# Math Placement Review 1-Behavior of Numbers

This review sheet is a supplement to the videos labeled MPR 1.X.

This is practice with the following material:

- a) Associative, Commutative and Distributive Property
- b) Order of Operations (PEMDAS)
- c) Defining Even and Odd Numbers
- d) Working with Signed Numbers
- 1) Using the associative property, rewrite each expression 2 different ways:
  - a. 3+5+8
  - b. 4+7+6
  - c. 3\*6\*1
  - d. 9\*4\*8
- 2) Using the distributive property either simplify each of the following or revert to a(b+c) form:
  - a. 3(5+2)
  - b. 8(4+1)
  - c. 5(2+2)
  - d. 20+42
  - e. 8+2
  - f. 18+27
- 3) Predict if the answers to the following will be a positive or negative integer. Also determine if it will be odd or even. Justify your answer:
  - a. 371+592
  - b. -586-190
  - c. 578÷14
  - d. 1091\*-537
  - e. -87+92

- 4) Simplify each of the following:
  - a. 3\*(8+2)
  - b. (3\*8)+2
  - c. 3\*8+2
  - d. 3\*2+8
  - e. 3\*(7÷1)
  - f. 3-6+4\*2
  - g. 3-[4+3(-1+2)]
  - h. 3÷3\*4

### Math Placement Review 2-Fractions, Ratios and Percents

This review sheet is a supplement to the videos labeled MPR 2.X.

This is practice with the following material:

- a) Operations involving fractions
- b) Ratios and Proportions
- c) Percents (including discount, tax and interest)

1) Simplify each expression. Convert to a mixed number when necessary.

3	2	1	2	4	2	$\frac{10}{r}$	6	5	4	5	1
$\frac{-}{4}$	5	$\frac{10}{10}$ T	3	5	3	$\frac{12}{12}$	7	$\frac{-}{7}$ X	5	8	3

 $\frac{1}{2} \div \frac{7}{8}$   $\frac{4}{9} \div \frac{1}{3}$   $\frac{2}{5} + \frac{7}{9}$ 

- 2) How far will a car travelling at 75 miles per hour travel in 40 minutes? (hint: convert 40 minutes to hours first)
- 3) What is the average speed of a car if it is going 10 miles in 30 minutes?
- 4) What is 22% of 83?
- 5) A sweater is marked down 35% and has a sale price of \$14.75. What was the original price? If bought in NYS (tax is 8%), how much will you pay at the register for the sweater?
- 6) How much interest is charged when you have a credit card bill of \$250 and are charged 1.875% interest?
- 7) If gas costs \$3.75 per gallon, how many gallons of gas can you get if you plan to pay \$20.00?

Math Placement Review 3-Exponents Radicals and Scientific Notation

This review sheet is a supplement to the videos labeled MPR 3.X.

This is practice with the following material:

- d) Rules of exponents
- e) Simplifying and Combining Radicals
- f) Scientific Notation
- 8) Using the rules of exponents, determine the value of each of the following expressions:

$$x^4 * x^2 = \frac{x^{-4}}{x^{-5}}$$
  $(a^2)^5 = \frac{x^3}{x^7} = (c^8)^0$ 

9) Simplify each radical:

 $\sqrt{50}$   $\sqrt{18}$   $\sqrt{28}$   $\sqrt{180}$   $\sqrt{294}$   $\sqrt{432}$   $\sqrt{804}$ 

- 10) Determine if any of your answers to question two (2) can be added together. Explain how you can add radicals together.
- 11) Convert each of the following either into or out of scientific notation:
  - a. 0.003279
  - b. 1000596
  - c. 0.082
  - d. 9
  - e. 10
  - f. 4.5x10<sup>-4</sup>
  - g. 8.78x10<sup>1</sup>
  - h. 6.19x10<sup>-5</sup>

Math Placement Review #4-Polynomial Operations and Functions

This review sheet is a supplement to the videos labeled MPR 4.X.

This is practice with the following material:

- g) Manipulating Polynomials
- h) Working with simple functions
- i) Working with composite and inverse functions
- 12) Simplify each expression below:
  - a. (3x+2)+(4x-1)
  - b. (8x+2)-(5x+3)
  - c. (9x-1)(4x+2)
  - d. (x+5)<sup>2</sup>
  - e.  $(x^2+2x+1)(3x-5)$
  - f.  $(2x^2+8x-7)+(3x^2-7)$
  - g.  $(x^2-7x+2)-(2x^2+7x-6)$
  - h. (3x-9)<sup>2</sup>

13) Given that f(x) = 3x+2 and  $g(x) = 10x^2-2$ , find each of the following:

- a. f(8)
- b. f(6)
- c. f(-3)
- d. f(-9)
- e. f(g(x))
- f. g(8)
- g. g(6)
- h. g(-3)
- i. g(-9)
- j. g(f(x))
- k. f<sup>-1</sup>(x)
- I.  $g^{-1}(x)$
- m. f<sup>-1</sup>(3)
- n. g<sup>-1</sup>(3)

## Math Placement Review #5-Linear Equations

This review sheet is a supplement to the videos labeled MPR 5.X.

