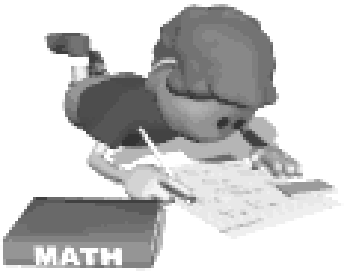
Summer Packet
for Students Entering Grade 8



All students entering Math 8 **MUST** complete this summer packet as they will be collected and graded upon return to school. All examples have been very carefully crafted to ensure your success. *Please read and study them carefully*.

This packet is due on the first day of class.

Student Responsibilities

Student will be able to improve their own math performance by:

- Completing the summer math packet
- Reviewing math skills throughout the summer months
- Practicing mathematics approximately 20-30 minutes a day 4-5 days a week
- See next page for websites
- Possible quiz upon return to school covering SOME of the material

_____ _____

Student Signature **Date**

Parent /Guardian Responsibilities

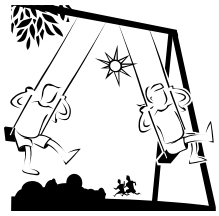
Parents / Guardians will be able to promote student success in math by:

- Supporting and monitoring your child's completion of the math summer packet
- Encouraging your child's use of math concepts in summer activities

_____ _____

Parent's/Guardian's Signature **Date**

Math Resource Websites



https://www.mobymax.com/signin

http://www.mathplayground.com/mathvideos.html

http://www.aaamath.com

http://www.onlinemathlearning.com/grade-7.html

http://www.sheppardsoftware.com/math.htm

http://www.ixl.com

http://www.khanacademy.org/#browse

http://aplusmath.com/Flashcards/index.html

http://www.purplemath.com/modules/index.htm

http://www.321know.com/grade8.htm

http://nlvm.usu.edu/

http://coolmath4kids.com/

http://appleuniversity.com/

http://youtube.com/

Fraction Operations

Finding equivalent fractions. HINT: Use your knowledge of factors to help you!, and there may be more than one answer*!*

Example:

Find 2 equivalent fractions to the following: $\frac{2}{4}$

$\frac{\quad}{\quad} = \frac{2}{4} = \frac{\quad}{\quad}$

$\frac{1}{2} = \frac{2}{4} = \frac{6}{12}$

1) **$\frac{\quad}{\quad} = \frac{7}{21} = \frac{\quad}{\quad}$**

2) **$\frac{\quad}{\quad} = \frac{14}{56} = \frac{\quad}{\quad}$**

Addition of Fractions

Example: Fractions can only be added when the DENOMINATOR is the SAME (you *must* use your knowledge of equivalent fractions for this!)

$\frac{1}{8} + \frac{1}{2} = ?$

Since "8" is the larger denominator, make both fractions out of "8"

$\frac{1}{8} = \frac{1}{8}$ and $\frac{1}{2} = \frac{4}{8}$

Now we have $\frac{1}{8} + \frac{4}{8} = \frac{5}{8}$

Add and present answers in simplest form.

1) $\frac{2}{12} + \frac{4}{12} = \frac{\quad}{\quad}$

2) $\frac{2}{5} + \frac{4}{3} = \frac{\quad}{\quad}$

Subtraction of Fractions

Example: **Fractions can only be subtracted when the DENOMINATOR is the SAME (you *must* use your knowledge of equivalent fractions for this!)**

$\frac{1}{2} - \frac{1}{8} = ?$

Since "8" is the larger denominator, make both fractions out of "8"

$\frac{1}{8} = \frac{1}{8}$ **and** $\frac{1}{2} = \frac{4}{8}$

Now we have $\frac{4}{8} - \frac{1}{8} = \frac{3}{8}$

Subtract, and present answers in simplest form.

1) $\frac{7}{12} - \frac{3}{6} =$ ___ **2)** $\frac{7}{10} - \frac{1}{3} =$ ___

Multiplication of Fractions

Example: **You can multiply ANY fraction by multiplying numerator x numerator and denominator x denominator ☺**

$\frac{1}{3} \times \frac{3}{12} = ?$

$\frac{1 \times 3}{3 \times 12} = \frac{3}{36}$

Now, 3 and 36 have a factor in COMMON… "3". So, find an equivalent fraction with a smaller numerator and denominator.

