

Bergenfield High School  
Bergenfield, New Jersey

# **Mathematics Department Summer Course Work**

in preparation for

**PreCalculus**

Completion of this summer work  
is required on the first day of the  
2023-24 school year.

Student Name: \_\_\_\_\_

***Bergenfield Public Schools***  
**Mathematics Department**  
80 South Prospect Avenue  
Bergenfield, New Jersey  
(201) 387-3850

June 2023

We are excited again to present summer activities that the math teachers of Bergenfield High School have created. Enclosed are math activities designed to help your son or daughter practice the skills which they have already learned and are critical to success in seventh grade mathematics. As you may be aware, studies have shown that students who do not practice or review during the summer months the material they have already mastered lose some of that mastery. Unfortunately, this then requires the next teacher to spend valuable teaching time reviewing. While certainly not the final answer, this packet of activities is designed to help your son or daughter retain his or her math skills and knowledge.

Like you, we want your child to enjoy a wonderful summer. That is why we have designed activities so that 20 to 30 minutes of work per week should be all that is required. We urge you to encourage your child to take this task seriously and complete it successfully. Together we can make a difference in your child's future. Now is the time to build on the foundation to help your child succeed on future standardized exams such as the NJSLA, and even more importantly, the SAT.

These activities will reinforce skills that were taught in previous courses. This assignment is voluntary and will not be graded but is recommended to ensure success in this course. Calculators are NOT to be used to complete this project except where noted. Please read all directions carefully.

We wish you a wonderful and safe summer

Sincerely,

Jim Fasano  
Principal

Steven Neff  
Supervisor of Mathematics

Bergenfield High School  
Mathematics Department

**Review Topics in Preparation for Pre-Calculus**

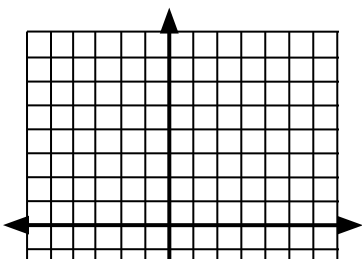
1. Graphing lines and parabolas
2. Factoring Polynomials
3. Operations on Rational Expressions
4. Solving Equations
5. Solving Quadratic Equations
6. Rational Exponents
7. Evaluating Functions
8. Right Triangle Trigonometry

*Completion of this booklet is recommended by the first day of the school year.*

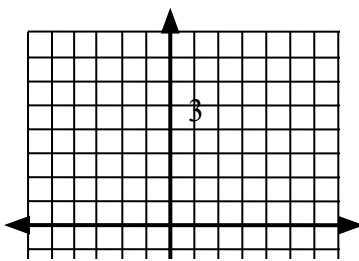
**Reminder:** Use Slope intercept form of a line to graph the line:  $y = mx + b$ .  $m$  = the slope,  $b$  = the y-intercept. If the equation is not in slope intercept form, solve for  $y$  first.

