


Numbers 2 & Computation
Mathematics and Millennials – 6th




Spice for Mathematics

Garden Mathematics plants many seeds of knowledge!

Knowledge in the form of **Concepts and Computations**:

Whole Numbers	Decimals Numbers
Fraction Numbers	Mixed Numbers
Exponents	Radicals
Proportions	Percentages



Whole Numbers - 1

Addition: Combining two quantities or values
 $4 + 3 = \text{**** combining with ***} = \text{*****}$

Subtraction: Take away one quantity from another
 $5 - 2 = \text{***** take away **} = \text{***}$

Multiplication: Repeated addition
 $5 \times 3 = 5 + 5 + 5 = 15$ I want 3 of 5s!

Division: Repeated Subtraction
 $9 / 4 = -4 -4 = 2$ R = 1 Answer = $2 \frac{1}{4}$!!!

Whole Numbers - 2

$79 + 352 = _? _ \quad 79 + 352 = \underline{\quad\quad\quad} \quad \text{Carry!}$

$312 - 54 = _? _ \quad 312 - 54 = \underline{\quad\quad\quad} \quad \text{Borrow!}$

$13 \times 17 = _? _ \quad 13 \times 17 = \underline{\quad\quad\quad} \quad \text{Two Digit!}$

$219 \div 4 = _? _ \quad 4 \overline{) 219} = \underline{\quad\quad\quad} \quad \text{Remainder!}$

Remainder as Fraction! Horizontal! Use calculator!

Fractions - 1A

Addition: (Common Denominator & Change)

$2/3 + 1/6 = _? _ \quad 2/3(2/2) + 1/6 = 4/6 + 1/6 = \underline{\quad\quad\quad}$

Subtraction: (Common Denominator & Change)

$7/9 - 1/3 = _? _ \quad 7/9 - 1/3(3/3) = 7/9 - 3/9 = \underline{\quad\quad\quad}$

Fractions - 1B

Multiplication: (Multiply Tops & Bottoms)

$3/5 \times 1/2 = _? _ \quad 3/5 \text{ of } 1/2 = _? _ \quad (3/5 = 6/10)$

$1/2 \text{ of } 1/10 + 1/10 + 1/10 + 1/10 + 1/10 + 1/10 = \underline{\quad\quad\quad}$

Division: (Invert 2nd Fraction & Multiply.)

$2/3 \div 4/7 = _? _ \quad 2/3 \div 4/7 = 2/3 \times 7/4 = 14/12 = 1 \frac{2}{12} = _? _$

$2/3 \div 4/7 = 2/3 \times (7/4) \mid 4/7 \times (7/4) = 2/3 \times 7/4 = 14/12 = \underline{\quad\quad\quad}$

Fractions – 2A

$3/4 + 3/8 = _? _$ Common Denominator & Change.

$$3/4 + 3/8 = 3/4(2/2) + 3/8 = 6/8 + 3/8 = ___ = ___$$

$7/9 - 2/3 = _? _$ Common Denominator & Change.

$$7/9 - 2/3 = 7/9 - 2/3(3/3) = 7/9 - 6/9 = ___$$

Fractions – 2B

$4/5 \times 3/8 = _? _$ Multiply Tops & Bottom

$$4/5 \times 3/8 = ___ = 12(4) / 40(4) = ___ \text{ Reduce!}$$

$2/3 \div 4/7 = _? _$ Invert 2nd fraction & Multiply

$$2/3 \div 4/7 = 2/3 \times 7/4 = ___ = ___ = ___ \text{ Reduce!}$$

Mixed Numbers – 1A

Proper Fraction

Numerator < Denominator $N < D$ $5/9$

Improper Fraction

Numerator > Denominator $N > D$ $7/4$

Mixed Number:

Whole Number and Proper Fraction $2 \frac{4}{5}$

Mixed Numbers – 1B

Change Improper Fraction to Mixed Number:

$$8/3 = \underline{\quad} \quad 5/4 = \underline{\quad} \quad 7/2 = \underline{\quad}$$

Change Mixed Number to Improper Fraction:

$$2 \frac{1}{5} = \underline{\quad} \quad 1 \frac{1}{3} = \underline{\quad} \quad 3 \frac{1}{4} = \underline{\quad}$$

Mixed Numbers – 2A

$2 \frac{3}{8} + 1 \frac{1}{4} = \underline{\quad} \underline{\quad}$ Add Numbers then Fractions

$$2 \frac{3}{8} + 1 \frac{1}{4}(\frac{2}{2}) = 2 \frac{3}{8} + \underline{\quad} = \underline{\quad}$$

$5 \frac{8}{9} - 2 \frac{2}{3} = \underline{\quad} \underline{\quad}$ Subtract Numbers then Fractions

$$5 \frac{8}{9} - 2 \frac{2}{3}(\frac{3}{3}) = 5 \frac{8}{9} - \underline{\quad} = \underline{\quad}$$

Mixed Numbers – 2B

$1 \frac{1}{2} \times 1 \frac{1}{3} = \underline{\quad} \underline{\quad}$ Mixed to Fractions Ts x Bs!

$$\frac{3}{2} \times \frac{4}{3} = \underline{\quad} = \underline{\quad} \quad \text{Reduce if needed!}$$

$3 \frac{1}{2} \div 1 \frac{2}{3} = \underline{\quad} \underline{\quad}$ Change, Invert, Multiply!

$$\frac{7}{2} \div \frac{5}{3} = \frac{7}{2} \times \frac{3}{5} = \underline{\quad} = \underline{\quad} \quad \text{Reduce if needed?}$$

Decimals - 1

$1.5 + .04 = \underline{\quad}$ **Think Money!** Calculator Check!

