CHAPTER 1 STUDY GUIDE (INTEGERS)

1.1 Opposites and Absolute Value examples on pages 2-4 *(see Chapter 1.1 notes)*

- **Tips:** Opposites are two numbers located in opposite directions on a number line, but the same distance from zero. An additive inverse is the same as an opposite. Absolute value measures the number of units from zero. The absolute value of any non-zero number will always be positive.

1. What is the opposite of 2^3? $2 \cdot 2 \cdot 2 = 8$, opposite = -8
2. What is the opposite of -5? 5
3. What is the inverse of -123? 123
4. What is the inverse of $(-3)^2$? $(-3 \cdot 3) = 9$, opposite = -9
5. Solve. $|-5^2| = |-(5 \cdot 5)| = |-25| = 25$
6. Solve. $|-28 + 7^0| = |-28 + 1| = |-27| = 27$
7. Simplify and rewrite from least to greatest using < sign.
   $-|23|$, -3^2, $(-3)^2$, (-6×2), (-3×-5)
   -23 $-(3 \cdot 3)$ $(-3)(-3)$ (-12) (15)
   -23 -9 9 -12 15
   $-23 < -12 < -9 < 9 < 15$

1.2 Adding Integers examples on pages 6-8 *(see Chapter 1.2 notes)* – Add numbers below

- **Tips:** On a number line, positive numbers always move to the right and negative numbers always move to the left.

8. $5 + (-2) = 5 - 2 = 3$
9. $-18 + (-3) = -18 - 3 = -21$
10. $6 + (-26) = 6 - 26 = -20$
11. $23 + (-17) + (-5) = 23 - 17 - 5 = 23 - 22 = 1$
12. $-16 + 27 + 13 = -16 + 40 = 24$
13. $-31 + 15 + (-7) = -31 + 15 - 7 = -38 + 15 = -23$

1.3 Subtracting Integers examples on pages 10-11 *(see Chapter 1.3 notes)* – Subtract numbers below

- **Tips:** When you subtract a negative number, the number becomes a positive number (two negatives will cancel each other).

14. $-9 - (-12) = -9 + 12 = 3$
15. $3 - (-8) = 3 + 8 = 11$
16. $-6 - 7 = -13$
17. $2 - (-18) = 2 + 18 = 20$
18. $-4 - 6 = -10$
19. $-17 - (-12) = -17 + 12 = -5$

1.4 Multiplying Integers examples on pages 15-17 *(see Chapter 1.4 notes)* – Multiply numbers below

- **Tips:** If two numbers being multiplied have different signs, their product (total/answer/result) will be negative.
- **Tips:** If two numbers being multiplied have the same sign, the answer will be positive (two negatives will cancel each other).
- **Tips:** When multiplying more than two numbers, if there is an odd number of negative signs, the answer will be negative.
- **Tips:** When multiplying more than two numbers, if there is an even number of negative signs, the answer will be positive.

20. $5(-8) = -40$
21. $-2(-15) = 30$
22. $-4(-5) = 20$
23. $-4(-2)(-3)(2)$
    $= (8)(-6)$
    $= -48$
24. $-2(-2)(-3)(-2)$
    $= (4)(6)$
    $= 24$
25. $3(-7)(3)(-1)$
    $= (-21)(-3)$
    $= 63$

1.5 Dividing Integers examples on pages 19-21 *(see Chapter 1.5 notes)* – Divide numbers below

- **Tips:** When dividing numbers with the same sign, the answer will be positive (two negatives will cancel each other).
- **Tips:** When dividing numbers with different signs, the answer will be negative.

26. $\frac{-22}{-11}$ = 2

27. $\frac{25}{-5}$ = −5

28. $\frac{-36}{9}$ = −4

29. $150 \div 25 = \frac{150}{25}$ = 6

30. $-90 \div -30 = \frac{-90}{-30}$ = 3

31. $48 \div -4 = \frac{48}{-4}$ = −12

1.6 Exponents examples on pages 23-26 *(see Chapter 1.6 notes)*

- **Tips:** An exponent is a superscript located to the upper-right of a number (or letter) that tells how many times that base number is repeated.
- **Tips:** When dealing with exponents, always look to see what it is touching. Ask yourself is it touching a number or is it touching a parenthesis?
- **Tips:** If the same base number is being multiplied, add the exponents.
- **Tips:** If there is a power-to-a-power, multiply the exponents.
- **Tips:** Assuming the same base number in the numerator and denominator, if both exponents are positive move the smaller exponent (cross the line, change the sign).
- **Tips:** Any none zero base number to the zero power is always equal to 1.

32. Write in expanded form. x^5 = $x \cdot x \cdot x \cdot x \cdot x$

33. Write in expanded form. a^{-3} = $\frac{a^{-3}}{1} = \frac{1}{a^3} = \frac{1}{a \cdot a \cdot a}$

34. Write in exponential form. $y \times y$ = y^2

35. Write in exponential form. $-3 \times -3 \times -3$ = $(-3)^3$

36. Simplify. $p^4 \times p^3$ = $p^{4+3} = p^7$

37. Simplify. $z^6 \times z^7 \times z^3$ = $z^{6+7+3} = z^{16}$

38. Simplify. $(a^2)^4$ = a^8

39. Simplify. $(n^3)^7$ = n^{21}

40. Simplify. $\frac{g^7}{g^2}$ = $g^{7-2} = g^5$

41. Simply. $\frac{2^5 \times 2^5}{(2^2)^3}$ = $\frac{2^{10}}{2^6} = 2^{10-6} = 2^4 = 16$

1.7 Order of Operations examples on pages 31-33 *(see Chapter 1.7 notes)* – Simplify

- **Tips:** (1) Symbols of grouping (2) Exponents (3) Multiplication and Division (4) Addition and Subtraction

42. $12 \div 2 + (8 + 4) \times 2 \div 3$

$12 \div 2 + (12) \times 2 \div 3$

$6 + 24 \div 3$

$6 + 8$

= 14

43. $-3^2 - (16 + 14) \div 5$

$-9 - (30) \div 5$

$-9 - 6$

= −15

44. $|-24| \div 2^3 - (7 + 5) \times 3 \div 9$

$24 \div 2^3 - (12) \times 3 \div 9$

$24 \div 8 - (12) \times 3 \div 9$

$3 - 36 \div 9$

$3 - 4$

= −1

1.8 Scientific Notation examples on pages 35-37 *(see Chapter 1.8 notes)*

- **Tips:** Scientific Notation is expressed as the product of a number between 1-10 and a power of ten.

Write in scientific notation (45-47):

45. 5,240,000 = 5.24×10^6

46. −0.000872 = -8.72×10^{-4}

47. 1,250 = 1.25×10^3

Write in standard form (48-50):

48. -7.34×10^{-4} = −0.000734

49. 2.55×10^6 = 2550000 = 2,550,000

50. 1.39×10^{-2} = .0139 = 0.0139