This is practice with the following material:

- j) Finding the equation of a line given two (2) points
- k) Finding the distance between two (2) points in the (x,y) coordinate plane
- I) Finding the midpoint of two (2) points on a line
- m) Determining if two (2) lines are either parallel or perpendicular

For each of the following pairs of points, determine:

- 1) The equation of the line that connects them
- 2) The distance between them
- 3) The midpoint of the line
- 4) A line that runs parallel to it
- 5) A line that runs perpendicular to it
- a) (3,2) and (5,8)
- b) (3,1) and (8,5)
- c) (4,4) and (7,9)
- d) (-1,0) and (5, 2)
- e) (-3,-4) and (5,-3)
- f) (-5,6) and (9,0)
- g) (0,0) and (1,-7)

# Math Placement Review #6-Systems of Equations

This review sheet is a supplement to the videos labeled MPR 6.X.

This is practice with the following material:

- n) Using substitution to solve systems of equations
- o) Using elimination to solve systems of equations
- 1) Oliver has \$100 in just \$20 bills and \$10 bills. He has six (6) total bills. How many tens does he have?
- 2) Algebraically solve each of the following systems:
  - a. Y = 5X+3 Y=8Xb. Y=4X-22 X=Y+7c. A=13C-2 C=8Ad. B=9A+4 B=6Ae. Y=17X-4 X=3Yf. 3X+6Y=8 3X+5Y=10g. -8X+2Y=3 -8X+5Y=12h. 3X + 5Y = 6

12X-10Y = 1

#### Math Placement Review #7- Quadratics and Factoring

This review sheet is a supplement to the videos labeled MPR 7.X.

This is practice with the following material:

- p) Factor quadratic equations
- q) Finding the roots of a quadratic equation
- r) Determining the axis of symmetry
- s) Calculating the max/min of a quadratic

For each of the following, determine:

- 1) The axis of symmetry
- 2) The maximum or minimum
- 3) Factors (if they exist)
- 4) Roots
- a) X<sup>2</sup>-9
- b) X<sup>2</sup>-20X+19
- c) 12X<sup>2</sup>+12X+3
- d) X<sup>2</sup>-X-42
- e)  $X^2$ -4X
- f) 10 X<sup>2</sup>-8X
- g) 3 X<sup>2</sup>-X-1
- h) 10 X<sup>2</sup>-18X-30
- i) X<sup>2</sup>+8X+12
- j) 3 X<sup>2</sup>-13X-10
- k) 8 X<sup>2</sup>+14X-15

Math Placement Review #8- Rational Expressions and Extra Factoring

This review sheet is a supplement to the videos labeled MPR 8.X.

This is practice with the following material:

- t) Solving a rational expression
- u) Determine missing part of a quadratic equation

1) Reduce each of the following rational expressions:

 $\frac{x^{2}+10x+24}{x+6} \qquad \frac{x^{3}+3x^{2}-x}{x} \qquad \frac{8x^{4}-16x^{3}}{8x} \qquad \frac{2x^{2}+x-3}{x^{2}-1} \qquad \frac{x^{2}+3x-18}{x^{2}+12x+36}$  $\frac{x^{4}-16}{x-2} \qquad \frac{x^{2}+11x+28}{x^{2}+3x-28}$ 

- 2) Assuming that one factor for each of the following expressions is 3x+1, determine k for each expression:
- $3x^{2} + kx + 5$   $3x^{2} + kx - 2$   $3x^{2} + kx + 3$   $9x^{2} + kx + 1$   $30x^{2} + kx - 4$   $6x^{2} + kx + 24$  $15x^{2} + kx - 6$

Math Placement Review #9-Exponential Equations and Logarithms

This review sheet is a supplement to the videos labeled MPR 9.X.