1. Graph the following linear equations:

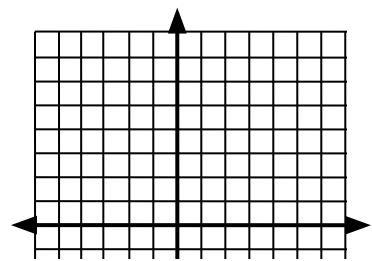
a)  $y = \frac{2}{3}x - 4$



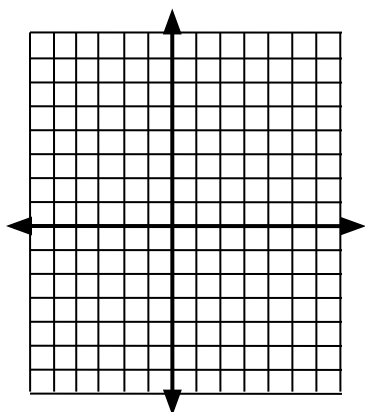
b)  $y = -x + 3$



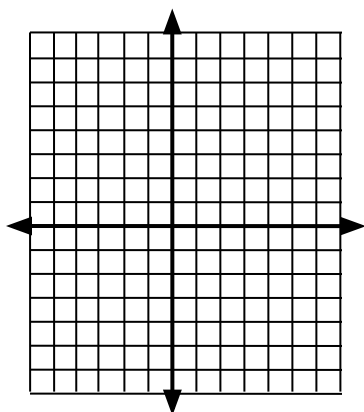
c)  $x = -2$



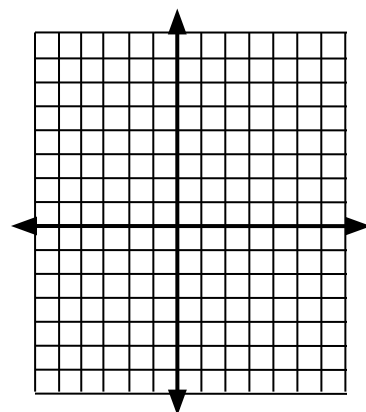
d)  $2x - 4y = 4$



e)  $y = 3$

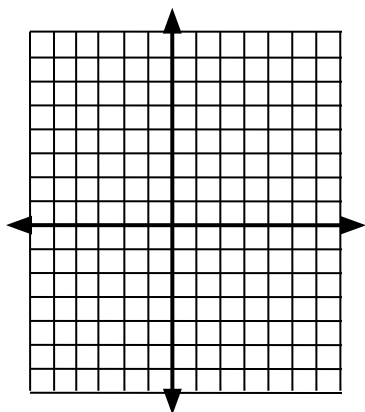


f)  $x + 3y = -6$

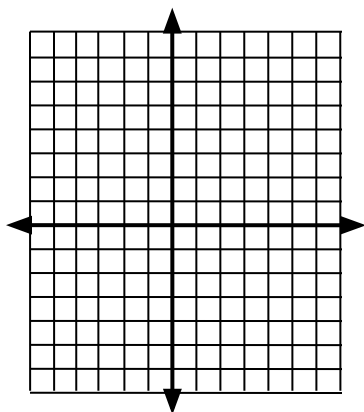


2. Graph the following quadratic equations.

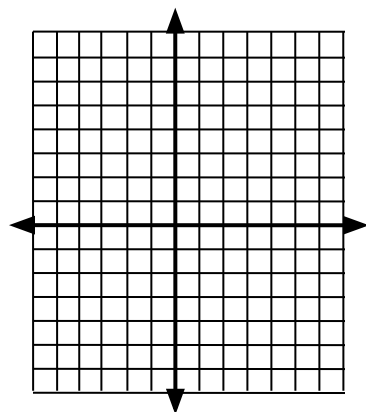
a)  $y = x^2$



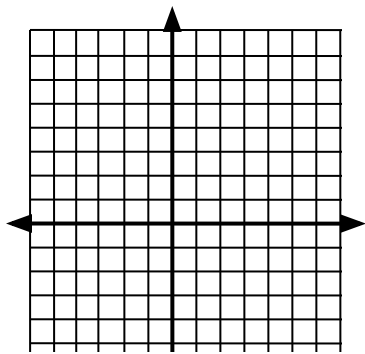
b)  $y = -x^2 + 4$



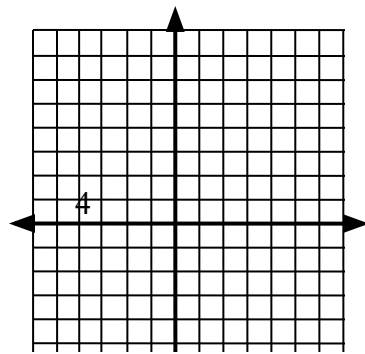
c)  $y = (x - 3)^2$



d)  $y = (x + 4)^2 - 2$



e)  $y = -(x - 1)^2 + 5$



3. Factor completely: Remove GCF first, if there is one.

a)  $x^2 - 16 =$  \_\_\_\_\_

b)  $x^2 - 7x - 18 =$  \_\_\_\_\_

c)  $6x^3y - 15x^2y =$  \_\_\_\_\_

d)  $3x^2 + 7x - 6 =$  \_\_\_\_\_

e)  $9x^2y - 25y =$  \_\_\_\_\_

e)  $2x^2 - 14x + 12 =$  \_\_\_\_\_

4. Multiply or divide the following expressions. Reduce all answers to lowest terms.

a)  $\frac{3a^4b}{2x} \cdot \frac{4x^2}{9a^6b} =$

b)  $\frac{2x+2}{6} \cdot \frac{x^2-x}{x^2-1} =$

c)  $\frac{x^2+x-6}{4x-8} \div \frac{x^2+4x+3}{8} =$

5. Add or subtract the following expressions. Remember to find a common denominator when necessary.

Reduce all answers to lowest terms.

