

Incoming 8th

2017 Summer Math Packet

Dear parents as we continue to grow and strengthen our school's math program, we have decided that we will begin to provide our students with a tool to review and prepare for the following math grade level expectations. As you know summer readings have been in place for a while. This year we are extending the summer experience to include math skills. We encourage you to continue to foster a belief in the importance and enjoyment of mathematics at home. Being actively involved in mathematical activities enhances learning. In preparation for the 2017-2018 school year, each student from Kindergarten to 8th grade is required to complete a summer math review packet. Each packet correlates to the standards of learning as identified and approved by the Diocese of Paterson and the Department of Education. As the packets are aligned to the Terranova Standardized testing, they focus on the prerequisite concepts and skills necessary for student success in each math class. During the first week of school, students will be required to turn in their packets for a grade. Review Skill worksheets will receive an assessment grade and Choice Board Activities will receive a project grade.

- ❖ Skills worksheets: Complete the packet, show work when necessary.
- ❖ Choice Boards:
 - Choose 1 project from the "Board"- Grades 1 to 4
 - 2 - 3 project "Boards" will be assigned - Grades 5 to 8
 - All packets will be available for download at the Holy Spirit website.

The work was designed to support instruction in the new curriculum in both its content and presentation. Activities may be done independently or with a parent, guardian or older brother or sister. Talking about the problem can be an important part of completing some activities.

How Holy Spirit's Summer Math Program Works:

- Students set their own goals for completing math activities.
- Students use the math packet to complete and record responses for the activities.
- Summer Math Packet is returned to school during the week of September 11th-15th.
- Students completing the Summer Math Packet will:
 - Receive a summer math certificate.

Summer Packet may have all or some to the following major content areas:

Standard 1: Operations and Algebraic Thinking Activity

Standard 2: Number and Operations

Standard 3: Measurement and Data

Standard 4: Geometry

The purpose of the summer math packet is to make sure students are prepared to start the year by understanding the prerequisite skills. We understand that summer is a busy time for families. If possible, the math department recommends that the packet is completed towards the end of the summer to ensure the skills are secured for the start of the year. The administration and the Math teachers wish you and your family a safe, happy, healthy and mathematically thrilling summer!

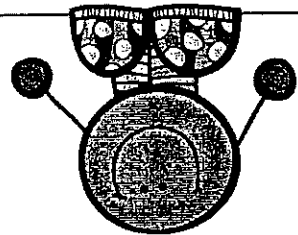
Thank you for your continued support,

Fr. Marie Antonelli M.F.P.
Principal

Faculty of Holy Spirit School

Statistics Choice Board

* Choose 3*



<p>Poster</p> <p>Create a poster for a younger student teaching them what median, mode, and range is. For each, give a definition, an example, and step-by-step directions on how to find. Why do we need to know them?</p>	<p>Real World Connections</p> <p>Using a newspaper, create an example problem of median, mode, and range based on information found in the newspaper, using any section. Give step-by-step directions on how to solve each. Be creative.</p>	<p>Create a Graph</p> <p>Using a newspaper, create a bar graph or line graph based on information found in the newspaper. You may use any section of the newspaper. Be creative.</p>
<p>Graphs Galore</p> <p>Create a bar graph, line graph, and picture graph for a given table of data that you have created. Then create a list of at least 10 questions based on the graphs.</p>	<p>Video</p> <p>Create a video showing and explaining how to find the median, mode, and range of a set of numbers. Include examples and step-by-step directions.</p>	<p>Foldable</p> <p>Create a foldable on median, mode, and range is. For each, give a definition, an example, and step-by-step directions on how to find. Give reasons why we need to know each.</p>
<p>Game</p> <p>Design and create a game on bar graphs and line graphs. Include at least 3 different questions which your questions come from. Include the game rules, question cards, and an answer key. Be creative!</p>	<p>Quiz</p> <p>Create a 10-question quiz on median, mode, and range. Include an answer key.</p>	<p>Computer Project</p> <p>Design a computer project that explains how to find the median, mode, and range of a set of numbers. Include step-by-step directions and pictures.</p>

Math Review Packet for 7th - 8th Grades

Find the sum or difference.

