Mr. Jackson's Or Statements Model Big Picture View of Math

Lecture No.A2: Meet the Or Statement Model, the big picture view....

"Mathematics is the most powerful tool we have. It controls our world. We can use it to put men on the moon. We use it to calculate how much insulin a diabetic should take. **It is hard to get right**." [Houston, *How To Think Like A Mathematician*, 2009]

"The highest form of pure thought is in Mathematics." - Plato

Common Core Standards: X-REF1

Lecture No.A2: Meet the Or Statement Model, the big picture view....

'If your dreams do not scare you, they are not big enough." [Ellen Johnson Sirleaf]

Math is a difficult subject to master. But it is not entirely impossible to master, especially if you incorporate the tools and approaches to math, we will be discussing here in this lesson and others in the Reference Series. This one,. the first of several Mr. Jackson has in store for you, will make the work much easier, thereby enhancing your chance at scoring A's.

Math will get complicated. But if you learn to see the effort through a problem-solving modeling approach, like the Or Statement Model, the work becomes much more manageable. But first let us look at what are the courses offered under Mathematics.

AGENDA/Learning Goals: No.A2: The Or Statement Model

Learning Objectives: (Students will study and learn the following)

Intended audience: Mature audiences (gr 8 and up)

1 **Math Courses**: Math falls under four broad categories, Arithmetic (from Greek word for numbers "Arithmos"), Algebra, Number Theory and Geometry. **Through Primary school (PK to 5)** it is Arithmetic (the study of the relationship between numbers) that remains the focus, by and large, however, Common Core pull in early exposure to Algebra, Number Theory and Geometry.

Middle School: By now the focus switched to heavy on Algebra and Number Theory, while pulling more Geometry.

High school: Now the focus is heavy on functions and their graphs. There is a full year of nothing by Geometry, closing for some with Elementary Calculus.

2 **The Or Statement Model**: Mr. Jackson's tools for jump-starting your problem solution exercises.

OR STATEMENT MODEL

_____ **or** _____ **or** _____
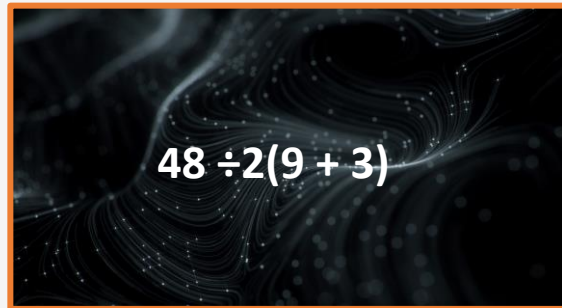
_____ **or** _____

____ **or** ____ **or** ____ **or** ____

_____ **or** _____

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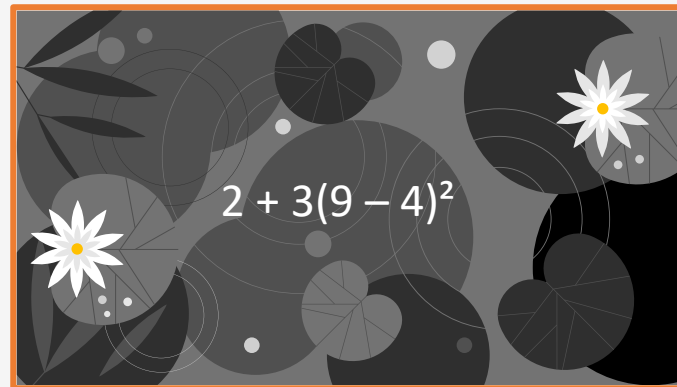
But First: No.A2: Pre-Test PoP-3 (need two of the three to advance)

