# MATH SKILLS SHARPENERS

## MATH SUMMER WORKBOOK

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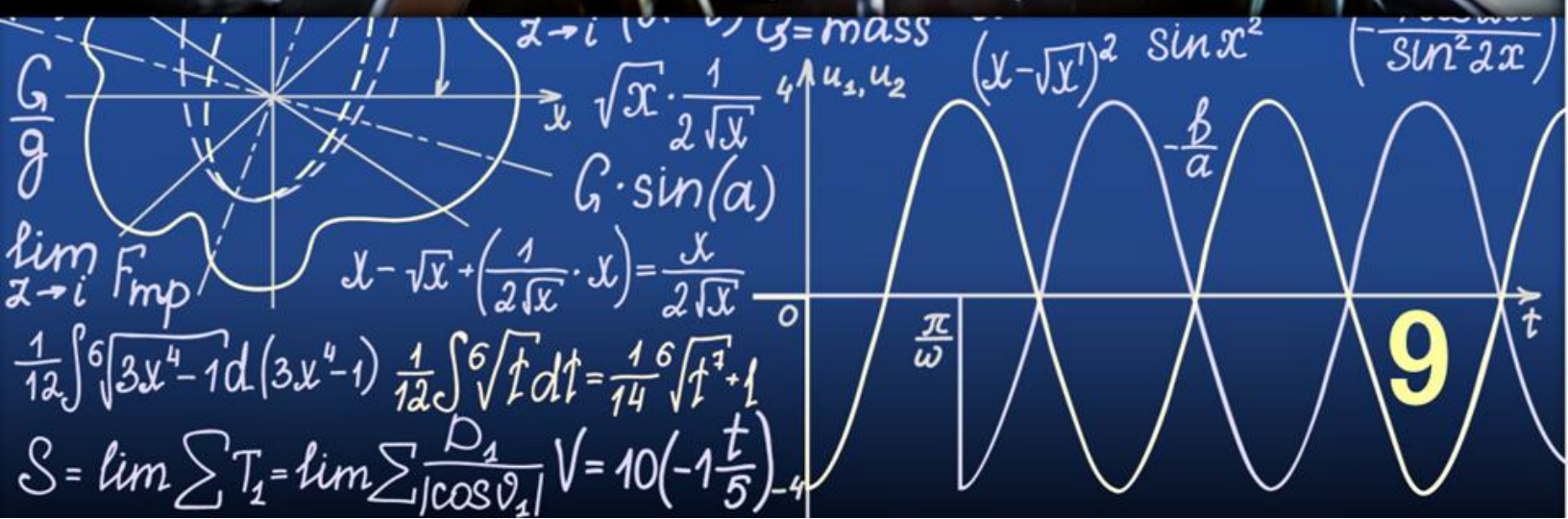
# FROEBEL
## BILINGUAL SCHOOL
### Home of the Space Generation

# 2024 SUMMER
# MATH SKILLS SHARPENER
# Going to Ninth Grade

| STUDENT'S NAME | DATE |
|---|---|
| TEACHER COMING FROM | SCORE |
| TEACHER GOING TO | |
| PARENT'S SIGNATURE | DATE RECEIVED |

# SKILLS SHARPENER FOR STUDENTS GOING TO NINTH GRADE MATH

## WEEK 1.

**Day 1.1** - Write the fraction as a decimal.

1) $\frac{8}{25}$

2) $\frac{-5}{18}$

3) $1\frac{9}{20}$

4) $1\frac{6}{11}$

**Day 1.2** - Write the decimal as a fraction.

1) $0.25$

2) $0.\bar{5}$

3) $-0.3$

4) $0.4$

**Day 1.3** - Find the sum or difference and simplify.

1) $\frac{3}{8} + \frac{2}{8}$

2) $\frac{-1}{6} + \frac{5}{6}$

3) $\frac{2}{15} - \frac{7}{15}$

4) $\frac{1}{12} - \left(\frac{-7}{12}\right)$

5) $1\frac{1}{2} + 1\frac{1}{2}$

6) $6\frac{2}{3} + 3\frac{1}{3}$

7) $4\frac{1}{5} - 2\frac{3}{5}$

8) $-3\frac{2}{7} - 6\frac{3}{7}$

**Day 1.4** - Simplify the expression.

1) $\frac{5x}{8} + \frac{x}{8}$

2) $\frac{2n}{15} + \frac{7n}{15}$
   a)