1. $40 + 77$ 2. $77 + 40$ 3. $94 - (-20)$ 4. $40 - (-20)$

5. $-100 - (-20)$ 6. $25 - (-20)$ 7. $-25 - (-20)$ 8. $40 - (-20)$

9. $25 - (-20) - (-20)$ 10. $-20 + 25 - (-20)$ 11. $20 + (-20) - 20$ 12. $20 - (-20)$

Find the product or quotient.

13. $60 \div 12$ 14. $-90 \div (-20)$ 15. $80 \div (-10)$ 16. $-10 \div 10$

17. $-10 \div 10$ 18. $40 \div (-4)$ 19. $2 \div (-2)$ 20. $10 \div (-10)$

21. $-20 \div (-20) \div (-20)$ 22. $-20 \div (-10) \div (-20)$ 23. $20 \div (-10) \div (-10)$

Evaluate the numerical expression. Be sure to use the order of operations.

24. $70 + (-2) \div (-2)$ 25. $-20 \div (-5) + (-3) + (-4)$ 26. $44 - 84 + (-2)$

27. $-10 + 10 \div (-10)$ 28. $-20 \div (-10) + (-20)$ 29. $-24 + 4 \div (-2)$

Operations with Integers

Adding Integers

- Positive + Positive:** Add the absolute values of the two numbers and make the answer positive.

ex: $25 + 19 \rightarrow 25 + 19 \rightarrow$ answer: 44
- Negative + Negative:** Add the absolute values of the two numbers (for percents bracket) and take the sign of the number with the greater absolute value.

ex: $-7 + (-12) \rightarrow 7 + 12 = 19 \rightarrow 19$ is greater, so answer is negative \rightarrow answer: -19

ex: $6 + (-9) \rightarrow 9 - 6 = 3 \rightarrow 9 > 6$, so answer is negative \rightarrow answer: -3

Subtracting Integers

- Keep the first number the same, change the subtraction sign to an addition sign, and change the sign of the second number. Then use the addition rules.

ex: $-3 - 7 \rightarrow -3 + (-7) = -10$

ex: $25 - (-8) \rightarrow 25 + 8 = 33$

ex: $-6 - (-4) \rightarrow -6 + 4 = -2$

Multiplying & Dividing Integers

Ignore the signs and multiply or divide as usual. Then determine the sign of the answer using the following rules:

- Negative + or \times Negative = Positive
- Negative \div or + Positive (or Positive \div or \times Negative) = Negative

ex: $-3 \times (-2) \rightarrow 3 \times 2 = 6 \rightarrow$ neg \times neg = pos \rightarrow answer: 6

ex: $48 \div (-6) \rightarrow 48 \div 6 = 8 \rightarrow$ pos \div neg = neg \rightarrow answer: -8

Order of Operations

For exponents
 Exponents
 Multiplication & Division (left to right)
 Addition & Subtraction (left to right)

Solve the proportion.

71. $\frac{2}{3} = \frac{10}{x}$ 72. $\frac{3}{4} = \frac{9}{x}$ 73. $\frac{5}{6} = \frac{21}{x}$

74. $\frac{2}{3} = \frac{8}{x}$ 75. $\frac{20}{33} = \frac{8}{x}$ 76. $\frac{5}{7} = \frac{21}{x}$

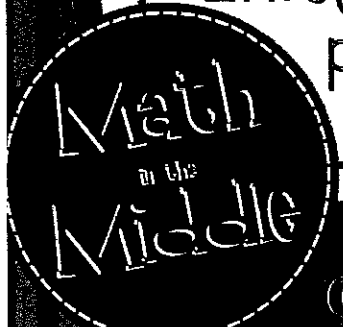
77. $\frac{2}{3} = \frac{8}{x}$ 78. $\frac{5}{6} = \frac{21}{x}$

Percent problems

79. 6 is 20% of what number? 80. What is 20% of 100?