Problem 1

Problem 2
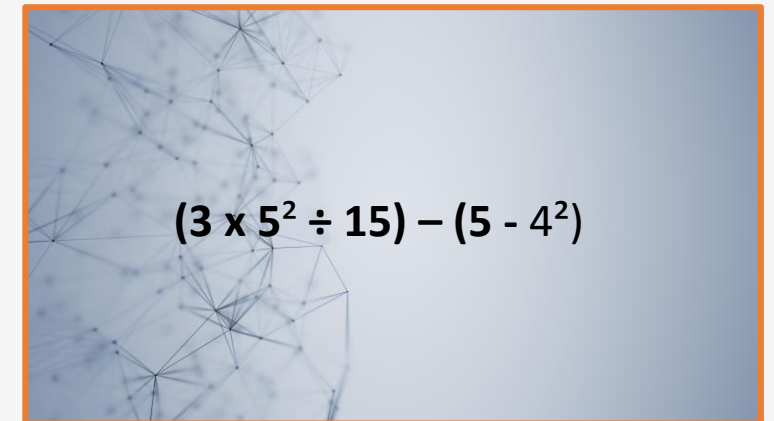
Problem 3

$$48 \div 2(9 + 3)$$

$$2 + 3(9 - 4)^2$$

$$(3 \times 5^2 \div 15) - (5 - 4^2)$$

ANSWER KEY: See next slide.

SCORE: You want to get at least two of the three PoP-3 (Problems of the Day).

HONOR SYSTEM: Why fool self?

Answer Key: Pre-Test (PoP-3)

No.1 **Answer = 2** (48 ÷ 2(12) = **48** ÷12)

No.2 **Answer = 77** (2 + 3 (25)), (2+75)

No.3 **Answer = 4** (3 x 5^2 ÷ 15) − (5 - 2^2), (3 x 25 ÷ 15) − (5 − 4), (75 ÷ 15) − 1, (5 − 1)

If you **MISSED ONE** or **MORE**, you might want to return to this lesson, and studying it once again. If this make twice, revisit the Foundation skills. **Revisit lecture A1: Perspectives.**

Exploratory Stage: (Got to get your hands dirty!) Student-centered

Experiment 1: **Open statement, no variables study** (1) Create five problems using random numbers. (2) Use three terms (different numbers) the first two problems. (3) Use four terms in the remaining two problems. (4) Vary the operations used to get a diverse set of problems. (5) Now, solve all five problems, and finally (6) score yourself. (7) Reflect on what you accomplished.

SUPPLIES: (A2 Experiment 1)

1. Paper and pen/pencil
2. Calculator (okay)

Experiment 2: **Open statement, one or more variable study** (1) Recycling the five problems in Experiment 1. (2) Replace any one term with the variable "x" in the first each of the two problems. (3) The remaining three, replace two non-consecutive term with -2x and 3y respectively. (4)Now, simplify all five, noting you cannot "solve" any (4) Score yourself. (5) Reflect on the difference and similarities to Experiment 1.

SUPPLIES: (A2 Experiment 2)

1. Paper and pen/pencil
2. Calculator (okay)

Exploratory Stage: (Continuation) Student-centered

Experiment 3: **Closed statement, one variable study** (1) Recycling the problems

in Experiment 2. (2) Close the first two by setting the equation equal to some double-digit number. (3) Close the

remaining three with one of the four greater-than, less-than and equals symbols instead of an equal sign (4) Now,

simplify then solve each for the variable "x." (4) Score yourself. (5) Reflect on the differences and similarity to others.

Experiment 4: **Closed statement, two variable study** (1) Recycling the problems

in Experiment 3. (2) Of the two variables used in the last two of the five problems, change any one of the two "x" terms

to "y" term. Now, because you have two variables, (3) solve for "y." That is to say, isolate "y" one the left-side of the

equality sign. (4) Recognize now all we can do is create a table or a graph of paired values. (5) Score yourself. (6)

Reflect on the similarities and differences between Experiment 2 and 3.

SUPPLIES: (A2 Experiment 3)

1. Paper and pen/pencil
2. Calculator (okay)

SUPPLIES: (A2 Experiment 4)

1. Paper and pen/pencil
2. Calculator (okay)

Intervention Stage: (Terms Introduction phase) Teacher-centered

See **A2: Or Statement Model** lecture notes below. Click the links to pull up the details.

