

Waring School Summer Math Packet

for students entering Precalculus

Hello folks,

Here is a packet of problems for you to ponder and work on over the summer, in order to keep your math skills fresh. Try all of the problems, and on your own paper, please write up your solutions (make sure the number of each problem is written clearly next to its solution!). This means not just writing your answers, but showing your steps and your thinking! This is the work you will hand in during the first week of classes.

Sometimes when we return to something we've learned before, it can feel unfamiliar again the second time around but it will come back to you more quickly! **Our message to you is - please just do your best!** Make note of ideas that feel unfamiliar to you. Make use of worked-out examples (at end of packet) to help you and you can check out our [Summer Resources](#) page. We so appreciate your willingness to spend some time doing math this summer!

“What kind of calculator do I need to do this work?”

No calculators necessary--just use your brain! :)

“How will I get all of these problems done this summer?”

We recommend that you pace yourself throughout the summer by working through about **half of a page each week**.

“I don't know the answers to some of these!”

That's OK! You aren't supposed to be perfect and may not yet know how to do all of these problems. This is school, after all, and everybody's learning. Please just do your best! Check out our [FAQ and Resources](#) for resources on what to do if you feel stuck.

If you have questions about specific problems, or anything else in this packet, you can look at our [FAQ and Resources](#) page, or E-mail our department chair Joan Sullivan at jsullivan@waringschool.org.

We hope you and your family have a good summer,
The Waring Math Teaching Team

1. Evaluate expressions for the given values of the variables. Evaluate functions for the value of x indicated in function notation.

b) $-8m + 12n$ for $m = -\frac{1}{4}$ and $n = \frac{1}{3}$

d) $4a^2b$ for $a = -3$ and $b = 2$

e) $f(4) = 3x^2 - 2x + 7$

f) $f(10) = \frac{x}{20-x}$

g) $\frac{11f - 4g^4}{2}$ for $f = 8$ and $g = 0$

h) $f(-5) = \frac{1}{3}(4 - x)^2$

i) $\log_2 x$ for $x = 8$

j) $b\sqrt{5 - a}$ for $a = -4, b = \frac{1}{3}$

2. Rewrite the expressions as sums in simplest form, by expanding binomials, distributing, and combining like terms as you are able to.

a) $2(a + 3b) + 9(3a + 2b)$ b) $t^2 - 59t + 54 - 82t^2 + 60t$

c) $(3x^5 + 8x^3) - (7x^2 - 6x^3)$ d) $\frac{4y^2 + 6y - 8}{2} + y$

e) $(x + 1)^2 - 2(x^2 + 4)$ f) $4(x - 2)^3 + x^2 - x$

3. Solve the equations (there may be two possible solutions in some cases)

a) $-5x - 6 = 6x - 61$

b) $15x - 3(x + 5) = 4x + 17$

c) $15 = \frac{x-5}{-2}$

d) $35 = \frac{5}{x}$

e) $3x^2 - 12 = 0$

f) $(x - 2)(x + 7) = 0$

g) $x^2 + 4x + 4 = 0$

h) $x^2 + 14x + 40 = 0$

i) $10^{4x-1} = 1000$

j) $\log_2 2x + \log_2 x = 4$

4. Fill in a table of values then sketch a graph of each function that demonstrates its shape. State the domain and range for each.

a) $f(x) = -\frac{1}{2}x - 5$

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

c) $f(x) = x^2 + 3x + 2$

d) $f(x) = 2^x$

e) $f(x) = \frac{1}{x^2}$

5. Determine an equation of a line that contains the point $(-6, 0)$ and is parallel to $f(x) = 2x + 3$.

6. Change the linear equation to standard form by solving for y :
 $5x + 3y = 24$

7. Solve the system of equation by using substitution or elimination methods

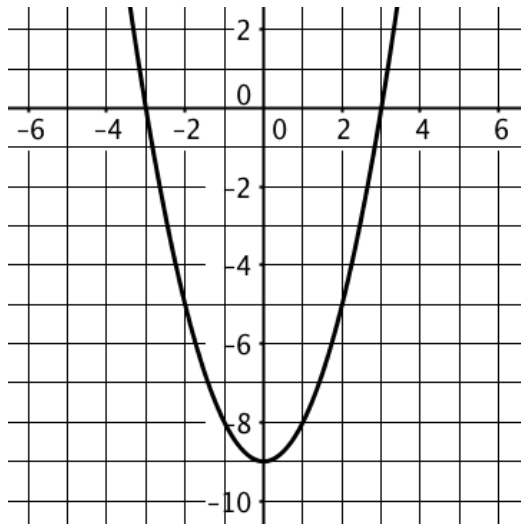
A. $5x + 2y = 12$
 $3x - 2y = 4$

B. $-2x + 3y = 4$
 $x = y - 3$

C. $2x + 7y = 9$
 $x + y = 2$

D. $y = 2x + 3$
 $y = x^2 + 4x + 4$

8. Determine the vertex, x-intercepts, and y-intercept of the following parabola from its graph.



9. Determine the vertex and x-intercepts of the following parabolas:

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

b) $f(x) = x^2 - 4x + 3$

10. Simplify the following expressions by evaluating, rationalizing the denominator, and combining terms as possible.

a) $\sqrt{64}$

b) $\frac{15}{\sqrt{5}}$

c) $\sqrt[3]{64}$

d) $27^{\frac{1}{3}}$

e) $(2^5)^3$

f) $(2^3)(2^4)$

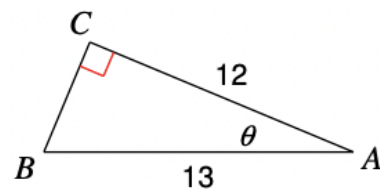
g) $(3^x)(3^y)$

h) 9^{-3}

i) $\log 6 - \log 3$

11. From the triangle on the right, answer the following

- a) What is the length of side CB?
- b) What is $\sin(\theta)$?
- c) What is $\cos(\theta)$?
- d) What is $\tan(\theta)$?



12. Sketch an angle of 120° in a Unit Circle. Then state the value of trig functions sine, cosine, and tangent for that angle.