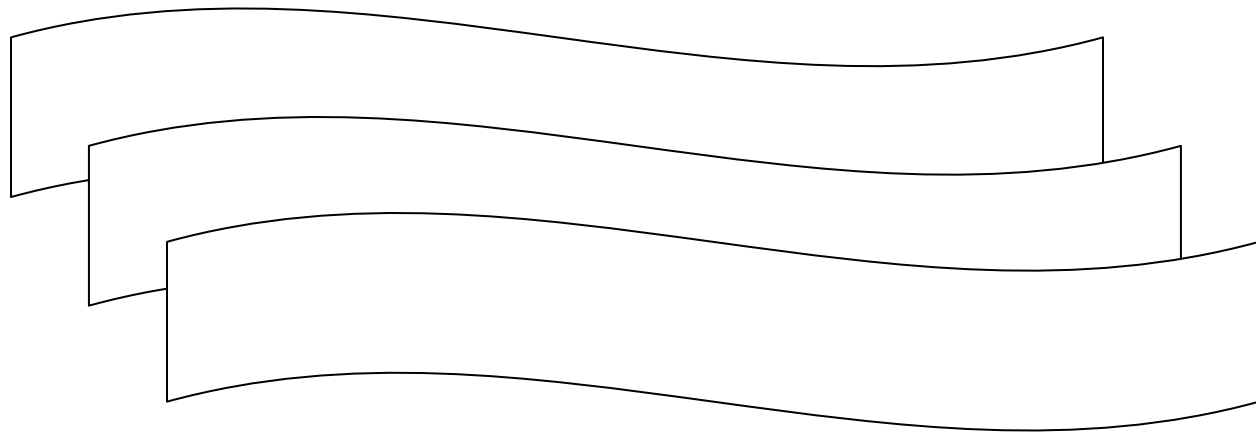


BARS



Basic Algebra Review

Presented by
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PURDUE NORTH CENTRAL

Q & A

Q: What is BAR?

A: BAR stands for Basic Algebra Review and covers problems 15 through 25 on the math portion (Form D) of the placement test-also called the SAM test.

Q: What are the possible results a student may see based on problems 15-25?

A: If a student has shown proficiency in basic arithmetic (the first fourteen problems on this test), his or her work in the next eleven problems is reviewed. If a student has six (or more!) correct in this section the placement result will state MA 111, Algebra. If a student has less correct, the result will be GNC 064, Fundamentals of Algebra.

Q: What kind of problems are on this part of the test?

A: The eleven problems cover the following math topics...

- Distributive Law
- Combing like terms
- Solving for the variable
 - Equalities
 - Inequalities
- Graphing linear equations
 - Intercepts
 - Slope
- Fractions with variables

** Students should also know how to solve a system of equations, a story problem, and other problems common to this level of math.*

Q: Are students allowed to repeat the placement test?

A: Yes! Students may repeat all of the placement test, or any one of the three components (Math, English, and Reading).

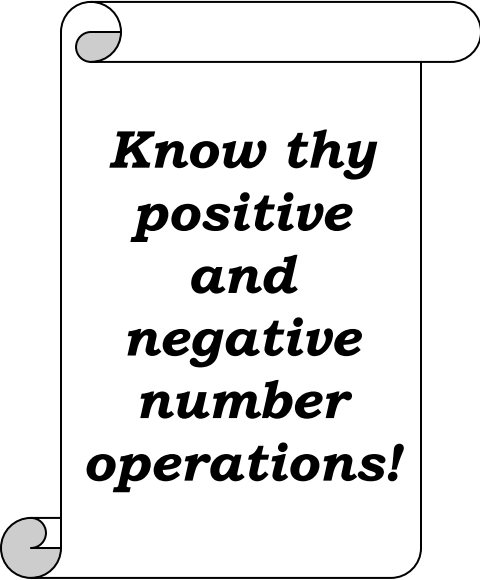
I. Problems 1 – 14

Students who wish to place in MA 111 must first show a mastery of basic computational arithmetic by correctly answering nine (or more!) problems of the first 14 problems on the SAM test.

These problems cover the following topics...

- Add, subtract, multiply, and divide whole numbers
- Add, subtract, multiply, and divide fractions and mixed fractions
- Add, subtract, multiply, and divide integers (negative and positive numbers)
- Students should also know how to read a graph, follow the order of operations, solve for an unknown (variable), solve a story problem, and simplify exponents

While examples given in this handout are usually positive numbers, problems 15 to 25 require a mastery of computational arithmetic using integers.



***Know thy
positive
and
negative
number
operations!***

Notes _____

The following 6 sections are based on problems 15 – 25 of Form D


II. Distributive Law

$$a(b + c) = ab + ac$$

$$a(b - c) = ab - ac$$

Whatever is on the outside of the parentheses is distributed to the terms being added or subtracted on the inside.

Multiply what is inside of the parenthesis by 6


$$6(3x + 5y) = 18x + 30y$$

$$4x(5 - 2y) = 20x - 8xy$$

Notes

III. Combining Like Terms

Notes _____

A. Combine like variables

$$2a + 3a = 5a$$

$$3x + 5 + 7x = 10x + 5$$

$$9y - 4y = 5y$$

$$6c - 2 - 2c = 4c - 2$$

B. Combine like variables and exponents

$$3x^2 + 2x^2 = 5x^2$$

$$4x^2 + 3x + 2 + 3x^2 + 2x + 6 = 7x^2 + 5x + 8$$

$$4x^2 - 3x^2 = x^2$$

$$5x^2 + 7x + 3 - 2x^2 - 4x - 2 = 3x^2 + 3x + 1$$

You combine like terms in this manner when adding or subtracting. When multiplying, multiply the coefficients (numbers) and add the exponents. Subtract the exponents when you divide.

$$(3x^2)(4x^3) = 12x^5$$

$$\frac{6x^2}{3x} = 2x$$

$$(2x)(5x) = 10x^2$$

$$\text{check: } (2x)(3x) = 6x^2$$

IV. Solve for the Variable

A variable is solved when...