$\frac{3}{36} = \frac{1}{12}$ ✔

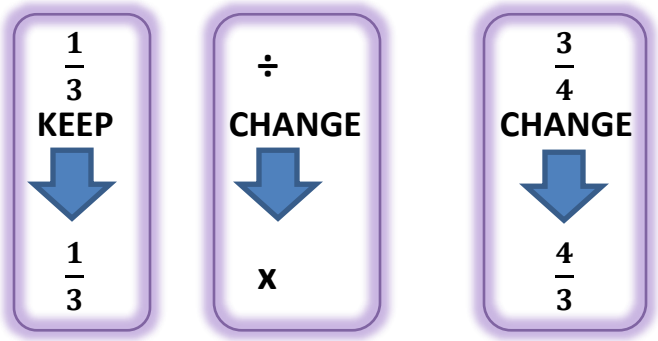
Multiply:

1) $\frac{1}{3} \times \frac{3}{6} =$ ___ = ___ **2)** $\frac{4}{8} \times \frac{1}{4} =$ ___ = ___

Division of Fractions

Example: **You can divide ANY fraction by KEEP CHANGE CHANGE.**

$\frac{1}{3} \div \frac{3}{4} = ?$



Now, just multiply fractions:

$$\frac{1 \times 4}{3 \times 3} = \frac{4}{9}$$

Don't forget to simplify!

Divide:

1) $\frac{1}{3} \div \frac{3}{5} =$ ___

2) $\frac{4}{5} \div \frac{1}{2} =$ ___

3) $\frac{1}{2} \div \frac{1}{6} =$ ___

Scrap Area:

Translating Words into Mathematical Expressions

Example:
8 times 2 means 8 x 2
4 + *c* means *c* more than 4

Translate the words into numbers, variables, and symbols.

1) 10 less than 14 _____ 2) half of 16 _____ 3) *v* squared _____

4) *t* more than 9 _____ 5) 3 cubed _____ 6) the sum of 2 and 12 _____

7) the product of 5 and *x* _____ 8) twice 11 _____ 9) 2 to the 4th _____

10) the quotient of 24 and 8 _____

Proportional Reasoning
A proportion is 2 ratios (fractions) separated by an "=" sign.

Example:

$\frac{1}{3} = \frac{2}{6}$

Is this statement true?

Check by CROSS MULTIPLYING:

$\frac{1}{3} = \frac{2}{6}$

1 x 6 = 3 x 2

6 = 6 ✔

These fractions are = (equal)

What if you have a variable?

$\frac{1}{3} = \frac{x}{6}$

1 x 6 = 3 x x

6 = *What number* x 3?

6 = *2* x 3!

6 = 6 ✔

These fractions are equal when *x* = 2

Solve.

1) $\frac{1}{3} = \frac{x}{18}$ ***x* = ___**

2) $\frac{2}{4} = \frac{8}{x}$ ***x* = ___**

3) $\frac{5}{x} = \frac{10}{50}$ ***x* = ___**

Percents

Example:
Per cent means "out of 100". The percent represents a ***part*** of ONE WHOLE (100%).

When you see "out of" you know to make a fraction (remember ratios??).

So, 75% means "75 out of 100" or "75 hundredths". Written symbolically it's: $\frac{75}{100}$.

You also know that the *fraction bar* means to DIVIDE.

So, "75 out of 100" ALSO means "75 ÷ 100" which is 0.75.

Write as a decimal.

1) 35% = _____ 2) 7% = _____ 3) 445% = _____

Example:

0.50 really means "0 wholes and 50 hundredths." *****Yes, the decimal places DO mean something!!*****

So, $\frac{50}{100}$, which means "50 out of 100" or "50%"

8.00 really means "8 wholes and 0 parts."

If 1 whole = 100%, 8 wholes = 800%. So, if you have 8 wholes, you have 800%

Write as a percent.

4) 0.85 = _____ 5) 3.00 = _____ 6) 0.08 = _____

Example:
Remember: That little fraction bar means, "divide."
$\frac{1}{5}$ means "1 ÷ 5"

1 ÷ 5 = "0.20"

This is read as "0 and 20 hundredths" or "20 out of 100"
It can be written as $\frac{20}{100}$ which is = 20%

Write a percent.

