## 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. $578 \div 14$
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. $3 *(7 \div 1)$
f. $3-6+4 * 2$
g. $3-[4+3(-1+2)]$
h. $3 \div 3 * 4$

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.
$\frac{3}{4}+\frac{2}{5} \quad \frac{1}{10}+\frac{2}{3} \quad \frac{4}{5}-\frac{2}{3} \quad \frac{10}{12} x \frac{6}{7} \quad \frac{5}{7} x \frac{4}{5} \quad \frac{5}{8}-\frac{1}{3}$
$\frac{1}{2} \div \frac{7}{8} \quad \frac{4}{9} \div \frac{1}{3} \quad \frac{2}{5}+\frac{7}{9}$
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:
$x^{4} * x^{2} \quad \frac{x^{-4}}{x^{-5}}$
$\left(a^{2}\right)^{5}$
$\frac{x^{3}}{x^{7}}$
$\left(c^{8}\right)^{0}$
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. $4.5 \times 10^{-4}$
g. $8.78 \times 10^{1}$
h. $6.19 \times 10^{-5}$

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. $(3 x+2)+(4 x-1)$
b. $(8 x+2)-(5 x+3)$
c. $(9 x-1)(4 x+2)$
d. $(x+5)^{2}$
e. $\left(x^{2}+2 x+1\right)(3 x-5)$
f. $\left(2 x^{2}+8 x-7\right)+\left(3 x^{2}-7\right)$
g. $\left(x^{2}-7 x+2\right)-\left(2 x^{2}+7 x-6\right)$
h. $(3 x-9)^{2}$
13) Given that $f(x)=3 x+2$ and $g(x)=10 x^{2}-2$, 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. $f^{-1}(x)$
I. $g^{-1}(x)$
m. $f^{-1}(3)$
n. $g^{-1}(3)$

## 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. $Y=5 X+3$
$Y=8 X$
b. $Y=4 X-22$
$X=Y+7$
c. $A=13 C-2$
$\mathrm{C}=8 \mathrm{~A}$
d. $B=9 A+4$
$B=6 A$
e. $Y=17 X-4$
$X=3 Y$
f. $3 X+6 Y=8$
$3 X+5 Y=10$
g. $-8 X+2 Y=3$
$-8 X+5 Y=12$
h. $3 X+5 Y=6$
$12 X-10 Y=1$

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) $x^{2}-9$
b) $x^{2}-20 x+19$
c) $12 x^{2}+12 x+3$
d) $x^{2}-x-42$
e) $x^{2}-4 x$
f) $10 x^{2}-8 x$
g) $3 x^{2}-x-1$
h) $10 x^{2}-18 x-30$
i) $x^{2}+8 x+12$
j) $3 x^{2}-13 x-10$
k) $8 X^{2}+14 X-15$

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:

$$
\begin{array}{lllll}
\frac{x^{2}+10 x+24}{x+6} & \frac{x^{3}+3 x^{2}-x}{x} & \frac{8 x^{4}-16 x^{3}}{8 x} & \frac{2 x^{2}+x-3}{x^{2}-1} & \frac{x^{2}+3 x-18}{x^{2}+12 x+36} \\
\frac{x^{4}-16}{x-2} & \frac{x^{2}+11 x+28}{x^{2}+3 x-28} & &
\end{array}
$$

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

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. $2^{x}=16$
b. $3^{x}=81$
c. $5^{x}=625$
d. $2^{x}=128$
e. $10^{\mathrm{x}}=0.001$
f. $\log _{3} x=5$
g. $\log _{2} x=64$
h. $\log _{8} x=100$
i. $\quad \log _{7} x=1$
j. $\log _{12} x=20736$
2) Using the rules of logarithms, rewrite each of the following:
a. $\log _{2} 100-\log _{2} 8$
b. $\log _{4} 5+\log _{4} 7$
c. $5^{*} \log 2$
d. $8^{*} \log 1$
3) Convert each of the following into base 10 logs:
a. $\log _{2} 8$
b. $\log _{3} 18$
c. $\log _{6} 36$
d. $\log _{5} 7$
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. $(7+3 i)-(4+2 i)$
b. $(7+2 i)(3-4 i)$
c. $(5+i)+(6-i)$
d. $(5+3 i)^{2}$
e. $(4+11 i)(6-2 i)+(3+5 i)(10+7 i)$
2) Determine the value of $i$ raised to each of the following powers:
a. 15
b. 68
c. 110
d. 55
e. $1 / 2$
3) Factor the following:
a. $x^{2}+x+4$
b. $x^{2}+3 x+4$
c. $X^{2}-X+8$
d. $X^{2}+4 X+5$
4) Find the conjugates and absolute values of each of the following:
a. $8+3 i$
b. $10-2 \mathrm{i}$
c. $4+6 \mathrm{i}$
d. 6 i
e. $4 \mathrm{i}-1$

## 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) $3 x+4 y=30$
$2 x+y=15$
6) $4 x-3 y=10$ $x-y=1$
7) $5 x-2 y=12$
$2 x+3 y=30$
8) $3 x+8 y=47$
$4 x+5 y=40$
9) $10 x+3 y=-5$
$3 x-y=-11$
Multiply each of the following matrices
$\left[\begin{array}{ll}2 & 1 \\ 5 & 6\end{array}\right] x\left[\begin{array}{ccc}3 & 5 & 9 \\ 1 & 2 & -4\end{array}\right]$
$\left[\begin{array}{ccc}4 & 8 & 1 \\ 3 & -5 & 2\end{array}\right] x\left[\begin{array}{l}1 \\ 9 \\ 6\end{array}\right]$

## 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) $\angle B=42, b=31$
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?