3) $\frac{m}{21} - \frac{5m}{21}$

4) $\frac{d}{6} + \frac{2d}{9}$

5) $\frac{3a}{2} - \frac{a}{6}$

6) $\frac{-x}{8} + \frac{x}{4}$

7) $\frac{5c}{3} - \frac{10c}{15}$

8) $\frac{7}{3a} + \frac{5}{3a}$

# WEEK 2.

**Day 2.1** - Find the product.

1) $\frac{2}{3} \cdot \frac{7}{8}$

2) $\frac{-5}{12} \cdot \frac{3}{10}$

3) $\frac{3}{4} \cdot (-12)$

4) $\frac{-4}{15} \cdot \frac{5}{8}$

5) $4\frac{1}{8} \cdot 1\frac{2}{3}$

**Day 2.2** - Find the quotient.

1) $\frac{7}{12} \div \frac{2}{3}$

2) $\frac{-4}{9} \div \frac{-8}{11}$

3) $\frac{15}{16} \div \frac{5}{24}$

4) $\frac{7}{8} \div \frac{3}{10}$

5) $\frac{-4}{21} \div \frac{-12}{28}$

**Day 2.3** - Evaluate the expression when m = 7, n = 9, and q = 10.

1) $n \cdot q$

4) $29 - m$

2) $\frac{18}{n}$

5) $16 \cdot q$

3) $m + q$

6) $m + n + q$

**Day 2.4** - Evaluate the expression using the order of operations.

1) $8 \div 2 \, (2 + 2)$

2) $9 \, (5 - 3)^3$

3) $100 \cdot 2 \div 40 - 16 \div 4$

4) $550 - (11^2 - 7^2 \cdot 2)^2$

# WEEK 3.

**Day 3.1** - Find the sum.

1) -14 + 30

2) -9 + 12 + (-4)

3) -21 + (-34)

4) -22 + (-13) + 6

**Day 3.2** - Find the difference.

1) $13 - (-8)$

2) $4 - (-20)$

3) $-2 - (-24)$

4) $-21 - (-6)$

**Day 3.3** - Solve inequalities by adding or subtracting and graph them.

1) $p + 6 < 12$

2) $z - 2 \geq -11$

3) $w + 3 \geq 4$

4) $a - 3 > 2$

5) $-5 + x \leq -20$

6) $-12 + q > 39$

**Day 3.4** - Solve inequalities by multiplying or dividing and graph them.

1) $3b > 27$

2) $\frac{k}{3} > 6$

3) $5f > -40$

4) $\frac{b}{-2} \geq 8$

5) $9s > -18$

6) $\frac{w}{4} > 2$

# WEEK 4.

**Day 4.1** - Solve each multi-step inequalities and graph them.

1) $160 + 4f < 500$

2) $m < 3m + 8$

3) $7 + 2t < 21$

4) $8x > 7x + 6$

5) $12 > 3x - 6$

6) $5t + 1 < -2t + 15$

**Day 4.2** - Solve each compound inequalities and graph.

1) $4 \leq x + 2 \leq 8$

2) $n + 2 < 3 \ OR \ n + 3 > 7$

3) $-3 < x + 2 < 7$

4) $x - 1 < -1 \ OR \ x - 5 > -1$

5) $2 < x + 2 < 5$

**Day 4.3** - Give the domain and range of each relation.

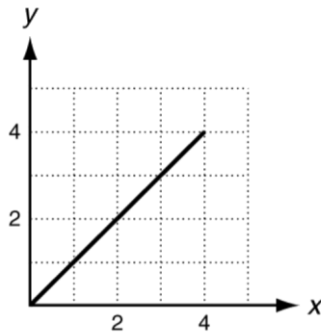1) {(2, 3), (-1, 5), (0, -1), (3, 5), (5, 0)}

   Domain:

   Range:

2) {(5, 1), (4, 2), (3, 3), (2, 4), (1, 5)}

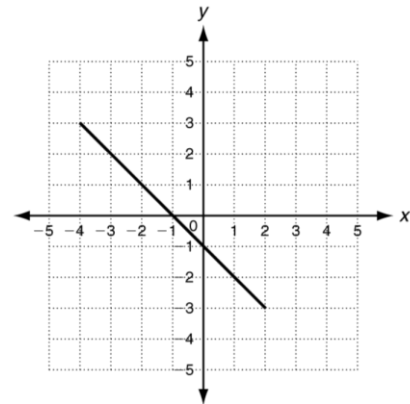   Domain:

   Range:

3) Use the graph to determine the domain and range:



   Domain:

   Range:

4) Use the graph to determine the domain and range:



   Domain:

   Range:

**Day 4.4** - Evaluate each function for the given input values.

1) For $f(x) = x - 5$, find f (x) when x = 0 and when x = 3.