81. Find the sale price. 82. A 20% discount on a \$100 pair of shoes. Find the sale price. 83. Find the total price of a \$100 pair of shoes if the tax is 8%.

Integers, Rational Numbers, Equations, Proportions, Percent, & Geometry



Operations with Integers

Adding Integers

- Negative + Negative: Add the absolute values of the two numbers and make the answer negative.

ex: $-5 + (-9) \rightarrow 5 + 9 = 14 \rightarrow$ answer: (-14)

- Negative + Positive (or Positive + Negative): Subtract the absolute values of the two numbers (larger minus smaller) and take the sign of the number with the greater absolute value.

ex: $-7 + 12 \rightarrow 12 - 7 = 5 \rightarrow$ answer: (5)

ex: $6 + (-9) \rightarrow 9 - 6 = 3 \rightarrow$ answer: (-3)

Subtracting Integers

- Keep the first number the same, change the subtraction sign to an addition sign, and change the sign of the second number. Then use the integer addition rules.

ex: $-3 - 9 \rightarrow -3 + (-9) = (-12)$

ex: $15 - (-8) \rightarrow 15 + 8 = (23)$

ex: $-6 - (-4) \rightarrow -6 + 4 = (-2)$

Multiplying & Dividing Integers

Ignore the signs and multiply or divide as usual. Then determine the sign of the answer using the following rules:

- Negative \cdot or \div Negative = Positive
- Negative \cdot or \div Positive (or Positive \cdot or \div Negative) = Negative

ex: $-3 \cdot (-5) \rightarrow 3 \cdot 5 = 15 \rightarrow$ answer: (15)

ex: $48 \div (-6) \rightarrow 48 \div 6 = 8 \rightarrow$ answer: (-8)

Order of Operations

Parentheses
Exponents

Multiplication & Division (left to right)
Addition & Subtraction (left to right)

Find the sum or difference.

1. $-80 + 77$

2. $77 + 160$

3. $-64 + (-33)$

4. $104 - (-92)$

5. $-105 - (-122)$

6. $185 - (-154)$

7. $-53 - (-59)$

8. $-6 + (-35)$

9. $15 - (-26) - (-39)$

10. $-93 + 191 + (-179)$

11. $18 + (-34) + 52$

12. $-50 - (-93) + (-17)$

Find the product or quotient.

13. $60 \div 12$

14. $-194 \div (-2)$

15. $88 \cdot (-2)$

16. $-12 \cdot 10$

17. $-10 \cdot (-11)$

18. $90 \div (-6)$

19. $3 \cdot (-59)$

20. $-7 \cdot (-2)$

21. $-28 \cdot (-22) \div (-88)$

22. $-56 \cdot 140 \div (-80)$

23. $108 \div (-12) \cdot (-12)$

24. $-84 \cdot (-17) \div 42$

Evaluate the numerical expression. (Be sure to use the order of operations!)

25. $-78 + (-2) \cdot (-56)$

26. $-65 + 6 \div (-3) + 40$

27. $-94 - (84 - 10)$

28. $43 + (-23) - (-57)$

29. $-15 - (-11) + 5 \cdot (-4)$

30. $-26 - (-64) + (-93)$

31. $-84 \div 4 + (-20)$

32. $-56 + (-50) + (-10) \cdot (-9)$

Operations with Rational Numbers

Adding & Subtracting Rational Numbers

Determine whether you should add or subtract using integer rules. Then add or subtract.

