

(Fall)

PRE-ALGEBRA (SEMESTER FINAL STUDY GUIDE)

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 -5? **5**

3. Solve. $|-28 + 7^0|$ $|-28 + 1| = |-27| = \mathbf{27}$

2. What is the additive inverse of -123? **123**

4. Solve. $|-5^2|$ $|-25| = \mathbf{25}$

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.

5. $5 + (-2)$ **3**

7. $6 + (-26)$ $6 - 26 = \mathbf{-20}$

6. $-18 + (-3)$ $-18 - 3 = \mathbf{-21}$

8. $23 + (-17) + (-5)$ $23 - 17 - 5 = \mathbf{1}$

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).

9. $-9 - (-12)$ $-9 + 12 = \mathbf{3}$

11. $2 - (-18)$ $2 + 18 = \mathbf{20}$

10. $3 - (-8)$ $3 + 8 = \mathbf{11}$

12. $-4 - 6$ **-10**

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).

13. $5(-8)$ **-40**

15. $-4(-2)(-3)(2)$ $(8)(-6) = \mathbf{-48}$

14. $-2(-15)$ **30**

16. $-2(-2)(-3)(-2)$ $(4)(6) = \mathbf{24}$

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.

17. $\frac{-22}{-11} = \mathbf{2}$

19. $48 \div -4 = \mathbf{-12}$

18. $\frac{25}{-5} = \mathbf{-5}$

20. $-90 \div -30 = \mathbf{3}$

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

➤ **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).

21. Simplify. $\frac{2^5 \times 2^5}{(2^2)^3} = \frac{2^{10}}{2^6} = 2^{10-6} = 2^4 = \mathbf{16}$

23. Simplify. $\frac{9^7}{9^2} = 9^{7-2} = \mathbf{9^5}$

22. Simplify. $(n^3)^7 = n^{3 \cdot 7} = \mathbf{n^{21}}$

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

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

25. $12 \div 2 + (8 + 4) \times 2 \div 3$
 $12 \div 2 + 12 \times 2 \div 3$
 $6 + 24 \div 3$
 $6 + 8$
 $= \mathbf{14}$

26. $-3^2 - (16 + 14) \div 5$
 $-3^2 - 30 \div 5$
 $-9 - 30 \div 5$
 $-9 - 6$
 $= \mathbf{-15}$

27. $|-24| \div 2^3 - (7 + 5) \times 3 \div 9$
 $24 \div 2^3 - 12 \times 3 \div 9$
 $24 \div 8 - 12 \times 3 \div 9$
 $3 - 36 \div 9$
 $3 - 4 = \mathbf{-1}$

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.
- **Tips:** Positive exponents equal larger numbers and negative exponents equal smaller numbers.

Write in scientific notation (45-47):

28. $5,240,000 = 5.24 \times 10^6$

29. $-0.000872 = -8.72 \times 10^{-4}$

Write in standard form (48-50):

30. $-7.34 \times 10^{-4} = -0.000734$

31. $2.55 \times 10^6 = 2,550,000$

2.3 Distributive Property examples on pages 55-56 (see Chapter 2.3 notes)

- **Tips:** Distributive Property is used to multiply a single term outside the parentheses and two or more terms inside a set of parentheses.

32. $5(3x - 2) = 15x - 10$

34. $-6(4y + 2) = -24y - 12$

33. $-8(-5y - 2) = 40y + 16$

35. $-4(7y - 3) = -28y + 12$

2.4 Evaluating Expressions examples on pages 59-60 (see Chapter 2.4 notes)

- **Tips:** To evaluate an algebraic expression, replace the variable with a given number and solve the expression where $a = 4$, $b = -2$, $c = 3$, $d = -5$.

36. $7b + 8$ $b = -2$
 $7(-2) + 8$
 $-14 + 8 = -6$

38. $-2d - (-7) + 15$ $d = -5$
 $-2(-5) - (-7) + 15$
 $10 + 7 + 15$
 $17 + 15 = 32$

37. $-3a - (-5)$ $a = 4$
 $-3(4) + 5$
 $-12 + 5 = -7$

39. $-4c - 9 - (-14)$ $c = 3$
 $-4(3) - 9 + 14$
 $-12 - 9 + 14$
 $-21 + 14 = -7$

2.5 Simplifying Expressions examples on pages 62-65 (see Chapter 2.5 notes)

- **Tips:** Like Terms = are terms that have the same variable(s) and same exponents.
- **Tips:** Combine all like terms.

40. $(a + 8) + 15$
 $a + 8 + 15$
 $a + 23$

42. $(-11d + 13) - 3d$
 $-11d + 13 - 3d$
 $-14d + 13$

41. $3(2b + 5) + 7$
 $6b + 15 + 7$
 $6b + 22$

43. $-5(3x - 5) - (-10p)$
 $-15x + 25 + 10p$
 $-15x + 10p + 25$

2.6 Translating Word Phrases examples on pages 69-71 (see Chapter 2.6 notes)

- **Tips:** Memorize the chart on the top of page 69.

44. 7 times a number, increased by 4
 $7n + 4$

46. the difference of p and 9 plus 7m
 $(p - 9) + 7m$

45. 4 less than the product of 3 and x
 $3x - 4$

47. the quotient of 21 and 7, minus 2
 $\frac{21}{7} - 2$

2.7 Estimating examples on pages 74-77 (see Chapter 2.7 notes)

- **Tips:** Highest Place Value = round the number to the far left
- **Tips:** To estimate a product, round each number to its highest place value.
- **Tips:** To estimate a quotient, the goal is to obtain a whole number for the answer.

