

Bergenfield High School
Bergenfield, New Jersey

**Mathematics Department
Summer Course Work**

in preparation for

Plane Geometry

Completion of this summer work

is optional for the

2024 -2025 school year.

Student Name: _____

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

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Dear Parents and Guardians:

Attached are the summer curriculum review materials for Geometry. This booklet was prepared by the Bergenfield High School Math department and contains topics that reflect content learned in prerequisite courses.

This is optional work that your child can complete over the summer to be better prepared for class in September.

Thank you for your cooperation.

Sincerely,

Jim Fasano
Principal

Steven Neff
Supervisor of Mathematics

Solving Linear Equations

Solve each equation. Then check your solution.

1. $-18 = -61 + d$

6. $\frac{2}{3}x - 6 = -10$

2. $x - \frac{3}{5} = -\frac{7}{10}$

7. $\frac{x+4}{2} = 17$

3. $-5r = 55$

8. $3k - 5 = 7k - 21$

4. $-\frac{v}{5} = -45$

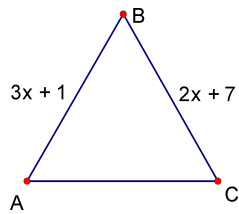
9. $8s + 9 = 7s + 6$

5. $\frac{1}{2}x = 80$

10. $7(x - 3) = 7$

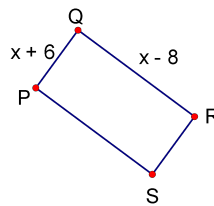
11. $\triangle ABC$ is an equilateral triangle.

- Find x .
- Find the length of side AB.

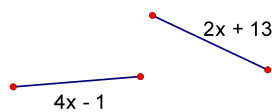


12. The perimeter of rectangle PQRS is 40 cm.

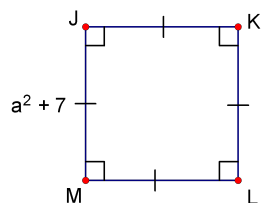
- Find x .
- Find the area of PQRS.



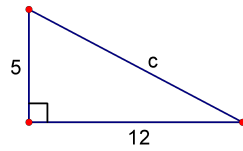
13. The two line segments below have the same length. Find the length of each segment.



14. The perimeter of square JKLM is 64 units. Find the length of each side.



Pythagorean Theorem



$$a^2 + b^2 = c^2$$

Example:

Step 1: Set-up Equation

$$5^2 + 12^2 = c^2$$

Step 2: Multiply

$$25 + 144 = c^2$$

Step 3: Add

$$169 = c^2$$

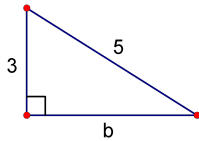
Step 4: Take square root of each side.

$$\sqrt{169} = \sqrt{c^2}$$

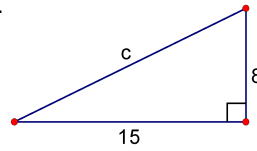
Step 5: Simplify square roots.

$$13 = c$$

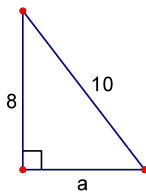
15.



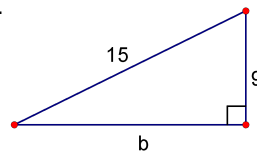
17.



16.



18.



GRAPHING

Instruction:

Plot each point on the graph below. Remember, coordinate pairs are labeled (x, y). Label each point on the graph with the letter given.

19. A(3, 4)

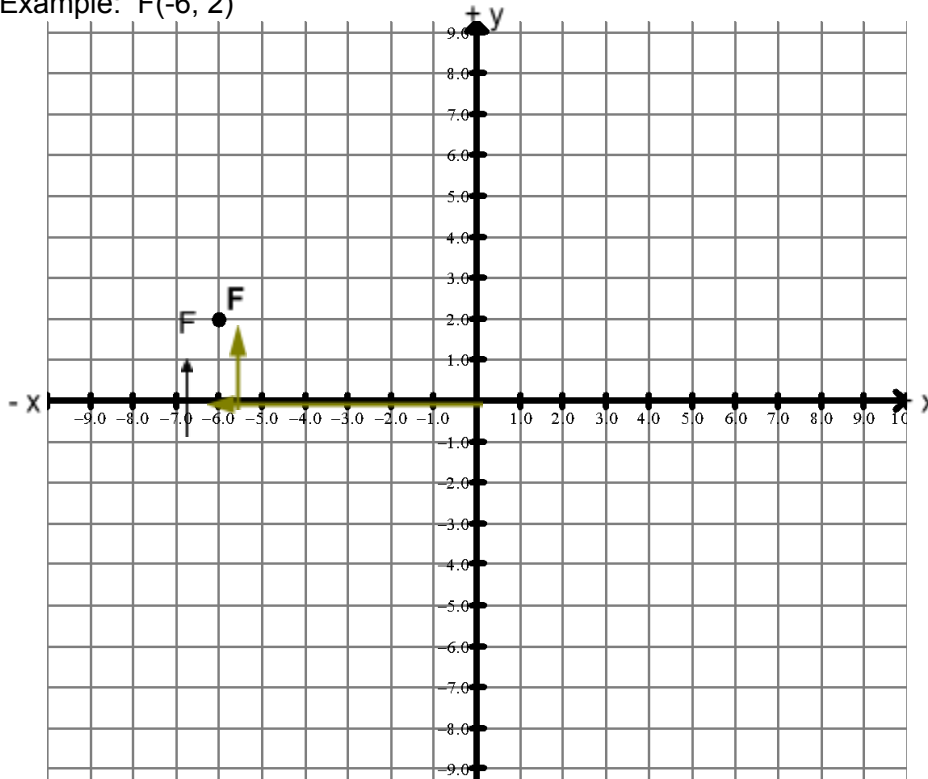
21. C(-4, 2)

