Name:_____

Parent Signature:_____ **Date:**_____

This packet must be signed/dated by a parent/guardian upon its completion by the student whose name appears above. It will not be graded without a parent's signature.

Ridgefield Park Public Schools

Summer Math 8 Packet For Students Entering Grade 8

- **Complete the following mathematics review packet and hand it in to your 8th grade math teacher on the first day of school in September.**
- **It will be graded and counted as a 1st Marking Period quiz grade...based on 100 points! Record your answers on the provided Answer Sheet.**
- **Unanswered questions and answers without work shown will be marked incorrect. <u>All work must be shown on separate sheets of paper that you attach.</u>** Each correct answer will receive 1 point for a total of 80 points. The attached work will be worth 20 points.
- **Beginning on the 2nd day of school the packet will be marked lower by 5 points per day it is late until such time as you would have 0 points.**

Please attach this cover page to the front of the materials you will be handing in to your 8th grade math teacher on the first day of school.

Name:_____ **School:**_____

Math 8 Summer Packet Answer Sheet

Record your answer for each question on the lines provided below. (1 point each)
All work must be shown on separate sheets of paper that you attach. (20 points)

1]_____
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3]_____
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71]_____
72]_____
73]_____
74]_____
75]_____
76]_____
77]_____
78]_____
79]_____
80]_____

Unanswered questions and answers that require work shown will be marked incorrect.

Use the first three pages of this packet as a guide for completing the questions that follow.

Fractions, Decimals, and Percents

Fraction	→	Decimal	→	Percent
$\frac{3}{8} = 3 \div 8$	=	0.375	=	37.5%

Percent	→	Decimal	→	Fraction
250%	=	2.50	=	$2\frac{50}{100} = 2\frac{1}{2}$

Percents and Proportions

Find the part.

Example 1: Find 10% of 92.

① Think of the percent as a ratio. $10\% = \frac{10}{100}$

② Write a proportion. $\frac{10}{100} = \frac{n}{92}$

③ Solve. $100n = 920$

$\frac{100n}{100} = \frac{920}{100}$

$n = 9.2$

10% of 92 is 9.2.

Find the percent.

Example 2: What percent of 80 is 20?

① Write a proportion. $\frac{20}{80} = \frac{n}{100}$

② Solve. $80n = 2{,}000$

$\frac{80n}{80} = \frac{2{,}000}{80}$

$n = 25$

20 is 25% of 80.

Find the whole.

Example 3: 50 is 20% of what number?

① Write a proportion. $\frac{50}{n} = \frac{20}{100}$

② Solve. $20n = 5{,}000$

$\frac{20n}{20} = \frac{5{,}000}{20}$

$n = 250$ 50 is 20% of 250.

Percent of Change

Percent of Increase

Example 1: Alex collects rare books. In 1997, he bought a book for $10. In 1998, it was worth $12. What is the percent of increase from 1997 to 1998?

$$\text{Percent increase} = \frac{\text{amount of change}}{\text{original amount}}$$

$$= \frac{12 - 10}{10}$$

$$= \frac{2}{10} = 0.2 = 20\%$$

The value of Alex's book increased by 20%.

Percent of Decrease

Example 2: Alex sold one of his books in 1998 for $8. The book cost $12 in 1996. What is the percent of decrease from 1996?

$$\text{Percent decrease} = \frac{\text{amount of change}}{\text{original amount}}$$

$$= \frac{12 - 8}{12}$$

$$= \frac{4}{12} = \frac{1}{3} \approx 33.3\%$$

The value of Alex's book decreased by $33\frac{1}{3}\%$.

Solving One-Step Equations by Adding and Subtracting

Follow these steps to solve equations.

	Solve: $n + (-2) = 11$	Solve: $n - 6 = -36$
① Use the inverse operation on both sides of the equation.	$n + (-2) - (-2) = 11 - (-2)$	$n - 6 + 6 = -36 + 6$
② Simplify.	$n = 13$	$n = -30$
③ Check.	$n + (-2) = 11$ $13 + (-2) \stackrel{?}{=} 11$ $11 = 11$ ✔	$n - 6 = -36$ $-30 - 6 \stackrel{?}{=} -36$ $-36 = -36$ ✔

Solving One-Step Equations by Multiplying and Dividing

Follow these steps to solve equations.

