

Summer Math Packet for Incoming 8th Graders

Welcome to 8th grade! This packet has 100 problems covering the major 7th-grade skills you'll need in 8th grade. Work through them over the summer at your own pace.

Instructions: Show your work and write your answer clearly. You can use drawings, equations, or words to explain your thinking.

Section 1: Rational Numbers & Operations (Problems 1–20)

Master positive and negative numbers with addition, subtraction, multiplication, and division.

1. $3 + (-5) =$

2. $-7 + (-8) =$

3. $12 + (-3) =$

4. $-4 + 9 =$

5. $15 - 8 =$

6. $5 - (-6) =$

7. $-10 - 4 =$

8. $-9 - (-5) =$

9. $6 \times (-2) =$

10. $(-3) \times (-7) =$

11. $(-8) \times 4 =$

12. $2 \times (-5) \times (-1) =$

13. $12 \div (-3) =$

14. $(-20) \div (-4) =$

15. $15 \div (-5) =$

16. $(-36) \div 6 =$

17. $-3 + (-4) - 2 =$

18. $8 - (-2) + (-5) =$

19. $(-2) \times 3 \times (-2) =$

20. **Real-World Problem:** A scuba diver starts at sea level (0 feet). She descends 45 feet, then ascends 15 feet. What is her current depth?

Section 2: Ratios & Unit Rates (Problems 21–40)

Learn to compute unit rates and understand proportional relationships.

21. If 5 pounds of apples cost \$12, what is the unit rate (cost per pound)?

22. Simplify the ratio $\frac{10}{15}$

23. Simplify the ratio $\frac{24}{36}$

24. If 4 pencils cost \$2, how much do 10 pencils cost?

25. A car travels 120 miles in 2 hours. What is the unit rate (miles per hour)?

26. If a recipe needs 2 cups of flour for 12 cookies, how much flour for 18 cookies?

27. Express as a unit rate: 300 words in 5 minutes

28. $\frac{3}{4} + \frac{1}{4} =$

29. $\frac{5}{6} - \frac{1}{3} =$

30. $\frac{2}{3} + \frac{3}{5} =$

31. $\frac{7}{8} - \frac{1}{2} =$

32. $\frac{2}{3} \times \frac{3}{4} =$

33. $\frac{5}{6} \times \frac{2}{5} =$

34. $\frac{3}{4} \div \frac{1}{2} =$

35. $\frac{5}{8} \div \frac{5}{16} =$

36. If 3 items cost \$15, what is the cost per item?

37. A painter paints 200 square feet in 4 hours. How many square feet per hour?

38. $\frac{1}{2} + \frac{1}{3} + \frac{1}{6} =$

39. $\frac{9}{10} - \frac{3}{5} =$

40. **Real-World Problem:** A store sells apples at 3 pounds for \$4.50. Another store sells them at 4 pounds for \$6.00. Which store has the better deal (lower price per pound)?

Section 3: Expressions & Equations (Problems 41–60)

Write and simplify expressions, then solve equations.

41. Evaluate $2x + 5$ when $x = 3$

42. Evaluate $3a - 4$ when $a = 2$

43. Evaluate $x^2 + 2x$ when $x = 2$

44. Simplify $3x + 2x$

45. Simplify $5a - 2a + a$

46. Simplify $4(x + 2)$

47. Simplify $2(3x - 1)$

48. Simplify $3x + 2(x + 1)$

49. Write an expression for "5 more than twice a number n "

50. Write an expression for "the sum of a number and 7"

51. Solve: $x + 5 = 12$

52. Solve: $x - 3 = 8$

53. Solve: $2x = 16$

54. Solve: $\frac{x}{3} = 4$

55. Solve: $3x + 2 = 11$

56. Solve: $2x - 5 = 9$

57. Solve: $4x + 3 = 19$

58. Solve: $5x - 2 = 23$

59. Solve: $-2x = 10$

60. **Real-World Problem:** Marcus has some money. After he spends \$15 on a video game, he has \$23 left. How much money did he start with? Write and solve an equation.

Section 4: Percentages & Multi-Step Problems (Problems 61–75)

Master percentages and solve real-world problems.

61. What is 10% of 50?

62. What is 25% of 80?

63. What is 50% of 120?

64. What is 20% of 75?

65. Find 15% of 200

66. An item costs \$40. It's on sale for 30% off. What is the sale price?

67. An item costs \$60. After a 20% discount, what do you pay?

68. If you earn a 15% raise on a \$100 salary, what is your new salary?

69. A test has 40 problems. If you get 90% correct, how many did you get right?

70. A shirt costs \$50. Sales tax is 8%. What is the total cost?

71. A restaurant bill is \$80. You want to leave a 15% tip. How much is the tip?

72. If 60% of a class of 25 students plays sports, how many students play sports?

73. $3 + 2 \times 4 =$

74. $10 - 2^2 =$

75. **Real-World Problem:** A store bought a jacket for \$40 and wants to mark it up 50%. After the markup, they give a customer a 10% discount. What is the final price the customer pays?