48. $129 - 285$ (round to the nearest hundred)
 $100 - 300 = -200$

50. $3.084 - 2.924$ (round to the nearest hundredth)
 $\frac{2.974}{0.100} = .16$

49. 239×47 (estimate the product)
 $200 \times 50 = 10,000$

51. $477 \div 12$ (estimate the difference)
 $480 \div 12 = 40$
 OR
 $500 \div 10 = 50$

3.1 Solving Equations by Adding or Subtracting examples on pages 84-88 (see Chapter 3.1 notes)

➤ Tips: The variable must always be on one side and a number must be on the other side

52. $16 = m + 9$

$-9 \quad -9$
 $7 = m$ $m = 7$

53. $-y - 13 = -29$

$+13 \quad +13$
 $(-1) - y = -16 (-1)$ $y = 16$

54. $w + (-7) = 6$

$w - 7 = 6$
 $+7 \quad +7$ $w = 13$

55. $-21 = x - (-14)$

$-21 = x + 14$
 $-14 \quad -14$ $-35 = x$ $x = -35$

3.2 Solving Equations by Multiplying or Dividing examples on pages 93-96 (see Chapter 3.2 notes)

➤ Tips: Multiplication and division are inverse operations of each other.

➤ Tips: Whatever you do to one side of the equation must be done to the other side (this keeps both sides equal).

56. $\frac{-63}{9} = \frac{9m}{9}$

$-7 = m$ $m = -7$

58. $\frac{(-13)y}{-13} = -24 (-13)$

$y = 312$

57. $\frac{-6n}{-6} = \frac{18}{-6}$

$n = -3$

59. $\frac{(-6)x}{-6} = \frac{36}{-6}$

$-36 = x$ $x = -36$

3.3 Solving Two-Step Equations examples on pages 98-102 (see Chapter 3.3 notes)

➤ Tips: Solving equations with two terms, undo the "order of operations" in reverse by performing the inverse operations on both sides of the equation (1) add/subtract, (2) multiply/divide, (3) exponents, (4) grouping.

60. $7n - (-6) = -8$

$7n + 6 = -8$
 $-6 \quad -6$ $7n = -14$
 $\frac{7n}{7} \quad \frac{7n}{7}$ $n = -2$

62. $\frac{w}{-11} + (-3) = 8$

$\frac{w}{-11} - 3 = 8$
 $+3 \quad +3$
 $(-11) \frac{w}{-11} = 11 (-11)$ $w = -121$

61. $18 = -5m + 13$

$-13 \quad -13$
 $5 = -5m$
 $\frac{5}{-5} = \frac{-5m}{-5}$ $-1 = m$ $m = -1$

63. $-33 = \frac{x}{5} - (-7)$

$-33 = \frac{x}{5} + 7$
 $(5) -40 = \frac{x}{5} (5)$
 $-200 = x$ $x = -200$

3.4 Simplifying Before Solving examples on pages 104-106 (see Chapter 3.4 notes)

➤ Tips: Combine like terms, then solve for the variable.

64. $12k + 15k + 2 = 56$

$27k + 2 = 56$
 $-2 \quad -2$
 $27k = 54$ $k = 2$

66. $-19 = 2x - (-17x) - 114$

$-19 = 2x + 17x - 114$
 $+114 \quad +114$
 $95 = 19x$
 $\frac{95}{19} = \frac{19x}{19}$ $5 = x$ $x = 5$

65. $121 = 3(3m - 4) + 3m - 11$

$121 = 9m - 12 + 3m - 11$
 $121 = 12m - 23$
 $+23 \quad +23$
 $144 = 12m$
 $\frac{144}{12} = \frac{12m}{12}$ $m = 12$

67. $-6y + (-7y) + 3y - 124 = -64$

$-6y - 7y + 3y - 124 = -64$
 $-10y - 124 = -64$
 $+124 \quad +124$
 $-10y = 60$
 $\frac{-10y}{-10} = \frac{60}{-10}$ $y = -6$

3.5 Using Equations examples on pages 110-112 (see Chapter 3.5 notes)

➤ Tips: R.E.S.T. = (R)ead – the problem carefully. (E)valuate – how to represent the words with an algebraic equation. (S)olve – the equation. (T)ry again – by plugging in the answer to verify if it is correct.

Write an equation & solve:

68. Mrs. Lygea loves to give students mints. How many days will her supply last if she has a total of 3080 mints and 220 students come by each day to grab 1 mint?

$220x = 3080$ $\frac{220x}{220} = \frac{3080}{220}$ $x = 14 \text{ days}$

3.7 Solving Linear Inequalities examples on pages 120-124 (see Chapter 3.7 notes)

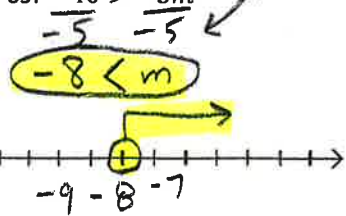
➤ Tips: Always read from the variable. For example, $x > 0$ is the same as $0 < x$.

➤ Tips: If the alligator is eating the variable, it is the greater than sign. If the alligator is not eating the variable, it is the less than sign.

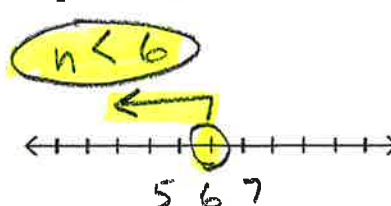
➤ Tips: If $>$ or $<$ sign, the dot on the line is empty (not filled in). If \geq or \leq sign, then the dot on the line is solid (filled in).

➤ Tips: When you multiply or divide by a negative number, flip the sign.

69. $40 > -5m$



70. $\frac{n}{2} < 3$



71. $-2p + 3 < 11$

