

Name:

Final Exam Practice Pack – Section 3

The Addition Principle

- When Adding or Subtracting with a variable, perform the opposite operation to eliminate the value
- Trying to make 0

Example:

$$r - 4 = 7$$

$$r - 4 + 4 = 7 + 4$$

$$r = 11$$

$$t + 5 = 2$$

$$t + 5 - 5 = 2 - 5$$

$$t = -3$$

The Multiplication Principle

- When Multiplying or Dividing with a variable, perform the opposite operation to eliminate the value
- Trying to make 1

Examples:

$$5x = 10$$

$$\frac{5x}{5} = \frac{10}{5}$$

$$x = 2$$

$$-3r = 27$$

$$\frac{-3r}{-3} = \frac{27}{-3}$$

$$r = -9$$

Example:

$$4a = 3$$

$$\frac{4a}{4} = \frac{3}{4}$$

$$a = \frac{3}{4}$$

$$8n = 2$$

$$\frac{8n}{8} = \frac{2}{8}$$

$$n = \frac{1}{4}$$

Multiple Steps

Example:

$$3q - 8 = 10$$

$$3q - 8 + 8 = 10 + 8$$

$$3q = 18$$

$$\frac{3q}{3} = \frac{18}{3} \rightarrow q = 6$$

$$5x + 4 = -6$$

$$5x + 4 - 4 = -6 - 4$$

$$5x = -10$$

$$\frac{5x}{5} = \frac{-10}{5} \rightarrow x = -2$$

Getting Rid of Brackets – Water Bombing

Example: $4(s + 4) = 28$

$$4s + 16 = 28$$

$$4s + 16 - 16 = 28 - 16$$

$$4s = 12$$

$$\frac{4s}{4} = \frac{12}{4}$$

$$s = 3$$

- Multiply in the 4 to both terms in the brackets
- Subtract 16 from both sides of the equation
- Divide both sides by 4 to isolate the variable

Getting Rid of Fractions – LCM

Example:

$$\frac{1}{2}x - \frac{2}{3} = \frac{1}{4}$$

$$12 * \frac{1}{2}x - \frac{2}{3} * 12 = \frac{1}{4} * 12$$

$$\frac{12}{2}x - \frac{24}{3} = \frac{12}{4}$$

$$6x - 8 = 3$$

$$6x - 8 + 8 = 3 + 8$$

$$6x = 11$$

$$\frac{6x}{6} = \frac{11}{6}$$

$$x = \frac{11}{6}$$

- Multiply every fraction by the LCM

- Remember the multiplication is with the numerator only

- Add 8 to both sides of the equation
- Simplify the fractions

- Divide both sides by 6

Use the Addition and Subtraction Principle. ISOLATE THE VARIABLE, show steps.

1. $w + 6 = 7$

2. $x + 12 = -4$

3. $t - 7 = -4$

4. $t + 3 = -3$

5. $k - 12 = -8$

6. $w - 7 = -8$

7. $z - (-13) = 5$

8. $-12 - j = 7$

9. $r - (-7) = 12$

10. $12 - l = -4$

11. $15 - r = 12$

12. $x + 23 = -7$

13. $j + 11 = -4$

14. $16 + f = -17$

15. $j + 3 = -11$

Use the Multiplication and Division Principle. ISOLATE THE VARIABLE, show steps.

16. $3x = -15$

17. $2x = 36$

18. $4t = -11$

19. $-3t = -7$

20. $-4r = 144$

21. $-12m = 120$

22. $3t = -22$

23. $-x = -6$

24. $7h = -3$

25. $\frac{z}{7} = -9$

26. $\frac{k}{6} = -3$

27. $\frac{t}{8} = 12$

28. $\frac{r}{3} = -6$

29. $\frac{j}{-4} = -1$

30. $\frac{r}{6} = 14$

31. $\frac{t}{-2} = 7$

32. $\frac{a}{7} = 0$

33. $-\frac{w}{7} = -5$

Use two-step processes to solve the following

34. $3x - 12 = 3$

35. $-2x + 9 = -4$

36. $-4r - 7 = -9$

37. $-6x + 8 = -12$

38. $3x - 6 = -12$

39. $2x + 3 = -4$

40. $-2r - 8 = 19$

41. $6x + 13 = -5$

42. $12x - 48 = 16$

43. $-7q - 4 = 9$

44. $-3r + 12 = -7$

45. $-x - 4 = 13$

46. $\frac{2}{3}x = 7$

47. $\frac{-2}{5}x = -4$

48. $\frac{2}{r} = 8$

49. $-\frac{3}{7}x = -2$

50. $-\frac{6}{7}x = 1$

51. $\frac{2}{5}t = 15$

Combine the Like Terms

52. $5 \text{ Apples} + 3 \text{ Apples} =$

53. $3 \text{ Bananas} - 8 \text{ Bananas} =$

54. $7 \text{ Cookies} + 1 \text{ Cookies} =$

55. $3x + 7x =$

56. $5x^2 - 26 =$

57. $2x - 12x =$

58. $-2x + 8x =$

59. $-5x^2 - 17x^2 =$

60. $-4x^2 + 5x - 5x =$

61. $-3xy - 11xy =$

62. $2t^2 - 4r^2 + 3t^2 - r^2 =$

63. $3r - 5r + 8r =$

Combine the LIKE TERMS and solve for the variable.