A2 – 1: [Math Courses List]

A2 – 2   [Mr. Jackson's Or Statement Model]   Put any/all Math problems into perspective
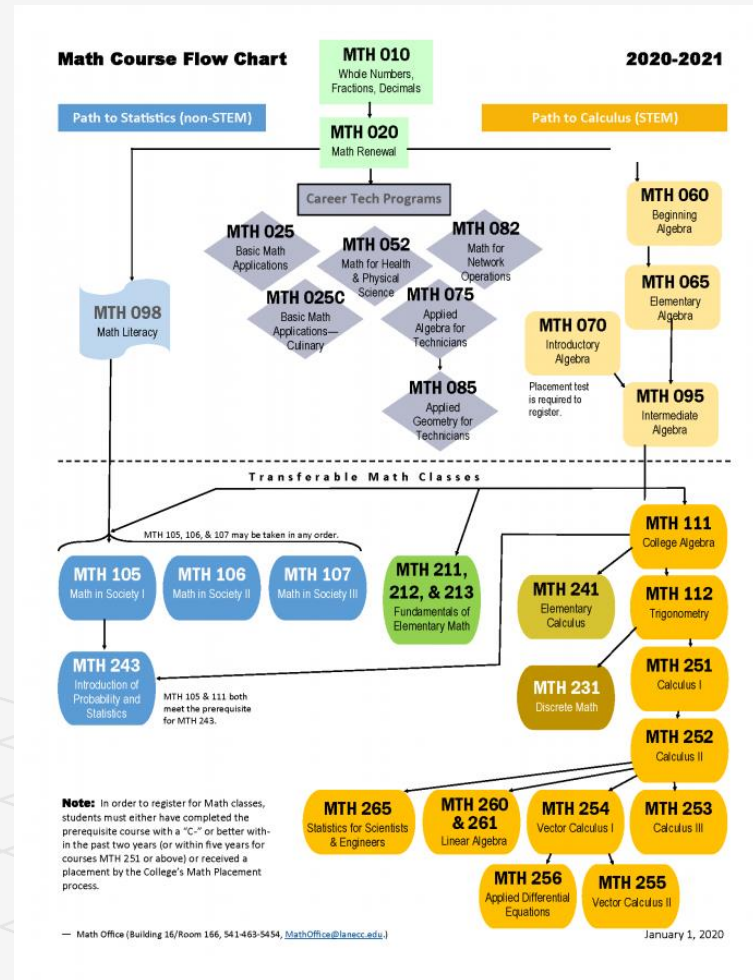
Mathematics Courses – A Comprehensive Review of what is Coming

Math Courses: Math falls under four broad categories, Arithmetic, Algebra, Number Theory and Geometry. **Through Primary school (PK to 5)** it is Arithmetic that remains the focus, by and large, however, Common Core pull in early exposure to Algebra, Number Theory and Geometry.

Middle School: By now the focus switched to heavy on Algebra and Number Theory, while pulling more Geometry.

High school: Now the focus is heavy on functions and their graphs. There is a full year of nothing by Geometry, closing for some with Elementary Calculus.

Beyond K-12: See adjacent diagram, courtesy Lane Community College, Eugene, OR.

Math Course Flow Chart   **2020-2021**

MTH 010 — Whole Numbers, Fractions, Decimals

Path to Statistics (non-STEM)   Path to Calculus (STEM)

MTH 020 — Math Renewal

Career Tech Programs

MTH 025 — Basic Math Applications
MTH 052 — Math for Health & Physical Science
MTH 082 — Math for Network Operations
MTH 025C — Basic Math Applications—Culinary
MTH 075 — Applied Algebra for Technicians
MTH 098 — Math Literacy
MTH 070 — Introductory Algebra
MTH 060 — Beginning Algebra
MTH 065 — Elementary Algebra
MTH 085 — Applied Geometry for Technicians
MTH 095 — Intermediate Algebra

Placement test is required to register.

Transferable Math Classes

MTH 105, 106, & 107 may be taken in any order.

MTH 105 — Math in Society I
MTH 106 — Math in Society II
MTH 107 — Math in Society III
MTH 211, 212, & 213 — Fundamentals of Elementary Math
MTH 241 — Elementary Calculus
MTH 111 — College Algebra
MTH 112 — Trigonometry
MTH 243 — Introduction of Probability and Statistics
MTH 231 — Discrete Math
MTH 251 — Calculus I
MTH 252 — Calculus II

MTH 105 & 111 both meet the prerequisite for MTH 243.

MTH 265 — Statistics for Scientists & Engineers
MTH 260 & 261 — Linear Algebra
MTH 254 — Vector Calculus I
MTH 253 — Calculus III
MTH 256 — Applied Differential Equations
MTH 255 — Vector Calculus II

Note: In order to register for Math classes, students must either have completed the prerequisite course with a "C-" or better with-in the past two years (or within five years for courses MTH 251 or above) or received a placement by the College's Math Placement process.