Decimals: Line up the decimal points. Then add or subtract and bring the decimal point down. Use integer rules to determine the sign of the answer.

ex: $-9.8 + 6.24 \rightarrow$ neg + pos: subtract \rightarrow answer: (-3.56)

$$\begin{array}{r} 9.80 \\ -6.24 \\ \hline 3.56 \end{array}$$

Fractions/Mixed Numbers: Find a common denominator and then add or subtract. Borrow or convert an improper fraction answer, if necessary. Use integer rules to determine the sign of the answer.

ex: $5\frac{11}{3} - (-3\frac{7}{8}) \rightarrow$ pos + pos: add \rightarrow answer: $(9\frac{9}{8})$

$$\begin{array}{r} 5\frac{11}{3} = 5\frac{22}{6} \\ + 3\frac{7}{8} = 3\frac{7}{8} \\ \hline 8\frac{13}{8} \end{array}$$

Multiplying & Dividing Rational Numbers

Determine the sign of the answer using integer rules. Then multiply or divide.

Multiplying Decimals: Ignore the decimal points. Multiply the numbers. Then count the decimal places in the problem to determine the location of the decimal point in the answer.

ex: $-9.23 \cdot (-11) \rightarrow$ neg \cdot neg = pos \rightarrow answer: (10.153)

$$\begin{array}{r} 9.23 \\ \times 11 \\ \hline 923 \\ 9230 \\ \hline 10153 \end{array}$$

Dividing Decimals: Move the decimal in the divisor to the end of the number. Move the decimal in the dividend the same number of places and then bring it straight up in quotient.

ex: $-5.2 \div 0.2 \rightarrow$ neg \div pos = neg \rightarrow answer: (-26)

$$\begin{array}{r} 02 \overline{) 52} \\ \underline{02} \\ 52 \\ \underline{52} \\ 0 \end{array}$$

Multiplying Fractions: Convert mixed numbers to improper fractions. Then cross-simplify. Multiply the numerators and multiply the denominators. Simplify if necessary.

ex: $-1\frac{1}{3} \cdot \frac{11}{6} \rightarrow$ neg \cdot pos = neg \rightarrow answer: $(-\frac{11}{3})$

$$1\frac{1}{3} = \frac{4}{3} \cdot \frac{11}{6} = \frac{44}{18} = \frac{22}{9}$$

Dividing Fractions: Convert mixed numbers to improper fractions. Then flip the second fraction to its reciprocal and multiply the two fractions. Simplify if necessary.

ex: $-\frac{1}{2} \div (-\frac{3}{8}) \rightarrow$ neg \div neg = pos \rightarrow answer: $(\frac{4}{3})$

$$1\frac{2}{3} = \frac{5}{3} = \frac{20}{12} \cdot \frac{8}{3} = \frac{160}{36} = \frac{40}{9}$$

Find the sum, difference, product, or quotient.

33. $38.61 + 36.841$

34. $1.755 - 1.23$

35. $0.71 \cdot 9.2$

36. $13.12 \div 0.1$

37. $3.651 - (-12.63)$

38. $-3.9 + (-7.6)$

39. $17.6 \cdot 4.3$

40. $6 \cdot (-16.7)$

41. $26.474 - 14.527$

42. $-2.1 + 3.78$

43. $-6.15 \div (-8.2)$

44. $-12.8 \cdot (-4.88)$

Find the sum, difference, product, or quotient.

45. $15 \frac{1}{2} + 15 \frac{1}{4}$

46. $18 \frac{11}{20} - 17 \frac{1}{2}$

47. $2 \frac{1}{4} \cdot 1 \frac{4}{5}$

48. $3 \frac{1}{2} \div 1 \frac{3}{7}$

49. $3 \frac{1}{3} - 5 \frac{1}{9}$

50. $5 \cdot (-1 \frac{2}{5})$

51. $-4 \frac{2}{3} + (-1 \frac{3}{4})$

52. $-5 \frac{5}{6} \div (-2 \frac{1}{6})$

53. $9 \div (-4 \frac{1}{2})$

54. $-18 + 3 \frac{4}{5}$

55. $-5 \frac{2}{3} \cdot (-2 \frac{5}{6})$

56. $-5 \frac{3}{4} - (-3 \frac{7}{8})$

Solving Equations

Solving One-Step Equations

- Cancel out the number on the same side of the equation as the variable by using the inverse operation. (Addition/Subtraction; Multiplication/Division). Be sure to do the same thing to both sides of the equation!

