Summer Math Practice Choice Board for Middle School
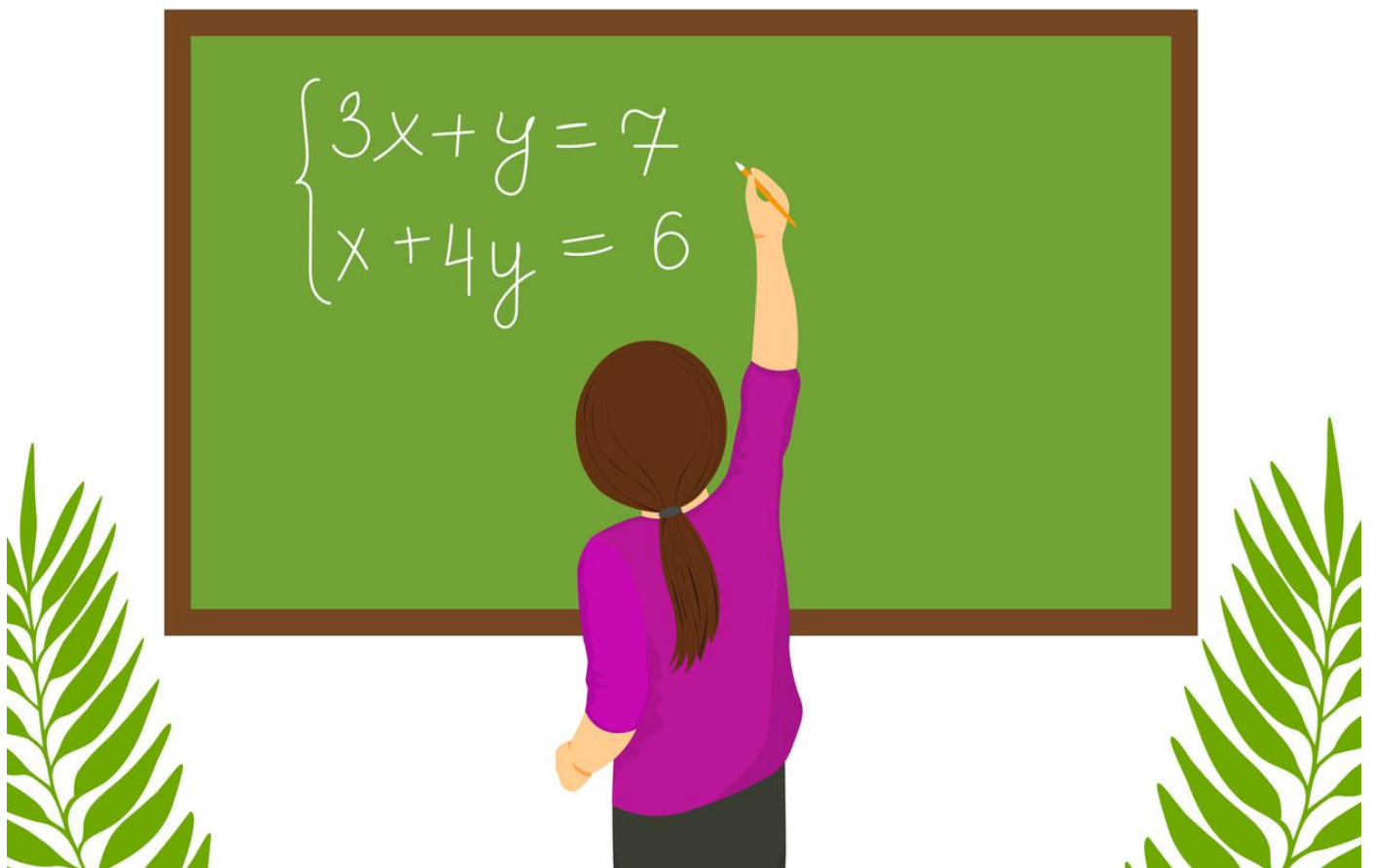
Photo credit: iStock/Alla Kuzmenko