a)  $\frac{4x}{5} + \frac{2}{5} =$

b)  $\frac{x}{6} + \frac{3x}{8} =$

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

d)  $\frac{5x+1}{2x^2} + \frac{4}{3x} =$

e)  $\frac{4x}{x-3} + \frac{6}{x+2} =$

6. Simplify the following.

a)  $\frac{\frac{4x}{5}}{\frac{2x}{10}} =$

$$\frac{\frac{x+y}{y}}{\frac{x^2-y^2}{xy}} =$$

b)

10. Solve each of the following equations.

Quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

a)  $3(x + 4) - 2(3x - 5) + 4x - 1 = 4(2x - 1) - (2x + 5)$

b)  $x^2 + 4x + 3 = 0$

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

d)  $x^2 + 2x + 2 = 0$

e)  $\sqrt{x+4} = 10$

f)  $4\sqrt{2x+2} = 8\sqrt{2x-4}$

g)  $3\sqrt{x} + 2 = 6$

h)  $\frac{x-2}{5} = \frac{4}{x+2}$

11. Simplify the following and leave the answer in radical notation.

a)  $\sqrt{32} =$  \_\_\_\_\_

b)  $\sqrt{125x^2y^7} =$  \_\_\_\_\_

c)  $\sqrt[3]{24x^3y^8} =$  \_\_\_\_\_

12. Simplify each. The answer must have positive exponents. Rationalize the denominator. (no calculator!)



$$\sqrt[n]{x^m} = x^{\frac{m}{n}} \quad x^{-m} = \frac{1}{x^m}$$

a)  $8^{\frac{2}{3}} =$  \_\_\_\_\_

b)  $-32^{\frac{6}{5}} =$  \_\_\_\_\_

c)  $100^{-\frac{1}{2}} =$  \_\_\_\_\_

d)  $x^{-2} =$  \_\_\_\_\_

e)  $2x^{-3}(x^3)^{-2} =$  \_\_\_\_\_

f)  $\left(\frac{2x^{-3}y^5}{6x^{-5}y^8}\right)^{-2} =$  \_\_\_\_\_

g)  $x^{-2} + x^{-3} =$  \_\_\_\_\_

h) Solve for x:  $x^{\frac{2}{3}} = 64$  ; x = \_\_\_\_\_

i) Write in exponential notation:  $\sqrt[4]{x^2y^4z^5} =$  \_\_\_\_\_

13. Let  $f(x) = -x^2 - 4x + 5$

a)  $f(3) =$  \_\_\_\_\_

b)  $f(-3) =$  \_\_\_\_\_

c)  $f(3) + f(-3) =$  \_\_\_\_\_

d)  $f(a) =$  \_\_\_\_\_

e)  $f(a + 2) =$  \_\_\_\_\_

14. Define each.

a) sine \_\_\_\_\_

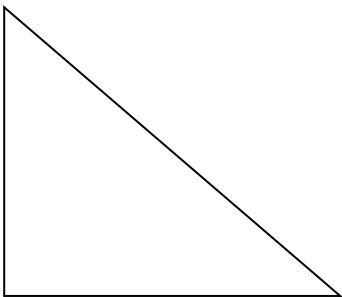
b) cosine \_\_\_\_\_

c) tangent \_\_\_\_\_

15. Solve for x & y.

a)

10



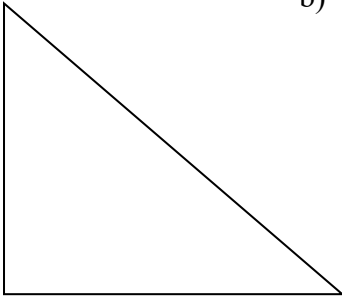
x

40°

x

x = \_\_\_\_\_

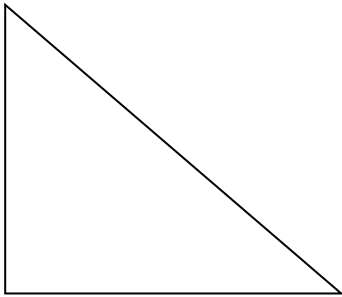
b)



40°

x = \_\_\_\_\_

c)



y

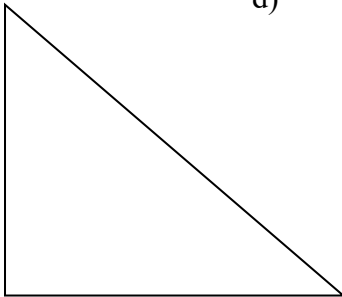
x

40°

10

x = \_\_\_\_\_

d)



3

x

4

x = \_\_\_\_\_ & y = \_\_\_\_\_