

## Topics and Practice Problems for Basic Algebra (MBALG) Placement Test

### General Information:

- The Basic Algebra (MBALG) Placement tests consists of 32 problems which makes is considerably shorter than this review document.
- Most of the questions on the placement test are multiple choice.
- Below is a list of topics covered on the placement test as well as problem examples. These examples are intended to be similar but not identical to the questions the student may encounter on the placement test.

### 1. Order of Operations and Simplifying Polynomials

a.  $(-3)(-6) + (4)(-2)$

b.  $\frac{-3(-5)-3(5-8)}{4(-8+6)}$

c.  $2[(-4)^2 - (-2)(-5)]$

d.  $4m + 2(m + 4) + 4$

e.  $7(4w - 3) - 25w$

### 2. Operations with Integer Exponents (pos., neg., & zero)

a.  $\left(\frac{2}{3}\right)^{-3}$

b.  $(2a^3)^2(a^0)^5$

c.  $3^05^3$

d.  $(p^4)(3p^3)^2$

e.  $(3x^{-2})(5x^2)^2$

## Topics and Practice Problems for Basic Algebra (MBALG) Placement Test (continued)

### 3. Evaluating Algebraic Expressions or Functions with given values

Given  $a = -2$ ,  $b = 5$ ,  $c = -4$ , and  $d = 6$ , evaluate the following algebraic expressions:

a)  $3b^2 + 4c$

b)  $\frac{2b+3d}{2a}$

Given  $f(x) = 3x^2 + x - 1$

a) find  $f(0)$

b) Find  $f(-2)$

c) Find  $f(1)$

### 4. Solving Linear Equations

a)  $9x + 7 = 5x - 3$

b)  $9(3x + 2) - 10x = 12x - 7$

c)  $\frac{x}{6} + \frac{x}{5} = 11$

d)  $\frac{6x-1}{5} - \frac{2x}{3} = 3$

e)  $5 + \frac{4}{x} = \frac{7x-8}{x}$

f)  $3x - 2 = 7$

g)  $5 - 4x = 25$

### 5. Solving a formula equation for a different variable

a. Given  $F = \frac{9}{5}C + 32$  solve for C.

b. Given  $2x + 3y = 6$  solve for x.

6. Creating an equation from a verbal description:

- a. Four hundred tickets were sold for a school play. General admission tickets were \$4 while student tickets were \$3. If the total ticket sales were \$1,350 how many of each type of ticket were sold?
  - i. With  $x$  as the number of general admission tickets create an equation by which we could solve for the number of general admission tickets.
  - ii. Solve for the number of general admission tickets and determine the number of student tickets.
- b. A coffee reseller wishes to mix two types of coffee beans. The Kona bean wholesales for \$4.50 per pound, the Sumatran bean wholesales for \$3.25 per pound. If she wishes to mix 200 lb. for a wholesale price of \$4.00 per pound how many pounds of each type of coffee should she include in the mix?
  - i. With  $x$  as the number of pounds of Kona beans needed create an equation that we could solve for the number of beans needed.
  - ii. Solve for the number of pounds of each type of coffee beans needed in the 200 pound mixture described above.

7. Adding and Subtracting Polynomials

- a.  $(2x^3 - 5x + 1) - (4x^2 + 8x + 6)$
- b.  $(5b^3 - 8b + 2b^2) + (3b^2 - 7b^3 + 5b)$

8. Multiplying Polynomials (Monomials and Binomials)

- a.  $(-3r^4s^2)(-7r^2s^5)$
- b.  $(6a - 5b)^2$

9. Dividing a polynomial by a monomial

- a.  $\frac{20b^3 - 25b^2}{-5b}$
- b.  $\frac{16a^3b^2 - 4a^2b^2 + 8a^2b^3}{4a^2b^2}$