1) $\frac{1}{100}$ =_____ 2) $2\frac{1}{10}$ = _____

Remember: the word "of" means "multiply."
Remember: A percent MUST be changed to a fraction or decimal to compute an answer!
Example:
What is 60% of 20?

60% changes to 0.60

0.60 x 20

12

OR

60% changes to $\frac{60}{100}$

$\frac{60}{100}$ x 20

12

3) What is 25% of 40? _____ 4) What is 200% of 50? _____

Scrap Area:

Addition and Subtraction of Integers
Example:

"-" means: minus, subtract, take away AND negative. When you see this symbol, move LEFT on the number line.
"+" means: add, plus AND positive. When you see this symbol, move RIGHT on the number line.

Combinations: When you have a "+ (-)", move LEFT

Combinations: When you have a "- (+)", move LEFT

The "-" ALWAYS wins!

Combinations: When you have a "- (-)", move RIGHT

So, when you have 3 + (-9)…
START at 3 on the number line
Move LEFT 9 units
End on -6

What about -9 – (+3)…
START at -9 on the number line
Move LEFT 3 units
End on -12

What about -3 – (-9)…
START at -3 on the number line
Move RIGHT 9 units
End on +6

1) 12 + (-7) = _____

2) 4 + (-3) = _____

3) 4 – (+3) = _____

4) -5 + (-2) = _____

5) -2 + (-5) = _____

6) -5 – (-2) = _____

7) -2 – (-5) = _____

Scrap Area:

Multiplication and Division of Integers

Example:

Integer Rules

Multiplication

+ x - = -	7 x -3 = -21
+ x + = +	7 x 3 = 21
- x - = +	-7 x -3 = 21

Division

+ ÷ - = -	12 ÷ (-3) = -4
+ ÷ + = +	12 ÷ 3 = 4
- ÷ - = +	-12 ÷ -3 = 4

1) 12 x (-7) = _____

2) 12 x 5 = _____

3) 4 x (-3) = _____

4) 14 ÷ (-2) = _____

5) -5 x (-2) = _____

6) -25 ÷ (-5) = _____

7) -5 x 2 = _____

8) -40 ÷ (-5) = _____

Evaluating Expressions/Equations

Remember PEMDAS
PEMDAS helps you remember which operation to do first when you have more than one in a problem.
Note: Multiply and divide as those operations appear in order from left to right. Do the same for addition and subtraction.

1st	2nd	3rd	Last
Parentheses	Exponents	M ⟺ D	A ⟺ S

Example:
4 x (3 – 1) =

2
⇩
4 x 2

8

When asked to ***evaluate*** an expression/equation, it means you first SUBSTITUTE a number for the variable, and THEN you use PEMDAS to solve!

Example:
Evaluate the expression for x = 2
x + 7 = ___
⇩
2 + 7 = 9

1) (30 – 3) ÷ 3 = ___

2) $1 + 7^2$ = ___

3) 8 + 6 x 9 = ___

4) 15 + 40 ÷ 20 = ___

5) 20 + 16 – 15 = ___

6) 19 – 15 – 3 = ___

Evaluate.

7) $n^2 - m$; $m = 7$, and $n = 8$ ____

8) $8(x - y)$; $x = 5$, and $y = 2$ ____

9) $yx \div 2$; $x = 7$, and $y = 2$ ____

Solving and checking equations: Big ideas (isolate the variable using inverse operations)

Examples:

1. Solve: $16 - 11w = 5$

Inverse operations: $-16 \quad -16$ (subtraction property of equality)

$\frac{-11w}{-11} = \frac{-11}{-11}$ (division property of equality)

$w = 1$

2. Solve: $-6x = 2x - 2$

$-2x \quad -2x$ (subtraction property of equality)

$\frac{-8x}{-8} = \frac{-2}{-8}$ (division property of equality)

Inverse operations: $x = \frac{1}{4}$

3. Solve: $-5m - 6 = 6 - m$

$+5m \quad +5m$ (addition property of equality)

$-6 = 6 + 4m$

Inverse operations: $-6 = -6$ (subtraction property of equality)

$\frac{-12}{4} = \frac{4m}{4}$ (division property of equality)

$-3 = m$

Practice: Solve, showing use of properties of equality (see above).
Check each solution using the 3 Rs (rewrite, replace, and recalculate)

1) $3x = 12$

2) $2x + 5 = 19$

3) $4x + 5 = 2x + 19$

4) $3(x + 4) = 18$