTER 3 STUDY GUIDE (NUMBER THEORY)

3.1 Factors and Multiples: examples on pages 104-106

- **Tips:** Factor = is any integer that divides the given integer with no remainder. For example, 3 and 7 are factors of 21
- **Tips:** Multiple = is the product of itself and any natural number. For example, the multiples of 9 are 9, 18, 27, 36, 45, etc.

List the first five multiples of each given number.

1. 7: 7, 14, 21, 28, 35
2. 8: 8, 16, 24, 32, 40
3. 16: 16, 32, 48, 64, 80
4. 23: 23, 46, 69, 92, 115

List all of the factors of each number in numerical order.

5. 16 = 1, 2, 4, 8, 16
6. 24 = 1, 2, 3, 4, 6, 8, 12, 24
7. 36 = 1, 2, 3, 4, 6, 9, 12, 18, 36
8. 45 = 1, 3, 5, 9, 15, 45

3.2 Divisibility: examples on pages 108-110

- **Tips:** Divisibility Table

  2 = the integer ends in an even digit 0, 2, 4, 6, or 8
  3 = the sum of the integer's digits is divisible by 3
  4 = the number formed by the last 2 digits is divisible by 4
  5 = the integer ends in 0 or 5
  6 = the integer is divisible by both 2 and 3
  8 = the number formed by the last 3 digits is divisible by 8
  9 = the sum of the integer's digits is divisible by 9
  10 = the integer ends in 0

For each number, decide if it is divisible by 2, 3, 4, 5, 6, 8, 9, 10.

9. 45 3, 5, 9
10. 160 2, 4, 5, 8, 10
11. 312 2, 3, 4, 6, 8
12. 51,120 2, 3, 4, 5, 6, 8, 9, 10

3.3 Prime Numbers: examples on pages 111-113

- **Tips:** Prime Number = is a natural number greater than 1 that has no positive divisors other than 1 and itself (examples: 2, 3, 5, 7)
- **Tips:** Composite Number = is any natural number greater than 1 that has positive factors other than 1 and itself (examples: 4, 6, 8, 9, 10)
- **Tips:** Factor Tree Rules
  1) always start with the smallest prime factors
  2) only circle prime numbers
  3) keep factoring numbers until all remaining numbers are prime numbers

Complete each factor tree or factor ladder; then write the prime factorization (example 36 = $2^2 \times 3^2$).

13. 24
2 12
2 6
2 3
$2^3 \cdot 3$

14. 35
5 7
$5 \cdot 7$

15. 64
2 32
2 16
2 8
2 4
2 2
2^6

16. 108
2 54
2 27
3 9
3 3
$2^2 \cdot 3^3$

17. 135
3 45
3 15
3 5
$3^3 \cdot 5$

18. 210
2 105
3 35
5 7
$2 \cdot 3 \cdot 5 \cdot 7$

3.4 Greatest Common Factor (GCF): examples on pages 117-119

- **Tips:** Greatest Common Factor (GCF) = is the greatest common number between 2 or more numbers **(matching)**
- **Tips:** Relatively Prime = is when the only positive integer that evenly divides both numbers is 1 (one is not a prime number)

Use prime factorization to find the GCF of each set of numbers.

19. 15, 40

GCF = 5

20. 12, 30

GCF = 6

21. 21, 84

GCF = 21

22. 8, 36, 100

GCF = 4

23. 27, 45, 54

GCF = 9

24. 15, 60, 126

GCF = 3

3.5 Least Common Multiple (LCM): examples on pages 120-122

- **Tips:** To find the LCM use the highest power of each prime factor & variable

Use prime factorization to find the LCM of each set of numbers.

25. 12, 40

$2^3 \cdot 3 \cdot 5 = 120$

26. 18, 75

$2 \cdot 3^2 \cdot 5^2 = 450$

27. 14, 49

$2 \cdot 7^2 = 98$

28. 8, 36, 100

$2^3 \cdot 3^2 \cdot 5^2 = 1800$

29. 27, 45, 70

$2 \cdot 3^3 \cdot 5 \cdot 7 = 1890$

30. 15, 50, 63

$2 \cdot 3^2 \cdot 5^2 \cdot 7 = 3150$

3.9 Number Patterns: examples on pages 136-137

- **Tips:** To find a number pattern, calculate the difference between each number

Find the missing numbers in each sequence.

31. 5, 9, 13, 17, 21, 25, 29

4 4 4 4 4 4

32. 3, 4, 6, 9, 13, 18, 24

1 2 3 4 5 6

33. 8, 11, 17, 26, 38, 53, 71

3 6 9 12 15 18

Find the last two numbers in each sequence.

34. 7, 13, 19, 25, 31, 37, 43

6 6 6 6 6 6

35. 2, 9, 23, 44, 72, 107, 149

7 14 21 28 35 42

36. 2, 3, 5, 9, 17, 33, 65

1 2 4 8 16 32