$.25 - .04 = \underline{\quad}$ **Think Money!** Addition Check!

$.03 \times .4 = \underline{\quad}$ **Multiply & Point!** Calculator Check!

$.048 / .2 = \underline{\quad}$ **Multiply & Divide!** Multiply Check!

Decimals - 2

$3.02 + 1.49 = \underline{\quad}$ Line up! Think Carry!

$7.80 - 3.06 = \underline{\quad}$ Line up! Think Borrow!

$.3 \times .07 = \underline{\quad}$ **Multiply & Point!** Fractions?

$1.4 / .02 = \underline{\quad}$ **Multiply & Divide!** Fractions?

Exponents - 1

Special Notation with **Small Number at Top Right!**

Special: $N^0 = 1$ Any N to a power of 0! $7^0 = 1$

Special: $N^1 = N$ Any N to a power of 1! $6^1 = 6$

Pattern or sequence assists in understanding!

$B^E = N$: $6^3 = 216$ $6^2 = 36$ $6^1 = 6$ $6^0 = 1 \dots$

Higher: $5^3 = 125 \Rightarrow 5 \times 5 \times 5 = 125$ $1^3 = 1 \Rightarrow 1 \times 1 \times 1 = 1$

Scientific Notation is a **Real World** use of Exponents!

Exponents - 2

$6^3 + 8^0 = _? _$

$_ _ + _ _ = _ _$

$6^3 = 6 \times 6 \times 6 = 216$

Higher Exponents!

$9^2 - 4^1 = _? _$

$_ _ - _ _ = _ _$

$5^0 \times 7^3 = _? _$

$_ _ \times _ _ = _ _$

$7^3 = 7 \times 7 \times 7 = 343$

Higher Exponents!

$6^0 / 3^1 = _? _$

$_ _ / _ _ = _ _$

Radicals - 1

Special Symbol ($\sqrt{\quad}$) in front of number. **Square Roots!**

The square root of 16 $\sqrt{16} = 4$ since $4 * 4 = 16$

Sq. Roots: $\sqrt{1} = 1$, $\sqrt{4} = 2$, $\sqrt{9} = 3$, $\sqrt{16} = 4$, $\sqrt{25} = 5 \dots$

Larger Square Roots:

$\sqrt{225} = 15$ since $15 \times 15 = 225$ $\sqrt{144} = _ _$

$\sqrt{361} = 19$ since $19 \times 19 = 361$ $\sqrt{400} = _ _$

Radicals - 2

$\sqrt{121} + \sqrt{4} = _? _$

$_ _ + _ _ = _ _$

$\sqrt{121} = 11 \times 11$

Larger Radicals!

$\sqrt{64} - \sqrt{25} = _? _$

$_ _ - _ _ = _ _$

$\sqrt{289} \times \sqrt{9} = _? _$

$_ _ \times _ _ = _ _$

$\sqrt{289} = 17 \times 17$

Larger Radicals!

$\sqrt{81} / \sqrt{16} = _? _$

$_ _ / _ _ = _ _$

Reduce if needed!

Proportion - 1

Ratio compares 2 numbers! **Proportion** is equal ratios!

$$3 : 4 = 6 : 8 \quad 3 / 4 = 6 / 8 \quad 3 \text{ to } 4 = 6 \text{ to } 8$$

Inside **Ns** called (Mean) Outside **Ns** called (Extreme)

Law of Proportion: **Product of Es = Product of Ms**

$$3 : 4 = 6 : 8$$

$$4 / 6 = 2 / 3$$

$$2 \text{ to } 3 = 6 \text{ to } 9$$

Proportion - 2

$$2 \text{ to } 3 = A \text{ to } 6$$

$$12 = 3 A$$

What times 3 = 12 ?

$$A = \underline{\quad}$$

$$3 : C = 6 : 10$$

$$30 = 6 C$$

What times 6 = 30 ?

$$C = \underline{\quad}$$

$$B / 4 = 7 / 12$$

$$12 B = 28$$

What times 12 = 28?

$$B = \underline{\quad}$$

$$5 / 3 = 7 / D$$

$$5 D = 21$$

What times 5 = 21?

$$D = \underline{\quad}$$

Percentages - 1

Change: 35% of 20 is 7 to Proportion!

A Percent is **Special Ratio!** Compares Number to 100!

First Ratio: % means per 100 35% = 35 to 100

Second Ratio: Of = (Out) & Is = (In) thus 7 to 20

Law of Proportion solves Percentage statements:

$$35\% \text{ of } 20 \text{ is } 7 \quad \text{Changes to} \quad 35 \text{ to } 100 = 7 \text{ to } 20$$

Percentages - 2

15% of 40 is A

$$15 / 100 = A / 40$$

$$600 = 100A$$

$$A = \underline{\quad}$$

150% of 6 is C

$$150 / 100 = C / 6$$

$$900 = 100C$$

$$C = \underline{\quad}$$

B% of 20 is 9

$$B \text{ to } 100 = 9 \text{ to } 20$$

$$20B = 900$$

$$B = \underline{\quad}$$

30% of D is 24

$$30 : 100 = 24 : D$$

$$30D = 2400$$

$$D = \underline{\quad}$$

Conclusion
