

Crib Sheet

• Adding / Subtracting Integers

① (number) + (number)

Ex. $(-5) + (3)$

↓ ↓ ↘
I owe \$5 and I added \$3
to the bank to my account.

Total: -2

"I still owe \$2".

② (number) - (number)

$(-10) - (4)$

REWRITE IT!

"minus" \Leftrightarrow "plus a negative"

$(-10) + (-4)$

↓ ↓ ↘
I owe \$10 and I owe \$4
to the bank more to the bank.

Total: -14

"I owe the bank \$14."

③ (number) - (negative number)

$(5) - (-4)$

"minus a negative"

REWRITE IT!



"plus"

$(5) + (4)$

↓ ↓ ↓
I have \$5. and I have \$4 more.

Total: 9

"I have \$9."

• Exponents

$$\begin{array}{c} 3 \rightarrow \text{exponent.} \\ \swarrow \\ 4 \\ \searrow \\ \text{base} \end{array}$$

Exponents tells how many times the base will appear!

4^3 means that the base "4" will appear "3" (exponent) times, as a factor.

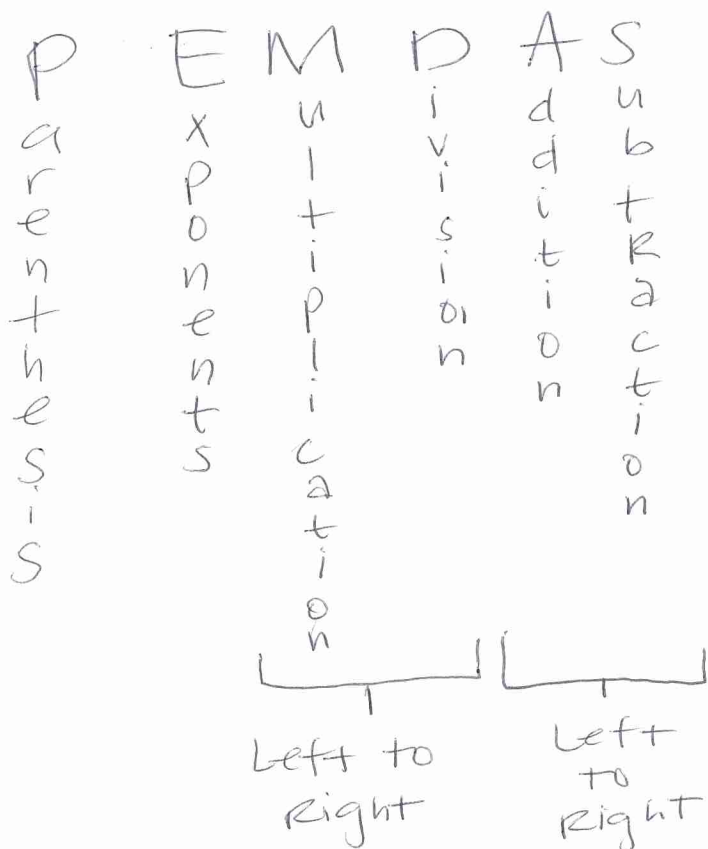
Just multiply! \rightarrow $\underbrace{4^{(1)} \cdot 4^{(2)} \cdot 4^{(3)}}_{3 \text{ times}}$

$$\underbrace{(-5)}_{\text{base}}^4 \rightarrow \text{exponent}$$

$(-5)^4$ means that the base "-5" will appear "4" times as a factor.

Just multiply \rightarrow $\underbrace{(-5)^{(1)} \cdot (-5)^{(2)} \cdot (-5)^{(3)} \cdot (-5)^{(4)}}_{4 \text{ times}}$

• Order of Operations



* This is how you properly simplify ANY Expression.

1. Finish all parenthesis until there's only a number.
2. Perform any exponents.
3. Perform any multiplication or division as you see it! Go LEFT to RIGHT.
4. Perform any addition or subtraction as you see it! Go LEFT TO RIGHT.