10. Factoring Polynomials

Factor the following polynomials completely:

a.  $3x^2 + 12x - 15$

b.  $n^2 + 5n - 50$

c.  $4x^2 - 25$

d.  $16a^4 - 81b^4$

e.  $4x^2 + 12xy + 9y^2$

f.  $6x^2 - 7x - 3$

g.  $6m^2 - 17mn + 12n^2$

11. Simplifying Rational Expressions

a.  $\frac{4x-28}{5x-35}$

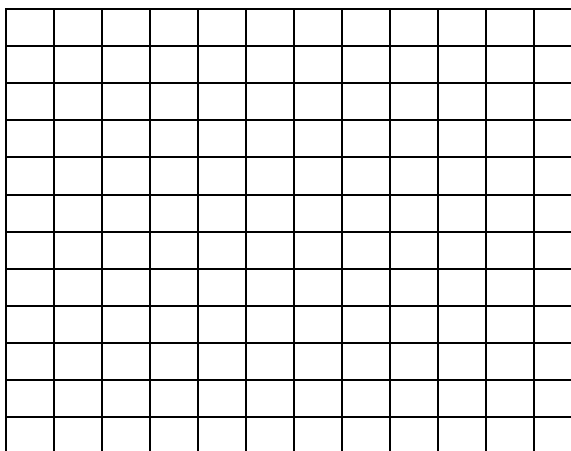
b.  $\frac{a^2-25}{a^2-a-30}$

12. Graphing Linear Equations

The student needs to be able to graph linear equations and also be able to match a linear graph with the equation that it represents.

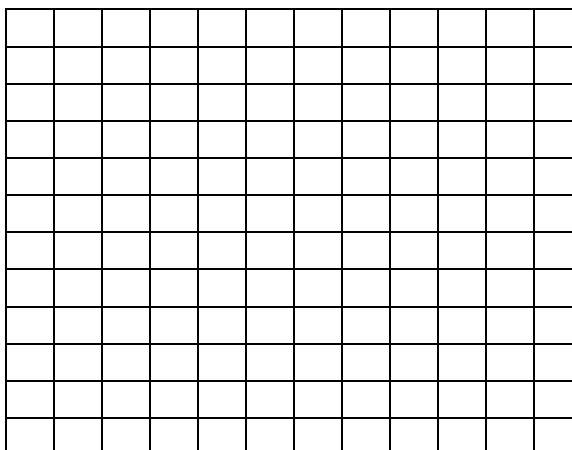
Part A: Graph each of the following equations:

a.  $3x - 2y = -6$

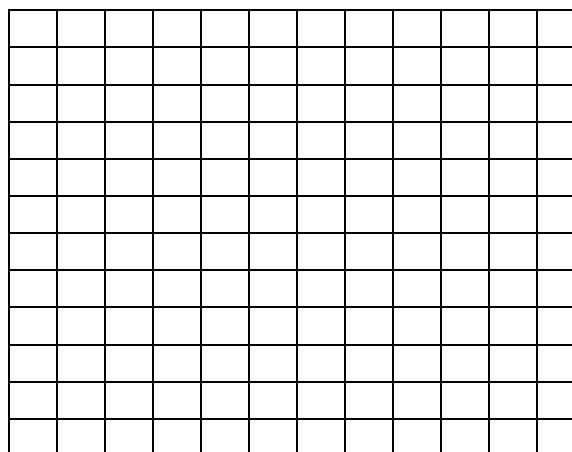


Topics and Practice Problems for Basic Algebra (MBALG) Placement Test (continued)