64. $14x - 7 - 2x + 8 = -11$

65. $-4r + 6 + 3r - 5 = -2r + 8$

66. $9k - 3 + 7 - 4k = k - 12 + 2k - 4$

67. $-8t - 3 + 5t + 5 = 2t - 9$

68. $5z + 12 - 6z = -z + 4$

69. $5 - 3s + 6 = 4s - 4$

70. $2x + 3 + 4x = 7 + 2x - 4 + 4x$

71. $-2t + 6 = -2t - 6$

72. $4t + 7 = -4t - 8$

73. $3f + 7 - 8f = 5 + 3f$

Eliminate the Brackets (WATERBOMB) – Distributive Property – Then solve for the unknown

74. $3(x + 4) = 12$

75. $-(s - 7) = -11$

76. $-4(t + 2) = 2(t - 3)$

77. $5(6 - z) = 3(z - 4)$

78. $2(-4t + 54) = -3(-t - 5)$

79. $-3(3q - 4) = 2(4q - 5)$

80. $3(4r + 3) = 5(-2r - 6) + 2$

81. $-8(3t - 12) = 12t$

Eliminate the fractions, using LCM, then solve for the unknown.

82. $\frac{5t}{6} + \frac{1}{3} = \frac{1}{2}$

83. $\frac{7}{8}x - \frac{3}{16} + \frac{3}{4}x = \frac{1}{4} + x$

$$84. \frac{2}{3}x - \frac{1}{4}x = \frac{1}{2}x + 2$$

$$85. \frac{7}{2}q - 2q = -\frac{9}{2}q + \frac{7}{2} + \frac{5}{2}q$$

$$86. 1 + \frac{2}{5}y = \frac{2}{3}y + \frac{7}{5}$$

$$87. -\frac{4}{5}x - \frac{1}{2}x = -\frac{3}{10}x + 4$$

Eliminate the decimals, using factors of 10, solve for the unknown.

$$88. 0.02k = 0.8$$

$$89. 0.02x + 0.22x = 0.84$$

$$90. 1.05y - 2.8 = 5.6$$

$$91. 3.4 + 10 - 1.62w = 0.4w + 4.68$$

92. $0.6 + 0.8x = 0.4 - 0.5x$

93. $0.02 - 0.25x = 0.05 - 0.25x$

94. $-0.6x - 0.01 = -0.02x + 0.29$

95. $1.05 + 0.62x = 0.85 + 0.22x$

Solve for the unknown

96. $\frac{1}{3}(4x - 2) + \frac{1}{2}(3 - 4x) = \frac{1}{4}(-3x - 2)$

$$97. -\frac{2}{3}\left(\frac{7}{8} - \frac{x}{4}\right) - \frac{3}{8} = \frac{5}{8}$$

$$98. -\frac{1}{4}(8x + 4) + 17 = \frac{1}{2}(4x - 8)$$

$$99. 0.25(8y - 4) - 17 = 0.5(4y + 8)$$

Solve the Inequalities, graph the results by hand on a number line

- **Remember to flip the inequality when you multiply or divide the equation by a negative!**

100. $x - 3 > 7$

101. $t + 7 < -4$

102. $3x \leq -12$

103. $-5q \geq -13$

104. $-\frac{x}{4} \leq 12$

105. $3(d - 4) \geq 15$

106. $\frac{2}{3}t - \frac{1}{4} < -2$

107. $0.8z + 0.4z \geq 1.2$

$$108. \quad -\frac{2}{3} \left(\frac{1}{4} - \frac{1}{6} t \right) \geq -\frac{1}{3}$$

$$109. \quad \frac{1}{2} \left(\frac{2}{3} + \frac{4}{7} t \right) \geq -\frac{1}{3}$$

Word Problems

110. The perimeter of a rectangle is 28cm . The length is 2cm less than three times the width. Determine the length and width.

111. Ellie is 6 and her dad is 37. How long will it be before her dad is twice as old as she is?

112. Two numbers differ by 5. Three less than four times the smaller number minus three times the greater number is 11. Find the numbers.
113. The second angle of a triangle is twice the measure of the first angle. The third angle is 12° more than the measure of the first angle. Find the three angles.
114. One number is 14 greater than another number. When the smaller number is subtracted from twice the larger number the difference is 97. Find each number.
115. The width of a rectangle is five centimeters. What length will make the perimeter at least 30 centimeters (inequality).