Bridging the Gap: Math Skill Building

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SASSO Learning Specialists
Math Bootcamp

• Program for first-year student-athletes who have tested into Math 1050 or Math 1075

• Two, hour-long weekly sessions over a 10 week period

• Review mathematical concepts through the development of each individual student’s metacognition and vocabulary.
Topics Covered

Math 1050 and 1075 curriculum
• Order of Operations
• Geometry
• Linear Functions through word problems
• Fractions
• Simplification
• Number sense/Logic
• Systems of Equations
Learning Goals

- Maintain and develop previously learned math skills

- Foster a cross-curriculum, multisensory approach to mathematics with particular focus on word problems

- Demonstrate identifiable growth from start to finish of programming
# Pre-Test – Math 1050 Final Exam

<table>
<thead>
<tr>
<th>Name</th>
<th>Pre-test (Exam out of 18 possible points)</th>
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<tbody>
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<td><strong>Average Score</strong></td>
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Language
“Most researchers agree that memory, language, attention, temporal-sequential ordering, higher-order cognition, and spatial ordering are among the neurodevelopmental functions that play a role when children think with numbers”

(Misunderstood Minds, 2002)
“Children's ability to understand the language found in word problems greatly influences their proficiency at solving them”

Language & Math
(Misunderstood Minds, 2002)
Students do anywhere from 10-30 percent worse on word problems than when the same problem is presented in mathematical form.

J. Kintsch, *Understanding Word Problems*
A student with language problems in math may have difficulty with:

- the vocabulary of math language
- decoding relevant information
- sequencing information
- learning or recalling abstract terms
- understanding directions
- explaining and communicating about math
  - asking and answering questions
- reading texts to direct their own learning
- remembering assigned values or definitions in specific problems
Application - Our tenets for Word Problems

• Preparation for word problems must be constant
• Repetition is necessary
• Use multiple avenues of instruction and review
• Keep the specific word problem strategy simple, understandable, and repeatable
Common Terms

<table>
<thead>
<tr>
<th>Mathematical Term</th>
<th>Definition in your own words...</th>
<th>Example...</th>
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<tbody>
<tr>
<td>Least common multiple</td>
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<tr>
<td>Lowest common denominator</td>
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<td>Variable</td>
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<tr>
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<td>Average</td>
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<td>Consecutive</td>
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<td>Simple Interest</td>
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<td>Compound Interest</td>
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<td>Integers</td>
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<td>Circumference</td>
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<tr>
<td>Roots</td>
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Match the terms with their matching formulas:

1. $A = \pi r^2$
2. $A = \frac{1}{2}bh$
3. $P = 2l + 2w$
4. $C = 2\pi r$
5. $P = \text{side} \times 4 + \text{side}$

Draw a line from the following terms to their definitions:

- **Circle**: A 2-dimensional shape with 3 sides and three angles, with a sum of 180°.
- **Square**: A 2-dimensional shape that has 4 equal sides and every angle is a right angle (90°).
- **Rectangle**: A 2-dimensional shape made by drawing a curve that is always the same distance from a center.
- **Triangle**: The distance around a circle.
- **Area**: The size of the surface of a 2-dimensional shape.
- **Radius**: The distance from the center to the circumference of a circle.
- **Diameter**: The distance around a 2-dimensional shape.
- **Circumference**: A 2-dimensional shape with 4 right sides where all interior angles are right angles (90°).
Glossary

- The glossary terms were turned into notecards and word sorts to drill and practice vocabulary
Multiple Avenues
Math Bingo
Full-Court Classroom

|MATH BINGO|
|---|---|---|---|
|\(-1/3\)| 2 | 6 | 1/2 |
|\(-7\)| 11/6 | 10 | -1 |
|-2 | 24 | 8 | 4/7 |
|5/4 | -3 | 5 | 1 |

nyfreebingocards.com
Multiple Avenues
Logic Puzzle

NAME:

Five neighborhood children went trick or treating together. Each wore different costumes, carried a different bag for candy and had a different favorite candy. From the clues can you figure out who wore which costume, the type of bag they carried and their favorite candy?

The Children:
Three girls: Abby, Leah & Xavine
Two boys: Logan & Tyler

Costumes:
Hobo
Knight
Pirate
Princess
Punk Rocker

Candy Bags:
Black Plastic Trick Bag (Black)
Blue Pillowcase (Blue)
Decorated Grocery Bag (Grocery)
Plastic Pumpkin (Pumpkin)
Yellow Pillowcase (Yellow)

Favorite Candy:
Bubblegum (Bubblegum)
Chocolate (Chocolate)
Lemon Drops (Lemon)
Post-it Note Pieces (Post-it)
Taffy

1. Of the punk rocker & the hobo, one of the girls had decorated a grocery bag and the other absolutely loves chocolate.

2. Neither of the boys carried the plastic pumpkin or the blue pillowcase.

3. The blue children were the boy with the black plastic bag, the one who loves lemon drops, Xavine, the chocolate lover, and the girl dressed as a hobo (who loves peanut butter).

4. The pirate (whose favorite candy is no bubblegum or taffy) carried the yellow pillowcase.

5. The pirate's sister, Abby, was going to carry a black one, but changed her mind at the last minute.

6. Tyler doesn't chew bubblegum so he gave his to the girl with the grocery bag (it is her favorite).

7. Again (not necessarily in the same order), the children are: the girl with the plastic pumpkin, the hobo, the princess, Logan and the one who loves bubblegum.
Attacking the Problem

Carefully read the problem
Locate the question to be answered
Underline important terms and information
Think the problem through (use pictures, mind maps etc.)
Create an equation or chart to solve for the answer
Hard work your way to a solution
Example 1

1050:

Comparing Services:

EZ&Z, a cell phone service provider, has a data plan that charges a flat fee of $14 per month. At the same time, an alternative data plan charges a fee of $3 per month plus $0.20 for each MB used.

How many MBs must a person use the alternative plan to exceed $14?

\[ 3 + (0.20 \cdot x) = 14 \]

1. Last sentence
2. Last sentence
Example 2

1075:

The distance required for an emergency stop for a car varies directly as the square of the speed of the car. A car travelling 50 miles per hour requires 140 feet to stop.

a. What is the constant of variation?

b. Write an equation relating the stopping distance to the speed of the car.

c. How many feet will the car need to make an emergency stop if it is travelling at 70 miles per hour?

d. How fast was the car travelling if it required 68.6 feet to make an emergency stop?
Example 3

1075:

Two airplanes leave the same airport at the same time. One airplane flies due south, while the other flies due west 10 mph faster than the first plane. After 1 hour the airplanes are 290 miles apart. Find the speed of each airplane.

(10 mph faster)

plane 2

plane 1

Airport
# Post Test (1050 Final)

<table>
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<tr>
<th>Name</th>
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<th>Post-test (18)</th>
<th>Net Change</th>
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Test Score Analysis

- Paired t-test
- Mean = 3.77
- T = 5.17
- p-value = 0.000422
- The result is significant at p ≤ 0.05
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