	Solve: $\frac{t}{5} = -7$	Solve: $-2x = 8$
① Use the inverse operation on both sides of the equation.	$(5)\frac{t}{5} = (5)(-7)$	$\frac{-2x}{-2} = \frac{8}{-2}$
② Simplify.	$t = -35$	$x = -4$
③ Check.	$\frac{t}{5} = -7$ $\frac{-35}{5} \stackrel{?}{=} -7$ $-7 = -7$ ✔	$-2x = 8$ $-2(-4) \stackrel{?}{=} 8$ $8 = 8$ ✔

Solving One-Step Inequalities by Adding or Subtracting

Solve: $x + 5 > 8$.

$x + 5 > 8$

$x + 5 - 5 > 8 - 5$ ← Subtract 5 from each side.

$x > 3$ ← Simplify.

Solve: $y - 4 \leq 1$.

$y - 4 \leq 1$

$y - 4 + 4 \leq 1 + 4$ ← Add 4 to each side.

$y \leq 5$ ← Simplify.

Ratios and Rates

A *ratio* is a comparison between two quantities. Suppose that an apple pie is cut into 12 pieces, with 8 to be served hot and 4 to be served cold. Two possible ratios are:

$\frac{\text{hot}}{\text{cold}} = \frac{8}{4}\ \frac{(part)}{(part)}$ $\frac{\text{hot}}{\text{total}} = \frac{8}{12}\ \frac{(part)}{(whole)}$

Example 1: Write the ratios in simplest form.

$\frac{8}{4} = \frac{8 \div 4}{4 \div 4} = \frac{2}{1}$ $\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$

A *rate* compares two different types of quantities. To find a unit rate, divide both the numerator and the denominator by the denominator.

Example 2: Find the unit rate for 150 miles in 6 hours.

① Compare. $\frac{\text{miles}}{\text{hours}} = \frac{150}{6}$

② Divide. $= \frac{150 \div 6}{6 \div 6}$

③ Simplify. $= \frac{25}{1}$

The unit rate is 25 miles per hour, or 25 mi/h.

Powers and Exponents

- To evaluate a power, write the factors and multiply.

$5^4 = 5 \cdot 5 \cdot 5 \cdot 5 = 625$ $(-2)^4 = (-2) \cdot (-2) \cdot (-2) \cdot (-2) = 16$ $-2^4 = -(2 \cdot 2 \cdot 2 \cdot 2) = -16$

- To multiply numbers or variables with the same base, add the exponents.

Simplify. $3^2 \cdot 3^4$ $3^2 \cdot 3^4 = 3^{(2+4)} = 3^6$

Simplify. $n^3 \cdot n^4$ $n^3 \cdot n^4 = n^{(3+4)} = n^7$

Simplify. $-4^3 \cdot -4^5$ $-4^3 \cdot -4^5 = 4^{(3+5)} = 4^8$

Circumference and Area of a Circle

The distance around a circle is called the *circumference.*

- You can use a formula to find the circumference (C) of a circle. *Pi* (π) is approximately equal to ($\approx$) 3.14.

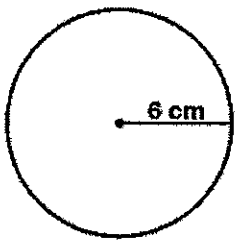
Circumference = 2 × π × radius

$C = 2\pi r$

- If you know the diameter, use this formula:

Circumference = π × diameter

$C = \pi d$



Circumference = 2 × π × r

$C = 2 \times \pi \times 6$

≈ 37.7 cm

To find the *area of a circle,* use this formula:

Area = π × radius^2

$A = \pi r^2$

Area = π × r^2

$A = p \times 6^2$

≈ 113.1 cm^2

The circumference of the circle is about 37.7 cm. The area of the circle is about 113.1 cm^2.

Complete the following questions, showing all work on separate sheets of paper that you attach. Record each answer on the provided answer sheet. The answer sheet is in the beginning of this packet.

Fractions, Decimals, and Percents

Use mental math to write each decimal as a percent.

1. 0.95 **2.** 0.006 **3.** 0.014

Write each fraction as a percent. Round to the nearest tenth of a percent.

4. $\frac{1}{6}$ **5.** $\frac{11}{12}$ **6.** $\frac{1}{20}$

Use mental math to write each percent as a decimal.

7. 2.6% **8.** 234% **9.** 9%

Write each percent as a fraction in simplest form.

10. 10% **11.** 47% **12.** $5\frac{1}{2}\%$

Solve.

13. There are twelve pairs of cranial nerves connected to the brain. Ten of these pairs are related to sight, smell, taste, and sound. What percent of the pairs are related to sight, smell, taste, and sound?

