



Summer Math Work: Pre-Calculus Honors

We hope you are enjoying your summer but are also thinking about how to have a great school year next year.

The attached problem set is intended to address Algebra 2 topics needed for success. **All students are required to complete the problem set to be turned in to their teacher as a homework assignment when returning to school in the fall.** This is the "summer reading" for your mathematics course. Be sure to show your work clearly in completing the problems.

If you find that there are specific topics that you need to review in more depth, you may want to spend some time doing so. Please consider this in planning your time to work.

You are welcome to receive help on any of the problems or topics covered. Indeed, if you have difficulty, we encourage you to work with a parent, older sibling, friend, or teacher so that you master each topic. You may consult a textbook or online resource if you wish as you work through the problems. **Be sure, however, to show all your work, and that you understand all the work you present. Note that you will have a graded classroom test on this material shortly after the start of school in September.**

We do not expect this packet to be a burden for you. However, we know that reviewing these topics will put you in a much better position to succeed.

Best wishes for a happy rest of the summer.

The work in this packet was completed independently by my daughter.

Parent Signature _____

*Please **DO NOT** use a calculator in completing this packet.*

REMEMBER TO WORK ON ABOUT TEN PROBLEMS EACH WEEK SO YOUR BRAIN
CAN STAY MATHEMATICALLY ACTIVE ALL SUMMER LONG. THANK YOU!

Functions

1.) Determine if the set of points represents a function or not, if so determine the domain and range.

a.) $(0, 1) (3, 5) (-2, 0) (-3, -3)$ b.) $(1, 1) (-1, 2) (2, 1) (2, -1)$ c.) $(3, 0) (1, -2) (2, 0) (-2, 3)$

2.) Evaluate the following expressions for $x = -1$

a.) $-2|-3 - x|$

b.) $3x^2 - 2x - 4$

c.) $\sqrt{5 - x^2}$

d.) $(x - 1)^3 + 2$

e.) $\sqrt[3]{8x} - 2$

f.) $f(x) = \begin{cases} x + 1 & x > 0 \\ x - 1 & x < 0 \end{cases}$

3.) Solve the following equations by factoring

a.) $x^2 - 3x + 2 = 0$

b.) $x^2 - 3x - 4 = 0$

c.) $x^2 + 5x = 0$

d.) $x^2 - 4 = 0$

e.) $1 - x^2 = 0$

f.) $x^2 + 6x + 9 = 0$

g.) $-x^2 - 7x - 6 = 0$

h.) $2x^2 + 8x + 8 = 0$

i.) $2x^2 + 5x + 2 = 0$

4.) Solve and graph the solution using a number line.

a.) $2x - 1 \geq 5$

b.) $5 - 3x > 4$

c.) $x^2 - 1 \leq 0$

5.) Simplify expressions

a.) $x^2 + 3x^2 + 3x^4$

b.) $(x - 1)(3x^2 - 4x - 5)$

c.) $4\sqrt{3x} + 4\sqrt{2x} + 2\sqrt{3x}$

d.) $5\sqrt{3x}(\sqrt{3x} - 2\sqrt{6})$

e.) $\frac{x}{5} \div 4x$

f.) $\frac{1}{3x} + \frac{1}{4x}$

6.) Identify the transformations of the parent function $y = x^2$

a.) $y = x^2 + 2$

b.) $y = (x + 2)^2$

c.) $y = 2x^2$

Polynomials

1.) Solve using the zero product property

a.) $(x - 2)(x + 1) = 0$

b.) $-4x(2x - 3) = 0$

c.) $0 = (x - 2\sqrt{3})(x + 2\sqrt{3})$

2.) Solve using factoring

a.) $f(x) = x^2 - 5x - 6$

b.) $f(x) = x^2 - 2x + 1$

c.) $f(x) = 2x^2 - 18$

d.) $f(x) = 2x^2 + 16x + 32$

e.) $f(x) = 2x^2 - 7x + 3$

f.) $f(x) = 2x^2 + x - 3$

3.) Solve using the quadratic formula

a.) $f(x) = x^2 - x - 3$

b.) $f(x) = -x^2 + 3x + 5$

c.) $f(x) = x^2 + 4x + 6$

4.) Multiply the following binomials

a.) $(-3x + 1)(x - 2)$ b.) $(x - 4)(x + 4)$ c.) $(3x - \sqrt{2})(3x + \sqrt{2})$ d.) $(x - 3i)(x + 3i)$