TeacherVision

Summer Math Practice for Middle School

The Ultimate Summer Schedule Create a chart that shows your ultimate summer schedule. For each activity, note the elapsed time from one event to the other. Be sure to show a 24 hour schedule on colorful poster paper.	**Road Trip Time!** Map out a road trip. Be sure to research mileage from one place to another. You will only be able to travel 1,000 miles (including your return). Your goal is to stop at as many places as possible on your journey! Keep a chart of your mileage and destinations!	**Dream Vacation Home** You just win a million dollars and get to design a vacation home. Use graph paper to create it, room by room. Be sure to calculate the area and perimeter of each space you design. Two of your rooms must be set up in shapes other than a rectangle or square!
A New Summer Wardrobe You have a budget of $250 to pick out a new summer wardrobe. Use magazines to cut out images of items you'd like to purchase, or draw your own. List the price of each item. Keep a running total to ensure you stay within your shopping budget. You may not use a calculator!	**Tic-Tac-Toe Balancing Act** Make a blank tic-tac-toe board. Take turns balancing algebra equations. If correct, mark the board with an X or O. Challenge your partner and repeat the process until the game is over!	**Summer Ice Cream Shop** Pretend that you set up an ice cream shop for a month. Make a list of the supplies you need to buy, employees you need to hire, and list your expenses in a Google Sheet. Set up your menu and prices. If you have a budget of $5,000; how much will you need to make each week in order to see a profit by the end of a month?
Math Pizza Party This sheet is serving up some summer slices that are sure to help you remember how to solve quadratic equations!	**Summer Rules!** Do you have rules you have to follow this summer? Remember, there are rules in math too! Complete this math rules chart to stay fresh on your reasoning skills!	**The Secrets of Summer** Put your algebra and graphing skills to the test by solving this secret message sheet!

Home Activities: Connecting Arithmetic to Algebra

We have been learning about connecting arithmetic to algebra. We have learned to make sense of large numbers, about number sense and operation sense, and we have had an introduction to algebra. Here is a list of some of the skills and concepts we have studied.

- ◆ Reading and writing large numbers
- ◆ Rounding large numbers
- ◆ Comparing and ordering numbers
- ◆ Exponents
- ◆ Mental math
- ◆ Estimating sums and differences
- ◆ Estimating products and quotients
- ◆ Order of operations
- ◆ Numerical patterns
- ◆ Variables and expressions
- ◆ Solving equations

Home Activities

Here are some activities you can do with your child that use these math skills and concepts.

Look through a department store catalog and ask your child to select several clothing items that he or she would like to purchase. Have your child estimate the total cost to buy these items by rounding each amount to the nearest dollar.

Extend the activity by setting a limit on the total amount of the purchase. For example, ask your child to select at least three items that will not exceed a total of $40. Then ask your child to find how much money would be left if these items were purchased.

If your child selects items that cost $19.49, $11.50, and $4.55, the sum can be rounded to $20 + $12 + $5 = $37.

Another variation of this activity is to have your child select three items that total more than a designated amount. For example, your child would pick three items that would total more than $50.

Name _____

Exploring Algebra: What's the Rule?

Complete each table. Write the rule for each table with
words and with a variable.