ex: $6x = -18$ → $\frac{6}{6}x = \frac{-18}{6}$ → answer: $x = -3$

ex: $y + 23 = -9$ → $y + 23 - 23 = -9 - 23$ → answer: $y = -32$

ex: $\frac{3}{h} = 4$ → $3 \cdot \frac{3}{h} = 4 \cdot 3$ → answer: $h = 12$

ex: $w - 13 = -5$ → $w - 13 + 13 = -5 + 13$ → answer: $w = 8$

Solving Two-Step Equations

- Undo operations using inverse operations one at a time using the order of operations in reverse. (ie.: undo addition/subtraction before undoing multiplication/division)

ex: $7x - 14 = -32$ → $7x - 14 + 14 = -32 + 14$ → $7x = -28$ → $\frac{7}{7}x = \frac{-28}{7}$ → answer: $x = -4$

ex: $\frac{5}{j} + 13 = 15$ → $\frac{5}{j} + 13 - 13 = 15 - 13$ → $\frac{5}{j} = 2$ → $5 \cdot \frac{5}{j} = 2 \cdot 5$ → answer: $j = 10$

ex: $\frac{3}{b+7} = -2$ → $3 \cdot \frac{3}{b+7} = -2 \cdot 3$ → $\frac{9}{b+7} = -6$ → $b + 7 - 7 = -6 - 7$ → answer: $b = -13$

Solve the one-step equation.

57. $19 + j = -34$

58. $m - 26 = 13$

59. $\frac{x}{5} = -3$

60. $12f = 2.16$

61. $g - (-31) = -7$

62. $\frac{h}{9} = 13$

63. $b + (-3) = -9$

64. $-4w = -280$

Solve the two-step equation.

65. $5m - 3 = 27$

66. $7 + \frac{y}{2} = -3$

67. $4 + 3r = -8$

68. $\frac{1}{2}p - 4 = 7$

69. $\frac{k+8}{3} = -2$

70. $\frac{f}{5} - (-13) = 12$

71. $-15 - \frac{g}{3} = -5$

72. $-8 + 4m = 2$

73. $-18 - \frac{3}{4}v = 3$

74. $\frac{-5+n}{4} = -1$

75. $3.5m + 0.75 = -6.25$

76. $2y + 3 = 19$

Proportions and Percent

- Set cross-products equal to each other and then solve the one-step equation for the given variable.

ex: $\frac{5}{b} = \frac{4}{10}$ \rightarrow $5 \cdot 10 = 4b$ \rightarrow $50 = 4b$ \rightarrow $\frac{50}{4} = \frac{4b}{4}$ \rightarrow answer: $b = 12.5$

Solving Proportions

Solving Percent Problems with Proportions

- Set up and solve a proportion as follows: $\frac{\%}{\text{part}} = \frac{100}{\text{whole}}$

ex: 25 is what percent of 500? \rightarrow $\frac{x}{25} = \frac{100}{500}$ \rightarrow answer: $x = 5\%$

ex: What is 15% of 88? \rightarrow $\frac{15}{x} = \frac{100}{88}$ \rightarrow answer: $x = 13.2$

ex: 18 is 30% of what number? \rightarrow $\frac{30}{18} = \frac{100}{x}$ \rightarrow answer: $x = 60$

Solving Percent Problems with Equations

- Translate the question to an equation and then solve. (Be sure to convert percents to decimals or fractions.)

ex: 20 is 40% of what number? \rightarrow $20 = 0.4x$ \rightarrow answer: $x = 50$

ex: 8 is what percent of 32? \rightarrow $8 = 32x$ \rightarrow $x = 0.25$ \rightarrow answer: 25%

ex: What is 25% of 88? \rightarrow $x = 0.25 \cdot 88$ \rightarrow answer: $x = 22$

Real-World Percent Problems

(This is just one way of many to solve real-world percent problems)

- Tax:** Find the amount of tax using a proportion or equation. Then add the tax to the original amount to find the total cost.
- Discount:** Find the amount of the discount using a proportion or equation. Then subtract the amount of discount from the original price to find the sale price.

