Trinity Catholic Academy
Grade 8 Summer Math Packet

Name: _____

Directions: Complete the following problems to keep your math skills sharp over the summer. Refer to resources included for tutorial videos, definitions and formulas to help you complete this assignment. Use **PENCIL** and show necessary work. Please complete all problems in a notebook labeled Summer Math Grade 8. You may use your graph paper composition notebook for your summer math if you wish.

Section 1: Integers & Order of Operations (1–10)

Show your work

1. -12 + 7 =
2. 15 - 22 =
3. -8 + (-14) =
4. -18 - (-6) =
5. -5 × 9 =
6. 56 ÷ (-8) =
7. 4 + 3(5) =
8. $(8 - 3)^2$ =
9. 24 ÷ 6 + 8 =
10. 18 - 2(4 + 1) =

Integers explained:
https://youtu.be/OSfDRqxmXAE?si=zYXQpzIeu1jq6OpQ

Add, Subtract, Multiply and Divide Integers (positive and negative):
https://youtu.be/O6bRgxVRoZ4?si=UcvSokB7ttXQHaNp

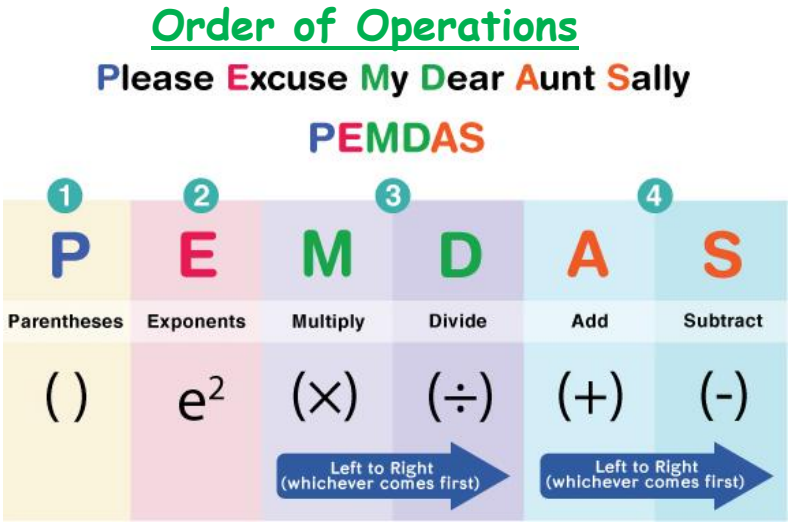
Section 2: Rational Numbers (11–20)

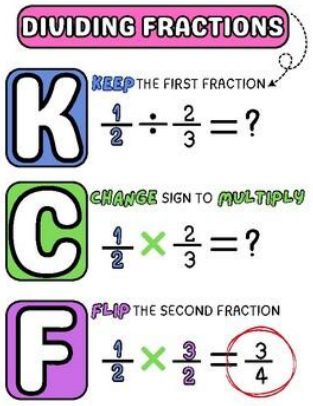
Show your work

11. 2/3 + 1/6 =
12. 5/8 + 3/4 =
13. 7/9 - 2/9 =
14. 3/5 × 10 =
15. 5/6 × 12 =
16. 3/4 ÷ 2 =
17. 2.5 + 4.75 =
18. 9.8 - 3.45 =

19. 6.2 × 4 =
20. 15.6 ÷ 3 =

Rational numbers explained:
https://youtu.be/wswkQxG-Kk8?si=cvQHWa1CKNBq9d9v





Section 3: Expressions & Equations (21–30)

Expressions

- An expression is a combination of numbers, variables, and operations (like addition, subtraction, multiplication, and division).
- For example, $3x + 5$ is an expression where x is a variable.
- Expressions do not have an equal sign and cannot be solved, only simplified.

Equations

- An equation states that two expressions are equal, indicated by an equal sign.
- For example, $2x + 3 = 7$ is an equation.

Equations can be solved to find the value of the variable (in this case, x).