2) For $f(x) = x^2 + 6$, find f (x) when x = 1 and when x = 2.

3) For $f(x) = \frac{2}{3}x + 3$, find f (x) when x = 9 and when x = -3.

4) For $f(x) = 3x + 1$, find f (x) when x = -2 and when x = 7.

# WEEK 5.

## Day 5.1 - Find the x- and y-intercepts

1) $-3x + 5y = 30$

2) $4x + 2y = 16$

3) $y - x = -1$

4) $5x + 3y = 15$

5) $-2x = 9y - 18$

6) $x - 3y = -1$

## Day 5.2 - Find the slope of each line.

The Slope Formula is: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

1) $(1, 2)$ and $(7, 7)$

2) $(3, 4)$ and $(-5, 0)$

3) $(5, -2)$ and $(5, 8)$

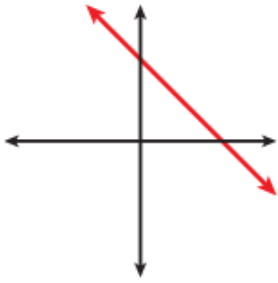4) $(2, -5)$ and $(5, -2)$

5) $x - y = 5$
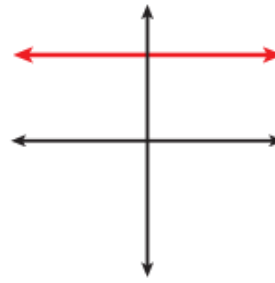
6) $3x + y = 9$

7) $y = 5x + 10$

8) $2x + 5y = 10$

**Day 5.3-** Tell whether the slope of each line is positive, negative, zero, or undefined.
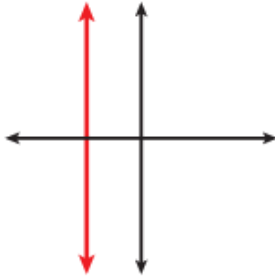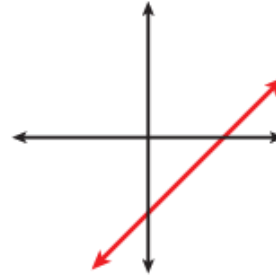
1)



a. positive
b. negative
c. zero
d. undefined

2)



a. positive
b. negative
c. zero
d. undefined

3)



a. positive
b. negative
c. zero
d. undefined

4)



a. positive
b. negative
c. zero
d. undefined

**Day 5.4-** Write the equation that describes each line in slope-intercept form.

1) Slope: -7,
   Y-intercept = 6

2) Slope: 4
   Y-intercept = -3

3) Slope: 8
   Y-intercept = 2

4) Slope: 0
   Y-intercept = -3

5) Slope: 2
   Point (3, 4) is on the line.

6) Slope: 8
   Point (-3, 1) is on the line.

# WEEK 6.

## Day 6.1 - Each pair of points is on a line. Find the intercepts.

1)  (5, 2) and (7, 4)

      x-intercept =
      y-intercept =

2)  (2, 9) and (-4, -9)