22. D(-3, -1)

20. B(4, 0)

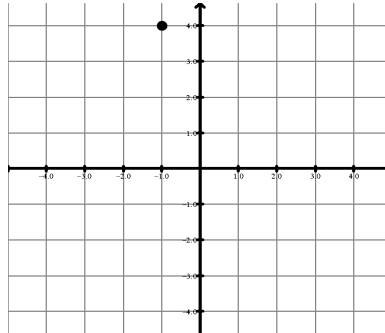
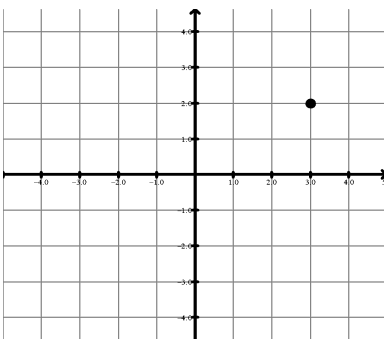
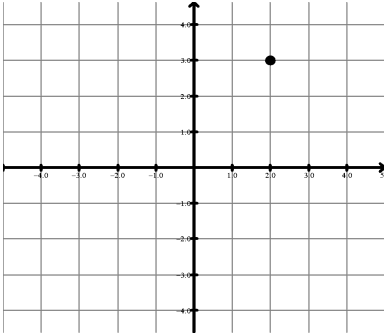
23. E(0, 7)

Example: F(-6, 2)



Determine the coordinates for each point below:

24. Example. (2, 3)



Slope and Midpoint

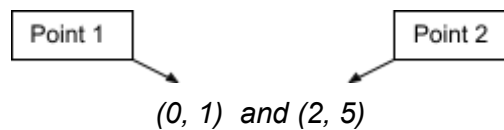
$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Before using the slope or midpoint formula, you must label your x_1 , y_1 , x_2 , and y_2 .

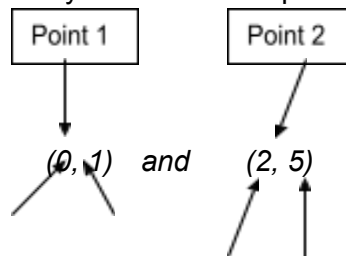
Example: For the points (0, 1) and (2, 5), label your x_1 , y_1 , x_2 , and y_2 so that you can use them in your slope or midpoint formula.

Step 1: Label one point as point 1 and the other as point 2.



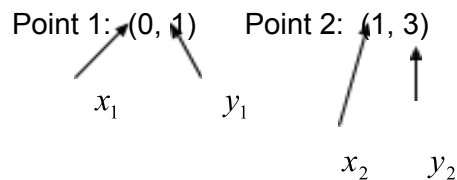
Step 2: Label the x- and y-coordinates of point 1 as x_1 and y_1 , respectively.

Then, label the x- and y-coordinates of point 2 as x_2 and y_2 .



Example 1: Use the slope formula to find the slope of the line between (0, 1) and (1, 3).

Step 1: Label x_1 , y_1 , x_2 , and y_2 .



Step 2: Plug values into the slope formula.

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{slope} = \frac{3 - 1}{1 - 0}$$

Step 3: Simplify.

$$\text{slope} = \frac{2}{1} = 2$$

25. Find the slope of the line between (1, 3) and (5, 5).

26. Find the slope of the line between (2, 3) and (9, 7).

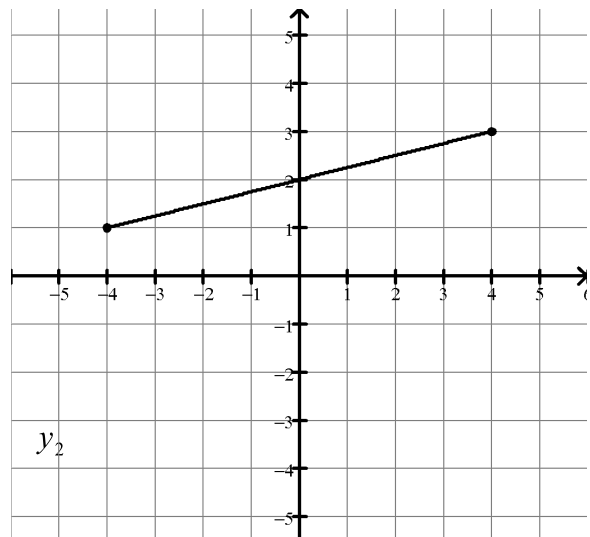
Example 2: Use the midpoint formula to find the midpoint of the segment below.

Step 1: Find the coordinates of the 2 endpoints

(-4, 1) and (4, 3)

Step 2: Label x_1 , y_1 , x_2 , and y_2 .

(-4, 1) and (4, 3)
↑ ↑ ↑ ↓
 x_1 y_1 x_2 y_2



Step 3: Plug into midpoint formula.
and simplify.

$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\text{midpoint} = \left(\frac{(-4) + 4}{2}, \frac{1 + 3}{2} \right)$$

$$\text{midpoint} = \left(\frac{0}{2}, \frac{4}{2} \right) = (0, 2)$$

27. Find the midpoint of the segment with endpoints (0, 0) and (4, 2).

28. Find the midpoint of the segment with endpoints (-3, -1) and (3, 3).

Factoring

Methods: GCF, Sum/Product, Grouping

29. $3x^2 + x$

32. $x^2 + 7x + 10$

30. $x^2 - 9$

33. $2x^2 + 10x + 12$

31. $16x^2 - 25$

34. $2x^2 - 11x - 6$

35. $3x^2 + 10x - 25$