

Decatur City Schools

Decatur, Alabama

# **Mathematics Department**

## **Summer Course Work**

In preparation for

### **Algebraic Connections**

Completion of this summer work is required on the first class day of the 2019 - 2020 school year.

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

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Mathematics Department  
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Dear Parents and Guardians:

Attached are the summer curriculum review materials for Precalculus. This booklet was prepared by the Decatur City Schools Math Department and contains topics that reflect content learned in prerequisite courses. These materials must be completed and brought to class on the first day of school for your specific class.

Your child is required to complete this booklet over the summer. A test based on the material in the packet will be given to your child during the second week of school. It will count as the first test of the year and the grade will be determined as follows:

Completion of the packet on time will count 20% of the grade Performance on the test will count 80% of the grade.

Thank you for your cooperation.

Sincerely,

Decatur City School Mathematics Department

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

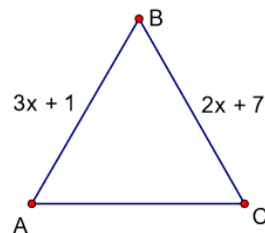
9.  $8s + 9 = 7s + 6$

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

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

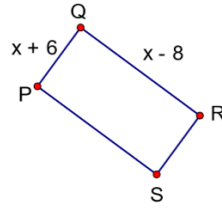
11.  $\triangle ABC$  is an equilateral triangle.

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

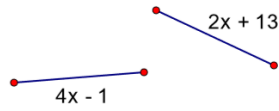


12. The perimeter of rectangle PQRS is 40 cm.

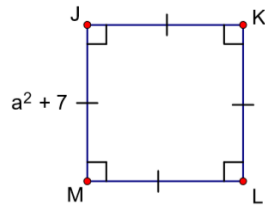
- Find  $x$ .
- Find the area of PQRS.



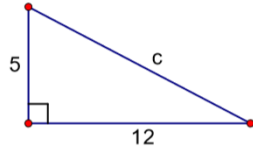
13. The two line segments below have the same length. Find the length of each segment.



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

$$169 = c^2$$

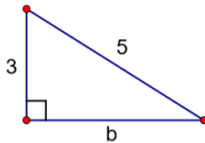
Step 4: Take square root of each side.

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

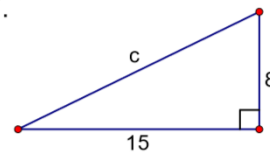
Step 5: Simplify square roots.

$$13 = c$$

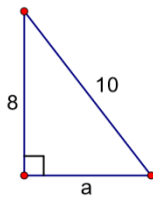
15.



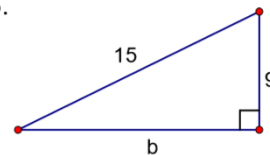
17.



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)

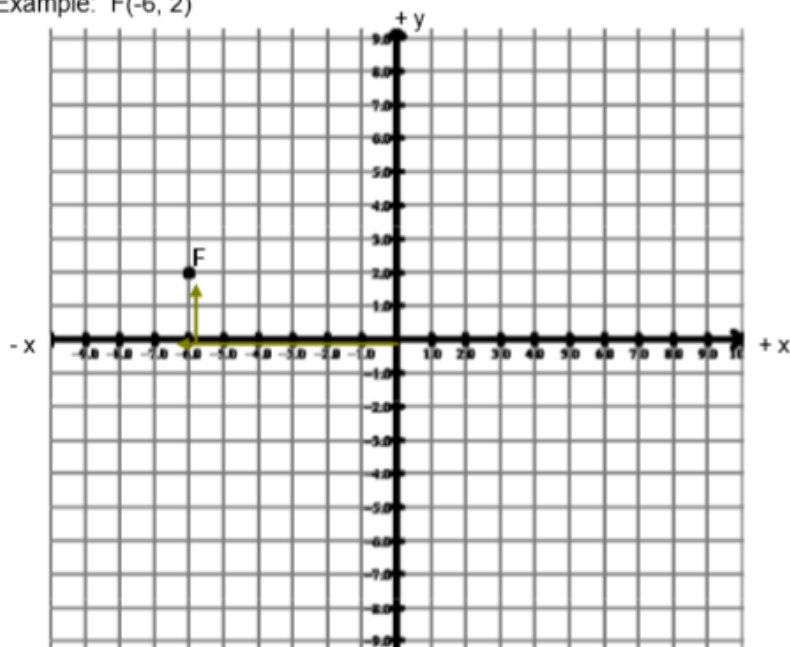
21. C(-4, 2)

23. E(0, 7)

20. B(4, 0)

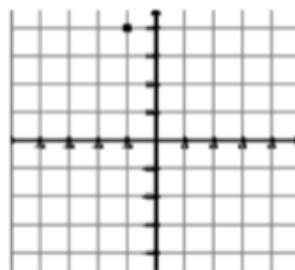
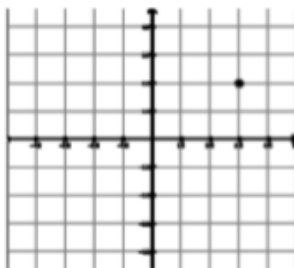
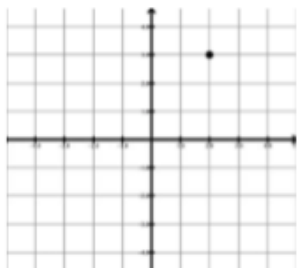
22. D(-3, -1)

Example: F(-6, 2)



**Determine the coordinates for each point below:**

24. Example. (2, 3)



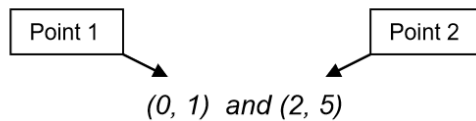
## Slope and Midpoint

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

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

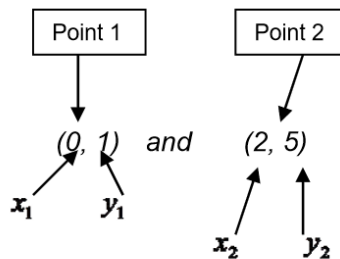
Example: For the points (0, 1) and (2, 5), label your  $x_1$ ,  $y_1$ ,  $x_2$ , and  $y_2$  so that you can use them in your slope or midpoint formula.

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



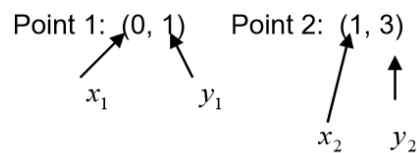
Step 2: Label the x- and y-coordinates of point 1 as  $x_1$  and  $y_1$ , respectively.

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

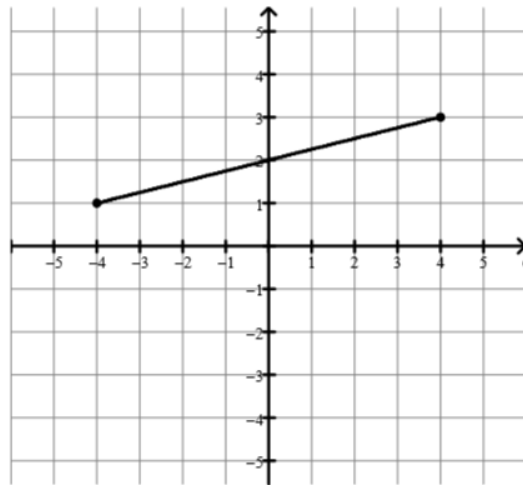
(-4, 1) and (4, 3)

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