21. Evaluate 5x when x = 4.
22. Evaluate 3a - 2 when a = 8.
23. Solve: x + 12 = 25
24. Solve: x - 17 = 31
25. Solve: 4x = 36
26. Solve: x/8 = 7
27. Simplify: 4y + 7y
28. Simplify: 10n - 3n

29. Evaluate 3(4 + 5)
30. Solve: 2x + 5 = 17

Section 4: Proportions & Percent (31–40)Percentage Formulas

1. To find a percentage of a number, use the formula:

$$\text{Percentage} = \frac{\text{Part}}{\text{Whole}} \times 100$$

2. To calculate the increase or decrease in percentage:

$$\text{Percentage Change} = \frac{\text{New Value} - \text{Old Value}}{\text{Old Value}} \times 100$$

3. Converting Between Fractions, Decimals, and Percentages

To convert a fraction to a percentage:

$$\text{Percentage} = \text{Fraction} \times 100$$

To convert a decimal to a percentage:

$$\text{Percentage} = \text{Decimal} \times 100$$

31. Write 15:20 in simplest form.
32. Solve: x/5 = 8/10
33. Solve: 4/7 = x/21
34. Find 25% of 80.
35. Find 15% of 200.
36. Change 0.45 to a percent.
37. Change 70% to a decimal.
38. A shirt costs $40 and is 20% off. Find the amount of the discount.
39. A $50 item has 6% sales tax. Find the amount of the tax.
40. Find the unit rate in miles/hour: 180 miles in 3 hours.

Section 5: Geometry (41–50) – refer to formulas below

Show your work

41. Area of a rectangle: length 15 cm, width 8 cm.
42. Perimeter of the same rectangle.
43. Area of a triangle: base 12 cm, height 10 cm.
44. Circumference of a circle with radius 5 cm **(Use 3.14 for π).**
45. Area of the circle in #44 above **(Use 3.14 for π).**
46. Volume of a rectangular prism: 4 × 3 × 5.
47. How many degrees are in a **straight angle**?
48. How many degrees are in a **triangle**?
49. Classify a 120° angle. **(acute, right or obtuse)**
50. Find x: 35° + x = 90°.

Rectangle
Area: $A = length \times width$
Perimeter: $P = 2(length + width)$
Square
Area: $A = side^2$
Perimeter: $P = 4\ x\ side$
Triangle
Area: $A = \frac{1}{2}\ x\ base\ x\ height$
Perimeter: $P = side\ a + side\ b + side\ c$
Circle:
Radius (r): Distance from the center to the edge.
Diameter (d): Distance across the circle through the center, $d = 2r$.
Area: $A = \pi r^2$
Circumference (perimeter): $C = 2\pi r$

Types of Angles:
Acute: Less than $90°$
Right: Exactly $90°$
Obtuse: Greater than $90°$ but less than $180°$
Straight: Exactly $180°$

Section 6: Statistics & Probability (51–60)

Mean (Average)

The mean is the arithmetic average of a set of numbers. To calculate it:
Add all the numbers in the data set.
Divide the sum by the total number of items.
Example: For the data set 4, 7, 8, 2, 1, 2, 4, 2:
Sum = 4 + 7 + 8 + 2 + 1 + 2 + 4 + 2 = 30
Number of items = 8
Mean = 30 ÷ 8 = 3.75

Median (Middle Value)

The median is the middle number when the data is arranged in order. If there is an even number of items, the median is the average of the two middle numbers.

Example: Arrange 4, 7, 8, 2, 1, 2, 4, 2 in order: 1, 2, 2, 2, 4, 4, 7, 8
Middle numbers = 2 and 4
Median = (2 + 4) ÷ 2 = 3

Mode (Most Frequent Value)

The mode is the number that appears most frequently in a data set. A set can have no mode, one mode, or multiple modes.