Solve the proportion.

77. $\frac{h}{6} = \frac{20}{24}$

78. $\frac{5}{7} = \frac{c}{14}$

79. $\frac{6}{8} = \frac{21}{b}$

80. $\frac{30}{j} = \frac{26}{39}$

81. $\frac{5}{k} = \frac{15}{20}$

82. $\frac{32}{12} = \frac{a}{14}$

83. $\frac{16}{7} = \frac{18}{g}$

84. $\frac{w}{60} = \frac{15}{200}$

Solve the percent problem.

85. Find 15% of 85.

86. 6 is 75% of what number?

87. 40 is what percent of 320?

88. What is 20% of 45?

89. 70 is what percent of 350?

90. Find $33\bar{3}\%$ of 81.

91. A \$58 camera is on sale for 20% off. Find the sale price.

92. Find the total price of a \$14.00 shirt including the 7% sales tax.

Geometry

Geometry Basics

- Perimeter is the distance around a polygon
- Circumference is the distance around a circle
- Area is the space inside a figure
- Volume is the capacity of a 3-dimensional figure
- Surface Area is the sum of the areas of all the faces on a 3-dimensional figure

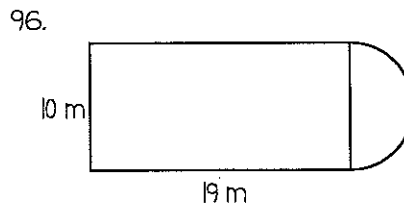
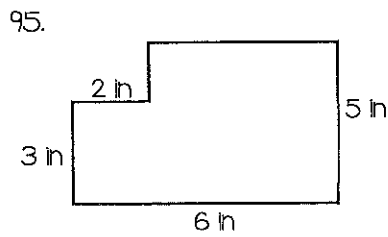
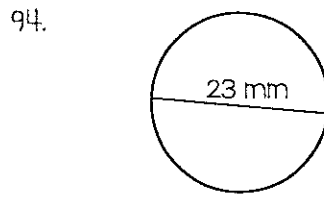
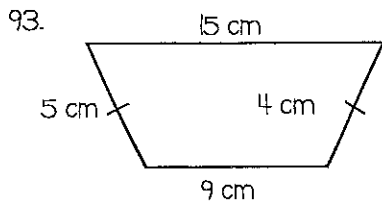
2-Dimensional Geometry Formulas

- Perimeter of Any Figure: sum of side lengths
- Circumference = $\pi \cdot \text{diameter}$
- Area of Parallelogram = $\text{base} \cdot \text{height}$
- Area of Triangle = $\frac{1}{2} \cdot \text{base} \cdot \text{height}$
- Area of Trapezoid = $\frac{1}{2} \cdot \text{height}(\text{base}_1 + \text{base}_2)$
- Area of Circle = $\pi \cdot \text{radius}^2$

3-Dimensional Geometry Formulas

- Volume of Rectangular Prism = $\text{length} \cdot \text{width} \cdot \text{height}$
- Volume of Cylinder = $\pi \cdot \text{radius}^2 \cdot \text{height}$
- Surface Area of Rectangular Prism = $2 \cdot \text{length} \cdot \text{width} + 2 \cdot \text{length} \cdot \text{height} + 2 \cdot \text{width} \cdot \text{height}$
- Surface Area of Cylinder = $2 \cdot \pi \cdot \text{radius}^2 + 2 \cdot \pi \cdot \text{radius} \cdot \text{height}$

Find the perimeter (or circumference) and area. Use 3.14 for pi.



Find the surface area and volume.