This is practice with the following material:

- v) Solving an exponential equation
- w) Solving a logarithmic equation
- x) Using the logarithmic rules
- y) Changing the base of a logarithmic function
- 1) Solve each for X:
  - a. 2<sup>×</sup>=16
  - b. 3<sup>x</sup>=81
  - c. 5<sup>x</sup>=625
  - d. 2<sup>x</sup>=128
  - e. 10<sup>x</sup>=0.001
  - f.  $Log_3x=5$
  - g. Log<sub>2</sub>x=64
  - h. Log<sub>8</sub>x=100
  - i. Log<sub>7</sub>x=1
  - j. Log<sub>12</sub>x=20736
- 2) Using the rules of logarithms, rewrite each of the following:
  - a.  $Log_2100-Log_28$
  - b.  $Log_45 + Log_47$
  - c. 5\*log2
  - d. 8\*log1
- 3) Convert each of the following into base 10 logs:
  - a.  $Log_2 8$
  - b.  $Log_318$
  - c.  $Log_636$
  - d.  $Log_57$
  - e.  $Log_{20}2000$

# Math Placement Review #10-Imaginary Numbers

This review sheet is a supplement to the videos labeled MPR 10.X.

This is practice with the following material:

- z) Complex and Imaginary Numbers
- aa)Factoring quadratics with imaginary roots
- bb) Finding the value of i raised to different powers
- cc) Finding the conjugate and absolute values of complex numbers

# 1) Simplify each of the following:

- a. (7+3i)-(4+2i)
- b. (7+2i)(3-4i)
- c. (5+i)+(6-i)
- d. (5+3i)<sup>2</sup>
- e. (4+11i)(6-2i)+(3+5i)(10+7i)
- 2) Determine the value of i raised to each of the following powers:
  - a. 15 b. 68 c. 110 d. 55 e. ½
- 3) Factor the following:
  - a. X<sup>2</sup>+X+4
  - b. X<sup>2</sup>+3X+4
  - c. X<sup>2</sup>-X+8
  - d. X<sup>2</sup>+4X+5
- 4) Find the conjugates and absolute values of each of the following:
  - a. 8+3i
  - b. 10-2i
  - c. 4+6i
  - d. 6i
  - e. 4i-1

#### Math Placement Review #11-Matrices

This review sheet is a supplement to the videos labeled MPR 11.X.

This is practice with the following material:

- dd) Designing matrices
- ee) Multiplying matrices
- ff) Using matrices to solve systems of equations with 2 variables

Using matrices solve each of the following systems of equations:

- 5) 3x+4y=30 2x +y = 15
- 6) 4x-3y=10 x-y=1
- 7) 5x-2y=122x+3y=30
- 8) 3x+8y=47 4x+5y=40
- 9) 10x+3y=-5 3x-y=-11

Multiply each of the following matrices

 $\begin{bmatrix} 2 & 1 \\ 5 & 6 \end{bmatrix} x \begin{bmatrix} 3 & 5 & 9 \\ 1 & 2 & -4 \end{bmatrix}$ 

$$\begin{bmatrix} 4 & 8 & 1 \\ 3 & -5 & 2 \end{bmatrix} x \begin{bmatrix} 1 \\ 9 \\ 6 \end{bmatrix}$$

#### Math Placement Review #12-Trigonometry

This review sheet is a supplement to the videos labeled MPR 12.X.

This is practice with the following material:

- gg)Determining the unknown sides of a right triangle
- hh) Determining the unknown angles of a right triangle

In each of the following situations, assume you are given the following triangle:



Use the following information to determine the remaining sides and angles:

- 1) a=6, b=8
- 2) a=5, c=17
- 3) b=6, c=18
- 4) <A=35
- 5) <B=25
- 6) <B=10
- 7) a=22, b=18
- 8) <B=42, b=31
- 9) <B=25, c=8
- 10) a=14, <B=35

### Math Placement Review #13-Probability

This review sheet is a supplement to the videos labeled MPR 13.X.

This is practice with the following material:

- ii) Determining probability of multiple events
- jj) Calculating the number of permutations or combinations for a given situation
- 1) A regular two (2) sided coin is flipped and a regular six (6) sided die is rolled. Determine the probability of each of the following outcomes:
  - a. A head and a 5
  - b. A tail or a 2
  - c. A 4
  - d. A tail and an even number
  - e. A head or an odd number
  - f. A tail and a number divisible by three (3)
  - g. A head and a prime number
  - h. A 7
- 2) A card is drawn at random from a normal 52 card deck. Determine the probability of the following outcomes:
  - a. A diamond
  - b. A spade or a club
  - c. A heart and a club
  - d. A heart given that you draw a 5
  - e. A black card given that you draw a 3
  - f. A 2 given that you draw a red card
  - g. An even given that you draw a black card
  - h. A prime number given that you draw a club
- 3) How many 5 letter permutations are formed from the English Language?
- 4) If you were given a group of 8 letters, how many 2 letter combinations would there be?