b.  $4x + 3y + 9 = 0$



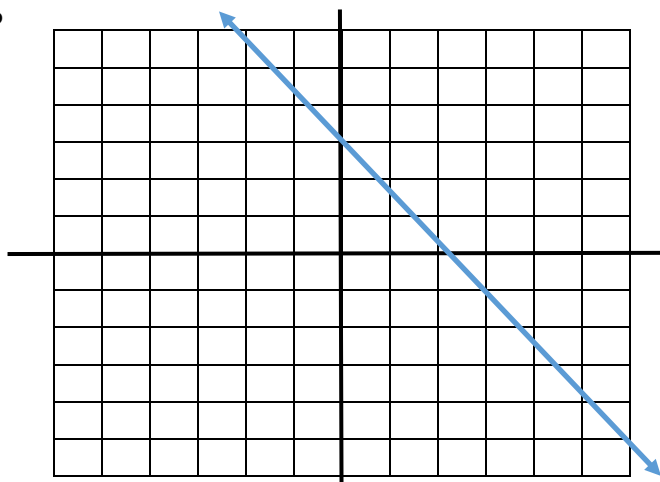
c.  $5x + 3y = 15$



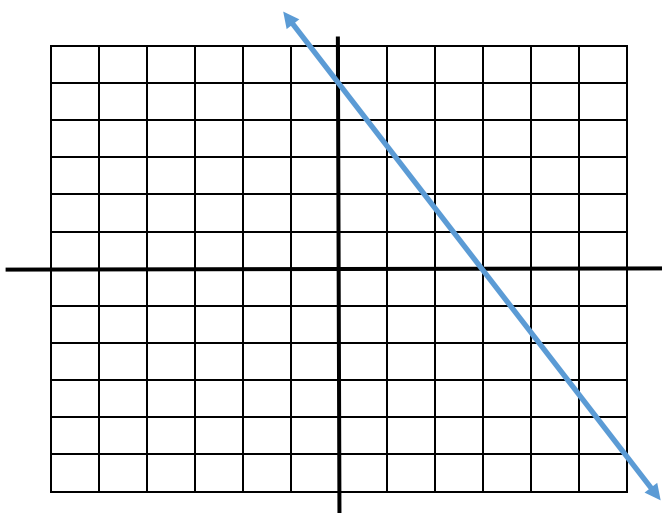
12 – Part B – Select which graph represents each of the following equations.

- a)  $3x - 2y = -6$
- b)  $4x + 3y - 9 = 0$
- c)  $5x + 3y = 15$

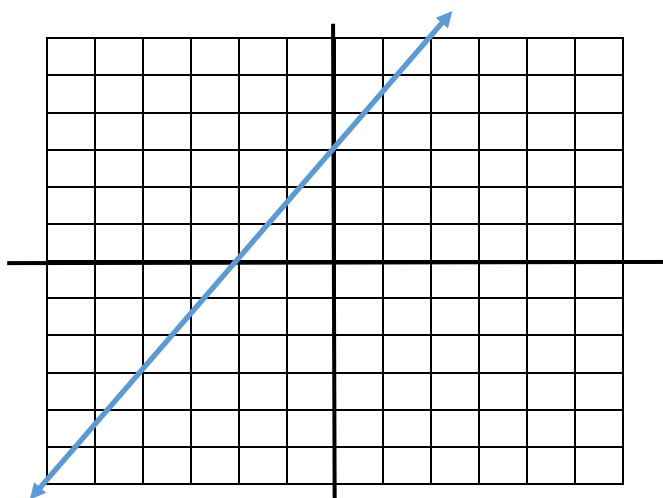
Graph P



Graph Q



Graph R



13. Computing the slope of a line

Find the slope for the graphs of the following equations.

a.  $4x + 3y + 9 = 0$

b.  $x - 2y = 5$

14. Identifying the x and y intercepts for the graph of a linear equation.

Find the x and y intercepts for each of the following equations.

a.  $3x - 2y + 6 = 0$

b.  $5x + 2y = 8$

15. Simplifying Radicals

Simplify the following radical expressions.

a.  $\sqrt{54w^4}$

b.  $\sqrt{80m^6n^4}$

c.  $\frac{10}{\sqrt{6x}}$

d.  $\sqrt{27p} + \sqrt{75p}$

16. Solving Quadratic Equations (by Factoring and by Quadratic Formula)

Solve each Quadratic Equation.

a.  $2x^2 - 17x + 36 = 0$

b.  $2m^2 = 12m + 54$

c.  $3x^2 - 2x = 6$

d.  $5x^2 - 4x = -4$