14. If a person weighs 150 lb, then calcium makes up 3 lb of that person's weight. What percent of a person's weight does calcium make up?

Percents and Proportions

Use a proportion to solve each problem.

15. What percent is 21 of 50?

16. What is 45% of 72?

17. 83 is 70% of what number?

18. 45 is what percent of 65?

Use a proportion to solve each problem.

19. 78% of 58 is_____.

20. 86 is 12% of_____.

21. 90 is _____ of 65.

22. 40 is 17% of_____.

23. 57 is 31% of_____.

24. 280% of_____ is 418.

Solve.

25. In 1990, the population of El Paso, Texas was 515,342. Of this population, 69% were of Hispanic origin. How many people were of Hispanic origin?

26. Bangladesh covers 55,598 mi^2. Of this land, 2,224 mi^2 are meadows and pastures. What percent of the land is meadow and pasture?

Percent of Change

Find each percent of increase or decrease. (Round your answer to the nearest tenth, if necessary.)

27. 15 to 20

28. 18 to 10

29. 10 to 7.5

30. 86 to 120

31. 17 to 34

32. 32 to 24

Solving One-Step Equations

Solve each equation.

33. $5t = 25$

34. $8w = 64$

35. $p + 5 = 12$

36. $a + 2 = 15$

37. $\frac{h}{6} = 4$

38. $\frac{x}{8} = 16$

39. $y - 11 = 28$

40. $d - 4 = 12$

41. $w - 10 = 15$

42. $18 - t = 14$

43. $21 + y = 31.64$

44. $18.43 + x = 123.4$

Solving One-Step Inequalities by Adding or Subtracting

Solve each inequality.

45. $m + 6 > 2$

46. $q + 4 \leq 9$

47. $w - 6 > -9$

48. $y - 3 < -4$

Ratios and Rates

Find each unit rate.

49. \$67.92 for 4 gal

50. 250 mi in 4 h

51. 141 words in 3 min

Powers and Exponents

Write using exponents.

52. $(-3m)(-3m)(-3m)$

53. $4 \cdot t \cdot t \cdot t$

54. $(5v)(5v)(5v)(5v)(5v)$

Simplify each expression.

55. $(-4)^2 + 10 \cdot 2$

56. $-4^2 + 10 \cdot 2$

57. $(-6)^2 + 3^3 - 7$

58. $-6^2 + 3^3 - 7$

59. $(2^3 + 8) - 5 \cdot 4 - 5^2$

60. $2^3 \cdot 3 - 5 \cdot 5^2 + 8$

Evaluate each expression for the given value.

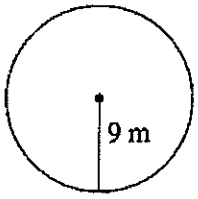
61. $2m^2 - 3m;\ m = 16$ **62.** $y^2 - 19y + 16;\ y = 25$ **63.** $x^2 + 7x - 19;\ x = 21$

64. Suppose you own a card shop. You buy one line of cards at a rate of 4 cards for \$5. You plan to sell the cards at a rate of 3 cards for \$5. How many cards must you sell in order to make a profit of \$100?

Circumference and Area of a Circle

Find the circumference and area of each circle. Round to the nearest hundredth.

65.



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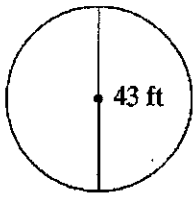
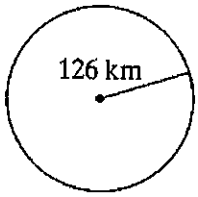


67.



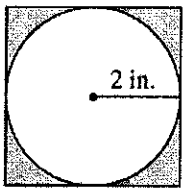
Find the circumference of a circle with the given diameter or radius. Use $\frac{22}{7}$ for pi.

68. $d = 70$ cm **69.** $r = 14$ cm **70.** $d = 35$ in.

Find the radius and the diameter of a circle with the given circumference. Round to the nearest hundredth.

71. $C = 68$ cm **72.** $C = 150$ m **73.** $C = 218$ in.

74. Find the area of the shaded region. Round your answer to the nearest hundredth.



Order of Operations and the Distributive Property

Find the value of each expression.

75. $(8 + 2) \times 9$ **76.** $5 - 1 \div 4$ **77.** $(6 + 3) \div 18$

78. $80 - 6 \times 7$ **79.** $4 \times (6 + 3)$ **80.** $35 - 6 \times 5$