— Math Office (Building 16/Room 166, 541-463-5454, MathOffice@lanecc.edu.)

January 1, 2020

Source: https://www.lanecc.edu/math/math-course-sequence

Mr. Jackson's Or Statement Model: Get the Big Picture

It as simple as **Four Simple Lines of Code,** but with it, you can tame any/all Math problems at but a glance.

If the problem is open, but no variables, or if closed with one variable you can **Solve** is always essential to understanding; or **Simplify,** if open statement, one variable, or two variable problem: which often next you will have to **Graph,** if given two or more variables, e.g., independent ("x'") and dependent ("y") variables. **Draw, ,** if given Geometry.

Next, you will likely have to breakdown **(deconstruct) OR** **simplify (construct)** aka "Mash-up" the numbers.

The last two lines, first **there are only four things you do in Math,** add, subtract, multiply and divide. **THAT'S IT!.** Just follow **PEMDAS** and remember Mr. Jackson's **PEDMAS logic**.

OR STATEMENT MODEL

| Solve | **or** | Simplify | **or** | Graph/Draw |

| Construct | **or** | Deconstruct |

| **+** | **or** | **-** | **or** | **X** | **or** | **÷** |

| PEMDAS | **or** | PEDMAS |

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YOU HEARD THAT? **Math only has four actions** to take, the rest is reasoning.

Discovery Stage: (Try your hands at the following)

Experiment 5: **Open Statement with no variable applications:** (1) Create

five open equations, minimum 3 terms in each, using non-repeating, single digits. (2) Vary use the four operators (+), (-

), (x), and (/) to ensure diversity. (3) Now, solve all five problems. (4) Score and reflect on the activity.

SUPPLIES: (A2 Experiment 5)

1. Paper and pen/pencil
2. Calculator (okay)

Experiment 6: **Open Statement, two or more variable applications:**

(1) Recycle the equations used in Experiment 5. (2) Take those five problems in (1), replacing "y" for one of the

remaining non-variable terms. (3) Isolate "Y", also known as "solve for "y."" setting up the relationship between the

Independent variable ("x") and the dependent ("y"). (4) We could graph but will hold off.. (5) But do reflect on the

activity. Find/try others.

SUPPLIES: (A2 Experiment 6)

1. Paper and pen/pencil
2. Calculator (okay)

Discovery Stage: (Try your hands at the following)

Experiment 7: **Closed with one variable applications:** (1) Take the five problems in Experience 5 (1), replacing "x" for one term in each. (4) Close the first two up with an equal sign capped by any two double-digit number. (5) The Remaining three problems, close with one different inequality sign capped with a double-digit number. (6) Now solve all five. (6) Score and reflect on the activity.

SUPPLIES: (A2 Experiment 7)

1. Paper and pen/pencil
2. Calculator (okay)

Experiment 8: **Closed with two or more variable applications:** (1) Recycle the equations used in Experiment 7. (2) Take those five problems in (1), replacing "y" for one of the remaining non-variable terms. (3) Now, Isolate "Y", also known as "solve for "y."" thereby setting up the equation showing the relationship between the Independent variable ("x") and the dependent ("y"). (4) The only thing we can do next is to graph the equation or populate a Table of Values (TOV) but don't. (5) But do reflect on the activity. Try other problems.

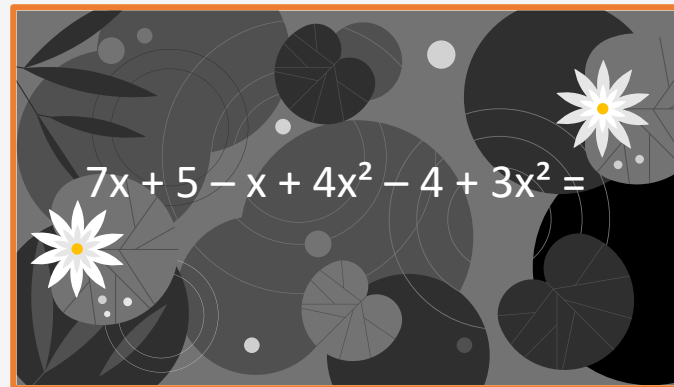**SUPPLIES**: (A2 Experiment 8)