5.) Find the x and y intercepts

a.) $y = x^2 - 4$

b.) $y = -(x + 2)^2 + 5$

c.) $y = (x - 1)^2 - 4$

6.) Factor the perfect square trinomial

a.) $x^2 - 4x + 4$

b.) $x^2 + 6x + 9$

c.) $x^2 + 8x + 16$

d.) $x^2 - 10x + 25$

Rational Functions

1.) Simplify

a.) $\frac{1}{4} + \frac{1}{3}$

b.) $\frac{2}{3} - 4$

c.) $\frac{2}{5} \div 4$

d.) $\frac{2}{5} \cdot \frac{9}{2}$

2.) Simplify

a.) $\frac{2x^2}{4x^3}$

b.) $\frac{3x^3}{2x^3}$

c.) $\frac{6x^3}{2x}$

d.) $\frac{(x+1)^3}{(x+1)^2}$

3.) Factor the following expressions

a.) $4x^2 + 3x$

b.) $2x^2 - 6x$

c.) $x^2 - 3x - 4$

d.) $x^2 + 3x - 4$

e.) $4x^2 - 16$

f.) $9 - x^2$

g.) $x^2 + 12x + 36$

h.) $3x^2 - 6x + 3$

i.) $2x^2 + 3x - 2$

4.) Determine the x and y intercepts

a.) $f(x) = \frac{1}{x} - 3$

b.) $f(x) = \frac{1}{x-2}$

c.) $f(x) = \frac{2}{x-1} + 3$

5.) Solve the following equations

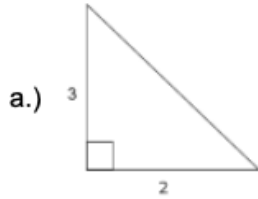
a.) $3 = \frac{1}{x}$

b.) $\frac{2}{x} = \frac{x}{2}$

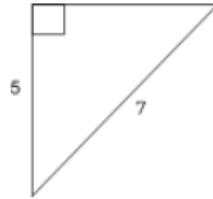
c.) $\frac{2}{x-3} = \frac{4}{x-1}$

Trigonometry

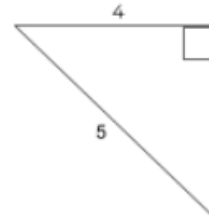
1.) Determine the missing side of the triangle using the Pythagorean Theorem



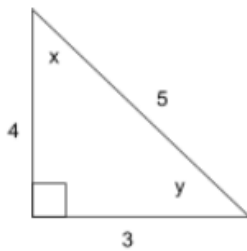
b.)



c.)



2.) Evaluate



a.) $\sin x$

d.) $\sin y$

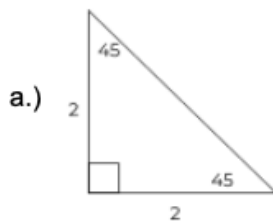
b.) $\cos x$

e.) $\cos y$

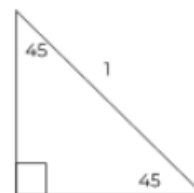
c.) $\tan x$

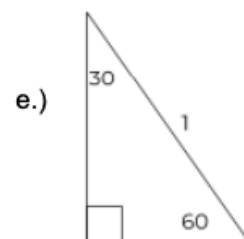
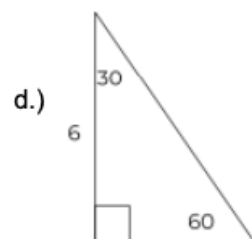
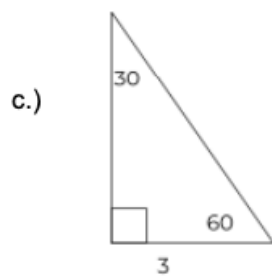
f.) $\tan y$

3.) Determine the missing sides of the triangle by using special right triangle relationships (angles are in degrees).



b.)





4.) Simplify

a.) $\sqrt{9}$

b.) $\sqrt{8}$

c.) $3\sqrt{20}$

d.) $\frac{1}{\sqrt{2}}$

e.) $\frac{-2}{3\sqrt{2}}$

f.) $\frac{6}{\sqrt{12}}$

g.) $\frac{\sqrt{7}}{\sqrt{3}}$

h.) $\frac{\sqrt{6}}{\sqrt{3}}$

i.) $\frac{\sqrt{3}}{\sqrt{12}}$