Example: In 1, 2, 2, 2, 4, 4, 7, 8, the number 2 occurs most often, so the mode is 2

Range (Spread of Data):
The range shows how spread out the data is. It is calculated by subtracting the smallest value from the largest value.
Example: For 1, 2, 2, 2, 4, 4, 7, 8:
Range = 8 – 1 = 7

In #51-55, use the data: 6, 8, 10, 12, 14

51. Mean
52. Median
53. Range
54. Greatest value
55. Least value

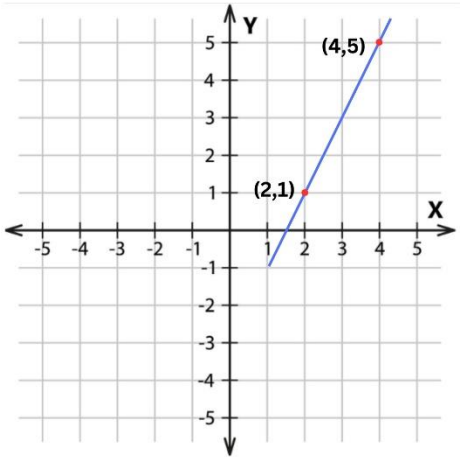
In #56-60, A bag contains 4 red, 5 blue, and 1 green marble.

56. Probability of red
57. Probability of blue
58. Probability of green
59. Probability of **not** green
60. Probability of drawing either red or blue

Section 7: Linear Relationships (61–70)

Slope: The slope formula is used to find the steepness of a line that passes through two points in the coordinate plane. It's also called the rise over run formula.

Formula: $m = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$ m = slope of the line



(x_1, y_1) and (x_2, y_2) are two points on the line
$y_2 - y_1$ is the vertical change ***(rise)***
$x_2 - x_1$ is the horizontal change ***(run)***

Above is an example of a line with graphed (x,y) coordinates

61. Find the value of y if y = 2x + 3 and x = 4.
62. Find y if y = 3x - 2 and x = 5.
63. Find the slope between (1,2) and (3,6).
64. Find the slope between (2,4) and (6,12).
65. Is the point (3,7) a solution to y = x + 4?
66. Is (2,8) a solution to y = 3x + 2?
67. Evaluate y = 4x - 1 when x = 3.
68. Evaluate $y = x^2$ when x = 5.

69. Solve: $3x = 21$.
70. Solve: $2x - 6 = 10$.

Section 8: Word Problems (71–80)

71. A movie ticket costs $14. What is the cost for 6 tickets?
72. A school sold 385 raffle tickets on Friday and 417 on Saturday. How many tickets were sold?
73. A bus seats 52 students. How many buses are needed for 260 students?
74. A runner jogged 4.5 miles for 5 days. What were the total miles jogged?
75. A recipe uses 2/3 cup sugar. How much sugar is needed for 6 batches?
76. A teacher buys 36 pencils for each of 7 classrooms. How many pencils were purchased?
77. A tank holds 80 gallons and contains 52 gallons. How many more gallons are needed to fill the tank?
78. A $25 shirt is discounted 20%. What is the discounted amount?
79. A student scored 54 out of 60. What is the percent?
80. A family drove 325 miles Saturday and 248 miles Sunday. What were the total miles driven?

Section 9: Multi-Step Problems (81–90)

81. A store sold 48 boxes of crayons with 24 crayons in each box. How many total crayons were sold?
82. A class has 12 boys and 18 girls. What fraction are girls?
83. A rectangle is 9 cm by 7 cm. Find area **and** perimeter.
84. Find 30% of 150.
85. If 5 notebooks cost $15, how much do 12 notebooks cost?
86. A number plus 18 equals 45. What is the number?
87. A number divided by 6 equals 8. What is the number?
88. Find the missing angle if two angles total 180° and one angle is 115°.
89. A pizza has 12 slices. If 8 are eaten, what fraction remains?
90. A family spends $45 on groceries and $32 on supplies. How much did the family spend?

Section 10: Challenge Problems (91–100)

91. Solve: $5x = 65$.
92. Solve: $x/9 = 12$.
93. What is the next number: 3, 6, 12, 24, ___?
94. What is the next number: 120, 110, 100, 90, ___?
95. A square has a perimeter of 40 inches. What is each sides length?
96. What is the area of the above square in #95?
97. A rectangle has an area of 72 and a width 8. What is the length.
98. Simplify 24/36.

99. A class has 24 students. 15 are girls. What fraction are boys?
100. A pizza is cut into 10 slices. If 4 remain, what fraction was eaten?

Summer Goal- Complete a few sections a week and bring the completed packet to school on the first day of Grade 8. If there are problems you don't know how to do, just try your best and it will be reviewed when you return. This pacing keeps skills fresh without taking too much time away from summer fun. 🌞📖➗