1. Paper and pen/pencil
2. Calculator (okay)

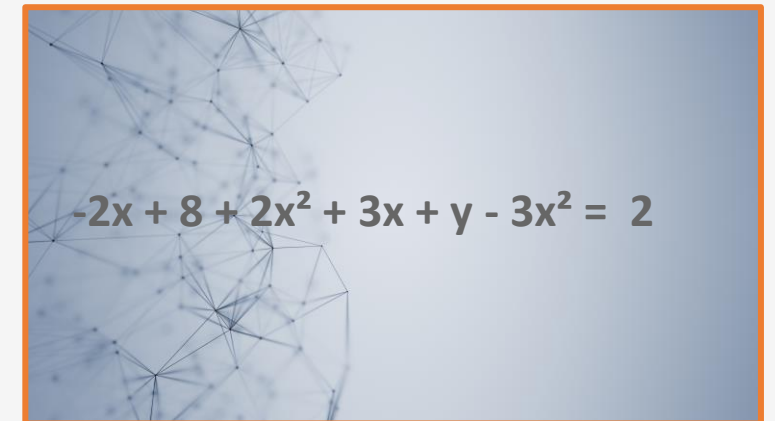# Finally: No.A2: Post-Test PoP-3 (need three of the three to advance)

Problem 1

Problem 2

Problem 3

$6 ÷ 2 =$

$7x + 5 − x + 4x^2 − 4 + 3x^2 =$

$-2x + 8 + 2x^2 + 3x + y - 3x^2 = 2$

ANSWER KEY: See next slide.

SCORE: You want to get at least two of the three PoP-3 (Problems of the Day).

HONOR SYSTEM: Why fool self?

Answer Key: Post-Test (PoP-3)

No.1 **Answer = 3** ($6 \div 2$ **could only but equal** 3)

No.2 **Answer = 7x² + 6x + 1** (**4x² + 3x² + 7x - x + 5 − 4**)

No.3 **Answer : y = x² - x - 6** (**y = +3x² - 2x² - 3x + 2x − 8 + 2**)

> If you **MISSED ONE** or **MORE**, you might want to return to this lesson, and studying it once again. If this make twice, revisit the Foundation skills. **Revisit this lecture again.**

Extensions and Extended Study

https://www.google.com/books/edition/How_to_Think_Like_a_Mathematician/sdgu2IICzu4C?hl=en&gbpv=1&printsec=frontcover read chapter: **Writing Mathematics, by Kevin Houston [2009]**

Vocabulary/Definitions

<u>Alge-4</u>: A Mr. Jackson invention noting the four operational moves in math.

<u>Axiom</u>: A statement regarded as self-evidently true, needs no further proof.

<u>Closed statement</u>: An expression with a defined equal/greater/less than value.

<u>Dependent variable</u>: Usually "y," the value derived from the independent....

<u>Draw</u>: The act of making an image or shape.

<u>Energy remaining</u>: Suggests that there are still more computations remaining.

<u>Graph, Graphing</u>: The act of plotting (x,y) relationship on the coordinates.

<u>Independent Variable</u>: Usually the "x" value, the value driving the results.

<u>Mathemagician(s)</u>: Very good students posing almost magical math skills.

<u>Nake Two(s)</u>: The missing digit in index position on the Radical symbol.

<u>Open Statement</u>: A expression without an equal, greater/less than sign.

<u>Or Statements Model</u>: A tool designed to stage all math problems.

<u>Postulate</u>: A statement assume to be true requiring no proof.

<u>Property(ies)</u>: Any characteristic that applies to a given of a set.

<u>Simplification (aka Reducing)</u>: Combine all like terms into a single value/term.

<u>Solve</u>: To arrive at the solution to a specific problem.

<u>Term</u>: A digit/combination of a digit and variable, separated by +,-, or = (or like).

<u>Theorem</u>: A statement that can be proven using Axioms, Postulates, et.al.

The END! Any questions?

Ready for Next Cookie?   Click here: **A3: Meet the Box-N-Wedge and Alge-4**

"Remember your PO, and always do good work."

- Mr. Jackson