1. Rule in words: _____   Rule with a variable: _____

In	4	6	9	11	12	14
Out	2	4	7			

2. Rule in words: _____   Rule with a variable: _____

In	6	4	8	10	12	2
Out	12	10	14			

3. Rule in words: _____   Rule with a variable: _____

In	11	9	12	18	14	16
Out	6	4	7			

4. Rule in words: _____   Rule with a variable: _____

In	0	1	4	8	7	11
Out	7	8	11			

5. Rule in words: _____   Rule with a variable: _____

In	4	6	10	12	9	8
Out	0	2	6			

6. Rule in words: _____   Rule with a variable: _____

In	2	4	6	1	11	10
Out	11	13	15			

Secret Messages

Each of the letters in the graph at the right can be described by a pair of equations that intersect at the point. You can, therefore, write a secret message made up of pairs of equations. The message can then be decoded by solving the system of equations graphically.
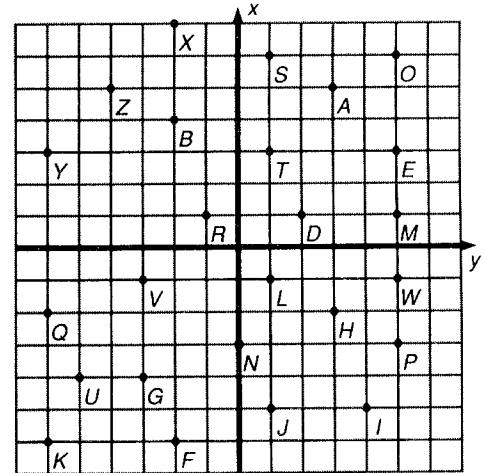
You will need:

■ *pencil, paper*
■ _____

EXAMPLE

$$x + 2y = -1$$
$$2x - 3y = 12 \quad \underline{\quad H \quad}$$

and

$$x + 2y = -6$$
$$-3y + 2y = -22 \quad \underline{\quad I \quad}$$

Here's how to encode a message.

1. Think of a message.

2. Find the coordinates of the first letter.

3. Write an equation $Ax + By = C$, where x and y are the coordinates of the point. Choose arbitrary values of A and B. Solve for C. Write the first equation.

4. Write another equation $Ax + By = C$, where x and y are the coordinates of the point. Choose different values for A and B. Solve for C. Write the second equation.

EXAMPLE *HI*

H is at $(3, -2)$.

Let $A = 1$ and $B = 2$.
$Ax + By = C$
$3 + (-4) = C$
$x + 2y = -1$

Let $A = 2$ and $B = -3$.
$Ax + By = C$
$6 + 6 = 12$
$2x - 3y = 12$

We now have a system of two linear equations that intersect at H, $x + 2y = -1$ and $2x - 3y = 12$. Repeat steps 2–4 for the other letters in the message.

Use this method to create a secret message for a friend to solve. Record your message and the pairs of equations used to decode the message.
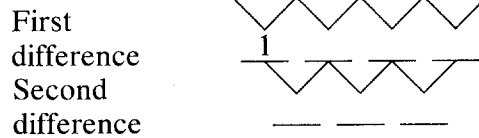
Pizza Pieces

What is the maximum number of pieces you can make when slicing a pizza with ten cuts? To find out, let's experiment with fewer cuts.

Draw lines on circles to represent the cuts and fill in the table below with the results. Find the differences between each number of pieces and the preceding number of pieces. Then find the differences between the consecutive differences.
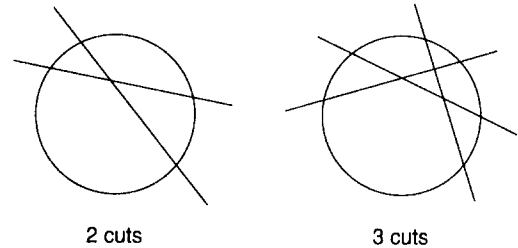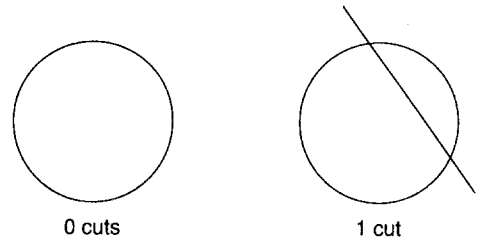
Fill in the blanks.

■ *You will need:*

■ *circles and a straight edge*

■ _____

1.