Section 5: Geometry & Measurement (Problems 76–90)

Calculate area, perimeter, volume, and surface area.

76. Find the area of a rectangle with length 8 cm and width 5 cm

77. Find the perimeter of a rectangle with length 10 m and width 6 m

78. Find the area of a triangle with base 6 and height 4

79. Find the area of a circle with radius 3 (use $\pi \approx 3.14$)

80. Find the volume of a rectangular prism with length 5, width 4, and height 3

81. Find the volume of a cube with side length 4

82. The area of a rectangle is 48 square units. If the width is 6, what is the length?

83. The perimeter of a square is 28. What is the side length?

84. Convert 5 meters to centimeters

85. Convert 2 kilometers to meters

86. A scale drawing uses 1 inch to represent 10 miles. If the distance on the map is 3 inches, what is the actual distance?

87. Find the surface area of a rectangular prism with length 3, width 2, and height 4

38. A rectangular garden is 12 feet long and 8 feet wide. How much fencing is needed to go around it?

39. How many square inches are in 1 square foot?

90. **Real-World Problem:** A swimming pool is 10 meters long, 5 meters wide, and 2 meters deep. How many cubic meters of water can it hold? If a filter can clean 15 cubic meters per hour, how long will it take to filter all the water?

Section 6: Exponents, Integers & Mixed Review (Problems 91–100)

Practice exponents and review a mix of all concepts.

91. $2^3 =$

92. $3^2 =$

93. $5^2 =$

94. $2^4 =$

95. $10^2 =$

96. $(-2)^2 =$

97. $(-3)^2 =$

98. $\sqrt{25} =$

99. $\sqrt{64} =$

100. **Real-World Problem:** You have a budget of \$100. You buy 4 notebooks at \$3 each, 2 pens at \$2 each, and a calculator. After spending 30% of your budget on the notebooks and pens, how much money do you have left? How much could the calculator cost if you want to spend no more than 60% of your original budget on it?

Answer Key

Section 1: Rational Numbers & Operations

1. -2 | 2. -15 | 3. 9 | 4. 5 | 5. 7 | 6. 11 | 7. -14 | 8. -4 | 9. -12 | 10. 21 | 11. -32 | 12. 10 | 13. -4 | 14. 5 | 15. -3 | 16. -6 | 17. -9 | 18. 5 | 19. 12 | 20. 30 feet below sea level (-30 feet)

Section 2: Ratios & Unit Rates

21. \$2.40 per pound | 22. $\frac{2}{3}$ | 23. $\frac{2}{3}$ | 24. \$5 | 25. 60 mph | 26. 3 cups | 27. 60 words/min | 28. 1 | 29. $\frac{1}{2}$ | 30. $\frac{19}{15}$ or $1\frac{4}{15}$ | 31. $\frac{3}{8}$ | 32. $\frac{1}{2}$ | 33. $\frac{1}{3}$ | 34. $\frac{3}{2}$ or $1\frac{1}{2}$ | 35. 2 | 36. \$5 per item | 37. 50 sq ft/hr | 38. 1 | 39. $\frac{3}{10}$ | 40. Store 1: \$1.50/lb is the better deal

Section 3: Expressions & Equations

41. 11 | 42. 2 | 43. 8 | 44. $5x$ | 45. $4a$ | 46. $4x + 8$ | 47. $6x - 2$ | 48. $5x + 2$ | 49. $2n + 5$ | 50. $n + 7$ | 51. $x = 7$ | 52. $x = 11$ | 53. $x = 8$ | 54. $x = 12$ | 55. $x = 3$ | 56. $x = 7$ | 57. $x = 4$ | 58. $x = 5$ | 59. $x = -5$ | 60. $x + 15 = 23$; $x = \$8$

Section 4: Percentages & Multi-Step Problems

61. 5 | 62. 20 | 63. 60 | 64. 15 | 65. 30 | 66. \$28 | 67. \$48 | 68. \$115 | 69. 36 problems | 70. \$54 | 71. \$12 | 72. 15 students | 73. 11 | 74. 6 | 75. Markup: \$60; After 10% discount: \$54

Section 5: Geometry & Measurement

76. 40 cm^2 | 77. 32 m | 78. 12 sq units | 79. 28.26 (approx.) | 80. 60 cubic units | 81. 64 cubic units | 82. 8 units | 83. 7 units | 84. 500 cm | 85. 2000 m | 86. 30 miles | 87. 52 sq units | 88. 40 feet | 89. 144 sq inches | 90. 100 cubic meters; approximately 6.67 hours

Section 6: Exponents & Mixed Review

91. 8 | 92. 9 | 93. 25 | 94. 16 | 95. 100 | 96. 4 | 97. 9 | 98. 5 | 99. 8 | 100. Spent on notebooks and pens: \$16 (16%); Remaining: \$84; Max for calculator: \$60