- The variable is positive
- The variable is isolated – no coefficient
- The variable is not in the denominator

Equations:

$$4x = 8$$

$$x = 2$$

$$5 + y = 9$$

$$y = 4$$

$$6 - c = 2$$

$$c = 4$$

$$\frac{12}{x} = 4$$

$$x$$

$$x=3$$

$$\frac{x}{6} = 2$$

$$6$$

$$x = 12$$

$$y - 7 = 5$$

$$y = 12$$

Inequalities:

$$3x > 12$$

$$x > 4$$

$$y + 2 > 5$$

$$y > 3$$

$$6 - c > 2$$

$$c < 4$$

← The sign changes when you multiply or divide by a negative number

Greater Than: $>$

Greater Than or Equal to: \geq

Less Than: $<$

Less Than or Equal to: \leq

$$\frac{15}{y} > 3$$

$$y$$

$$5 > y$$

$$\text{or } y < 5$$

$$\frac{c}{6} < 2$$

$$6$$

$$c < 12$$

***Watch the inequality sign!**

Check with an example to make sure your answer is correct:

$$-6x > 30$$

$$x < -5$$

*Remember to switch signs when multiplying or dividing by a negative number

$$\frac{x}{-5} < 3$$

$$-5$$

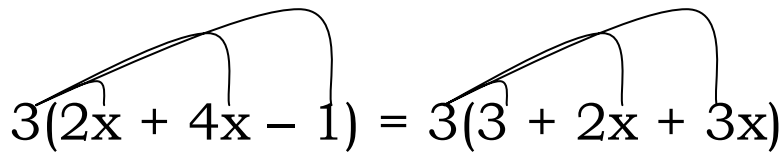
$$x > -15$$

V. Combination Problems

1. Distributive law
2. Combine like terms
3. Isolate the variable
4. Solve for the variable

$$\text{Example: } 3(2x + 4x - 1) = 3(3 + 2x + 3x)$$

**Work both sides of the equal sign*


$$3(2x + 4x - 1) = 3(3 + 2x + 3x)$$

1. Distributive law

$$6x + 12x - 3 = 9 + 6x + 9x$$

Multiply each term in the parenthesis by 3

2. Combine like terms

$$18x - 3 = 9 + 15x$$

$$\begin{array}{cccc} -15x & +3 & +3 & -15x \end{array}$$

Subtract 15x from both sides and add 3 to each side to isolate the variable

3. Isolate the variable

$$18x - 15x = 9 + 3$$

4. Solve for the variable

$$3x = 12$$

$$x = 4$$

Divide both sides by 3

Notes _____

VI. Graphing Linear Equations

Terms to know and understand:

- Coordinates or ordered pairs (x,y)
- Cartesian Coordinate System
- X axis and Y axis
- X intercepts and Y intercepts
 - Standard Form: $Ax + By = C$
 - Slope: $m = \frac{Y_2 - Y_1}{X_2 - X_1}$
 - Slope Intercept Form: $y = mx + b$

Example:

a) Graph the equation $2x - y = 4$

b) Find the X and Y intercepts

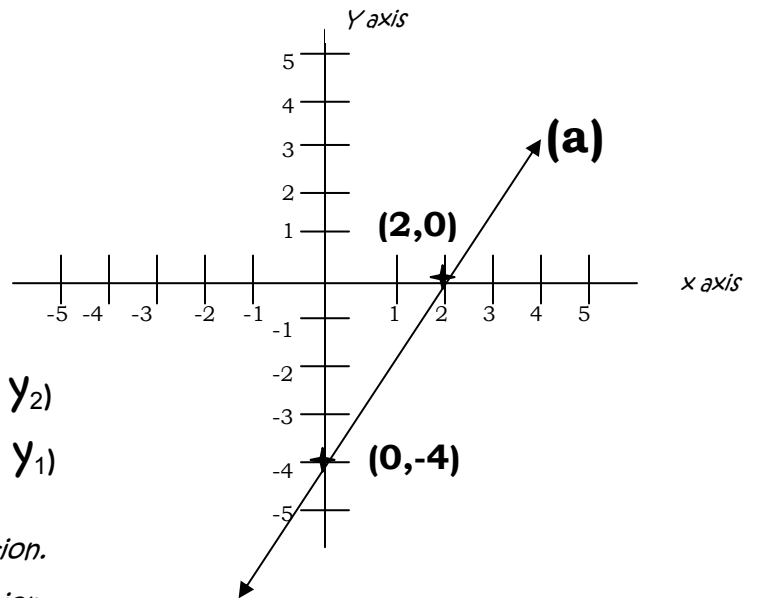
c) Find the Slope

$$\underline{2x - y = 4}$$

x	y
0	-4
2	0

when $x = 0$, $y = -4$

when $y = 0$, $x = 2$



(b) y intercept is (0, -4) (Use as X_2, Y_2)

x intercept is (2, 0) (Use as X_1, Y_1)

Find the x-intercept by using $y=0$ in the equation.

Find the y-intercept by using $x=0$ in the equation.

**see the table above*

(c) Slope = $m = \frac{(-4 - 0)}{(0 - 2)} = \frac{-4}{-2} = 2$