      x-intercept =
      y-intercept =

## Day 6.2 - Solve each system by Substitution.

1. $\begin{cases} y = x + 3 \\ y = 2x + 12 \end{cases}$

2. $\begin{cases} x - 3y = 3 \\ 2x = 3y \end{cases}$

3. $\begin{cases} x + y = -1 \\ y = -2x + 3 \end{cases}$

4. $\begin{cases} y = -x \\ y = -2x - 5 \end{cases}$

**Day 6.3** - Solve each system by Elimination.

1. $\begin{cases} x + 3y = 15 \\ 2x - 3y = -6 \end{cases}$

2. $\begin{cases} x + y = 12 \\ x - y = 2 \end{cases}$
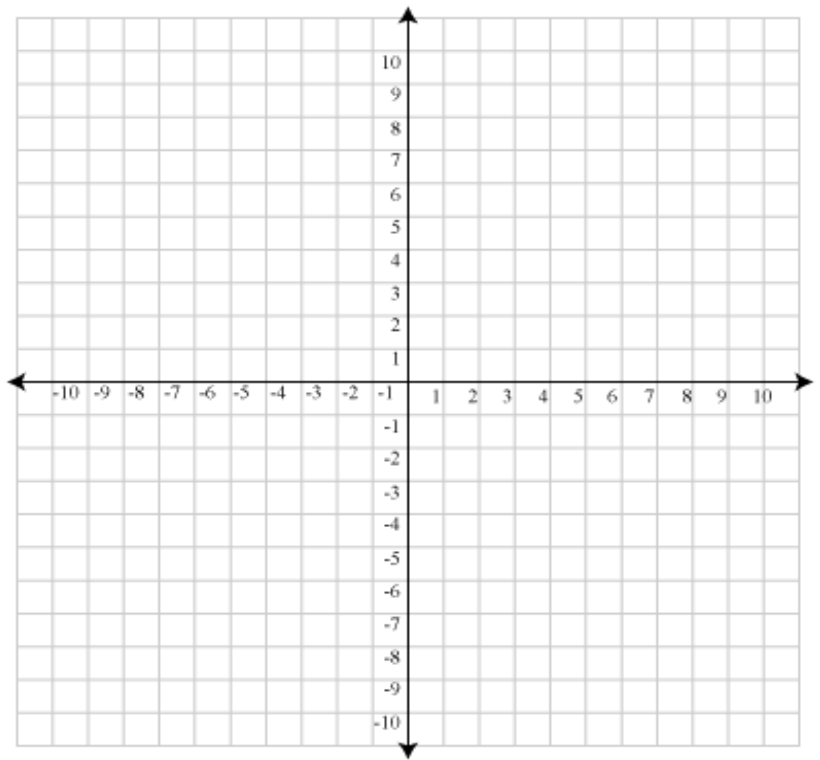
3. $\begin{cases} 3x - y = 7 \\ 2x + y = 3 \end{cases}$

4. $\begin{cases} -x + y = 5 \\ x - 5y = -9 \end{cases}$

5. $\begin{cases} 4x + y = 0 \\ x + y = -3 \end{cases}$

6. $\begin{cases} -2x + 5y = -1 \\ 3x + 2y = 11 \end{cases}$

**Day 6.4** - Solve each system by Graphing.

1. $\begin{cases} y = -2x + 5 \\ y = 4x - 1 \end{cases}$



# WEEK 7.

**Day 7.1 -** Evaluate each expression and simplify.

1)   $4m^0$

2)   $a^3 \cdot a^{-6} \cdot a^{-2}$

3)   $2x^0 y^{-4}$

4)   $(3x^4)^3$

5)   $(m^3 n^2)^5$

6)   $(cd^6)^0 \cdot (c^5 d^2)^2$

**Day 7.2** - Evaluate each expression and simplify.

1) $\dfrac{c^4}{c^{-2}}$

2) $\dfrac{2s^5}{s^2}$

3) $\dfrac{s^{-3}}{t^{-5}}$

4) $\dfrac{4fg^{-5}}{12h^{-3}}$

5) $\dfrac{2x^{-3}y^{-2}}{z^4}$

6) $\left(\dfrac{4p^3}{2pq^4}\right)^2$


**Day 7.3** - Find the product of the following polynomials and simplify.

1) $(2r)\,(4r)$

2) $(3a^3b)\,(2ab)$

3) $2x\,(x^2 - 4x + 6)$

4) $-3ab\,(ab - 2a^2b + 5a)$


**Day 7.4** - Find the product of the following polynomials and simplify.

1) $(2q + 6)\,(4q + 5)$

2) $(5g - 8)\,(4g - 1)$

3) $(-3y + 1)(4y^2 - y - 7)$

4) $(p^2 + 3p)\,(9p^2 - 6p - 5)$

## WEEK 8.

**Day 8.1** - Find the product of the following polynomials and simplify.

1) $(2x + 4)^2$

2) $(3a^2 - b)^2$

3) $(5x + 8y)^2$

4) $(x + 9)(x - 9)$

**Day 8.2** - Factor each polynomial completely.

1) $8c^2 + 7c$

2) $15x^5 - 18x$

3) $-8n^4 - 20n^2 - 28n$

4) $6m^6 + 18m^4 - 24m$

5) $-5k^2 - 15k - 25$

6) $2x^4 + 2x^3 - 20x^2 - 46x$

**Day 8.3** - Factor out a common binomial factor.

1) $3m(m + 5) + 4(m + 5)$

2) $16b(b - 3) + (b - 3)$

3) $-9a(5a - b) - 5(5a - b)$

4) $2x(x^2 + 1) - (x^2 + 1)$

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