Number of cuts	0	1	2	3	4
Number of pieces	1	2			

First difference

Second difference _____ _____ _____

0 cuts

1 cut

2 cuts

3 cuts

2. Use the pattern to extend the chart.

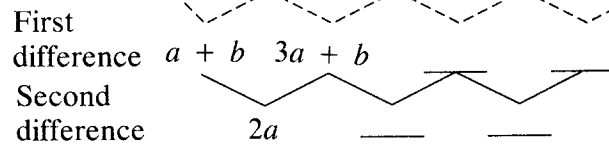| Number of cuts	5	6	7
Number of pieces			

You can also use a quadratic equation to determine the number of pieces. To derive the equation, complete the table for the general form $y = ax^2 + bx + c$. Then find the differences between consecutive entries as you did above.

3.

x	0	1	2	3	4
y	c	$a+b+c$	$4a+2b+c$		

First difference $a + b$ $\quad$ $3a + b$ _____ _____

Second difference $\quad$ $2a$ _____ _____

4. Substitute $x = 0$ in the pizza experiment.

Since $2a = 1$, $a =$ _____.

Since $a + b = 1$, $b =$ _____ and $c =$ _____.

Therefore, $y =$ _____.

5. Use the quadratic equation to determine the number of pieces for these numbers of cuts.

5 cuts _____ 6 cuts _____ 10 cuts _____

Name _____

Exploring Algebra:
Balancing Number Sentences
Write a number sentence that has the same meaning.

$5 + n = 14$ $n + 5 = 14$

1. $8 + n = 18$ _____

2. $n + 4 = 11$ _____

Find the value of n in each of the following number
sentences. You may use counters to help.

3. $n + 10 = 20$ _____   **4.** $3 + n = 16$ _____

5. $9 + n = 16$ _____   **6.** $5 + n = 13$ _____

7. $4 + n = 18$ _____   **8.** $n + 9 = 15$ _____

9. $n + 17 = 30$ _____   **10.** $11 + n = 23$ _____

11. $20 + n = 36$ _____   **12.** $n + 8 = 27$ _____

Use number patterns to find the value for each n.

13. a. $n + 20 = 62$ **b.** $n + 20 = 52$ **c.** $n + 20 = 42$

_____   _____   _____

Find the value for n in each of the following.

14. $n + 3,051 = 7,063$ _____   **15.** $1,823 + n = 2,840$ _____

16. $1,391 + n = 2,000$ _____   **17.** $n + 1,602 = 2,512$ _____

Find the value for n in each of the following.

18. $n + 300 = 315$ _____   **19.** $1,000 = n + 600$ _____

20. $750 = 400 + n$ _____   **21.** $45 + n = 345$ _____

Exploring Algebra:
Balancing Number Sentences

Write a number sentence that has the same meaning.

$5 + n = 14$ $n + 5 = 14$

1. $8 + n = 18$ **$n + 8 = 18, 18 = 8 + n$, or $18 = n + 8$**

2. $n + 4 = 11$ **$4 + n = 11, 11 = 4 + n$, or $11 = n + 4$**

Find the value of n in each of the following number sentences. You may use counters to help.

3. $n + 10 = 20$ **10**   **4.** $3 + n = 16$ **13**

5. $9 + n = 16$ **7**   **6.** $5 + n = 13$ **8**

7. $4 + n = 18$ **14**   **8.** $n + 9 = 15$ **6**

9. $n + 17 = 30$ **13**   **10.** $11 + n = 23$ **12**

11. $20 + n = 36$ **16**   **12.** $n + 8 = 27$ **19**

Use number patterns to find the value for each n.

13. a. $n + 20 = 62$ **b.** $n + 20 = 52$ **c.** $n + 20 = 42$

     42   **32**   **22**

Find the value for n in each of the following.

14. $n + 3,051 = 7,063$ **4,012**   **15.** $1,823 + n = 2,840$ **1,017**

16. $1,391 + n = 2,000$ **609**   **17.** $n + 1,602 = 2,512$ **910**

Find the value for n in each of the following.

18. $n + 300 = 315$ **15**   **19.** $1,000 = n + 600$ **400**

20. $750 = 400 + n$ **350**   **21.** $45 + n = 345$ **300**