REMEMBER!

• Every time you do a step, start Order of operations over on the expression you are using.

• Don't let negative numbers fool you.

• Absolute value counts as parenthesis.

Please Excuse my Dear Aunt Sally!



$$\text{Ex. } |-3+7| \cdot 7^2$$

1. Parenthesis: $|-3+7|$
(absolute value)

$$-3+7 = 4, \text{ so } |4| = 4.$$

2. Rewrite exprⁿ.

$$4 \cdot 7^2$$

3. No more parenthesis.

Exponents? YES!

$$7^2 = 7 \cdot 7 = 49$$

4. Rewrite exprⁿ

$$4 \cdot 49$$

5. Simplify using Multⁿ.

$$\begin{array}{r} 3 \cdot 49 \\ 14 \\ \hline 196 \end{array}$$

$$\text{So } |-3+7| \cdot 7^2 = 196. \square$$

$$\text{Ex. } 8^2 - (5-2)^4$$

1. Parenthesis: $(5-2) = 3$.

2. Rewrite ~~exprⁿ~~ exprⁿ.

$$8^2 - (3)^4$$

3. Exponents.

$$8^2 = \underbrace{8 \cdot 8}_{2 \text{ times}} = 64$$

$$3^4 = \underbrace{3 \cdot 3 \cdot 3 \cdot 3}_{4 \text{ times}} = 81.$$

4. Rewrite and Simplify

$$64 - 81 = 64 + (-81) = -17. \square$$

$$\text{Ex. } \frac{10(-1) - (-2)(-3)}{2[-8 \div (-2-2)]}$$

* This has two parts. So do the top first, then the bottom. BUT DON'T forget to put them back together!

$$\text{Top: } 10(-1) - (-2)(-3)$$

1. Parenthesis? NO.
2. Exponents? NO.
3. Multⁿ? YES.

So we go left to right!

$$\begin{array}{ccc} \underbrace{10(-1)} & - & \underbrace{(-2)(-3)} \\ -10 & - & 6 \end{array}$$

4. Rewrite and simplify

$$-10 - 6 = -10 + (-6) = -16.$$

$$\text{Bottom: } 2[-8 \div (-2-2)]$$

1. Parenthesis? YES

$[-8 \div (-2-2)]$ This is a BIG Paren.

2. Restart order of operations.

- i. parenthesis? YES.

$$(-2-2) = -2 + (-2) = -4.$$

- ii. Rewrite and simplify

$$[-8 \div -4] = 2. \text{ Done.}$$

3. Rewrite and simplify

$$2[2] = 4.$$

Put
BACK

TOGETHER

$$\frac{\text{Top}}{\text{Bottom}} = \frac{-16}{4} = -4. \quad \square$$

Ex. $5(7-4)^3 - 4(2-3)^2 + 24$

1. parenthesis: $(7-4) = 1$

$(2-3) = -1$

2. Rewrite & Simplify

$5(1)^3 - 4(-1)^2 + 24$

3. Exponents? YES.

$(1)^3 = \underbrace{1 \cdot 1 \cdot 1}_{3 \text{ times}} = 1$

$(-1)^2 = \underbrace{-1 \cdot -1}_{2 \text{ times}} = 1$

$24 = \underbrace{2 \cdot 2 \cdot 2 \cdot 2}_{4 \text{ times}} = 16$

4. Rewrite and Simplify

$5(1) - 4(1) + 16$

5. Multⁿ? YES.

$5(1) = 5$

$4(1) = 4$

6. Rewrite and simplify

$5 - 4 + 16$

7. Addition? YES. BOTH.
Subtraction? YES.

Do it left to right!

$5 - 4 = 1$
 $1 + 16 = 17$ □
 $\underbrace{5 - 4} + 16$

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Don't let silly mistakes trip you up!
 Just remember to please excuse my dear Aunt Sally.

