

How Many are There?



Time:	15–30 minutes
Materials:	Whiteboard Markers
Note:	This lesson works well with Survey Your Friends.
Objective:	Students will categorize and count their classmates in various ways.
Procedures:	<ol style="list-style-type: none">1. Discuss ways that class members are alike and different (eye color, hair color, number of siblings, number of places lived, month they were born, number of letters in their name, favorite food, color, candy, book, etc.).2. Make a grid on the board similar to the one below using one of the categories mentioned above.3. Complete the grid as a class by having students raise their hands.

January	February	March	April	May	June
July	August	September	October	November	December

	<ol style="list-style-type: none">4. Have students determine which column has the most and which has the least.5. Summarize by explaining that all things can be categorized in different ways.6. Get the students to decide another way to categorize the class and complete a second grid.7. Discuss situations where the information from the grids may be useful.
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Extension:

Assign students to independently make a grid categorizing the members of their family in some way.



TIPS FOR
Success:

Developing an organized method for determining and recording grid information will help significantly with class management during this activity. For example, fill in the columns one by one by having students who should be counted for each column raise their hand as you come to it. Ask another student, who is not being counted, to count the hands raised and enter the number on the grid.

Survey Your Friends



Time: 30+ minutes

Materials Needed:

- Pencil
- Paper

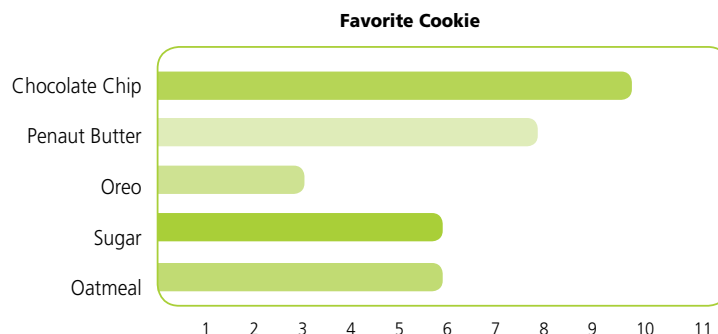
Objective: Students will survey the class on a topic of interest, create a bar graph to illustrate the results, and develop questions relating to the information collected.

Procedures:

1. Conduct a class survey on a topic of interest. (Favorite candy bar, color, professional football team, etc.)
2. Have students construct a bar graph illustrating the results of the survey (see example on the following page).
3. Have students write three questions that require using the bar graph to determine the correct answer (see examples below).
4. Exchange papers among classmates and get them to answer each other's questions.
5. Make sure that both the student who wrote the questions and the student who answered them are clearly identified on the paper, then hand in for teacher evaluation.

Example Questions and Bar Graph:

1. How many more students voted for Oatmeal than Oreo cookies? _____
2. What is the total number of votes for Peanut Butter and Sugar cookies combined? _____
3. Which kind of cookie received the most votes? _____



Extension:

Get students to develop individual surveys to conduct outside of class. Assign them to survey 30 people, at lunch, during recess, etc. After the surveys are complete, assign students to construct bar graphs to be compiled in a book or displayed in the classroom for other students to see.

Notes for the Teacher:

Finding an organized way to conduct the class survey will help with class management during this activity. One method is to get students to write their answers on a piece of paper. Collect the papers and get one student to read the results while another tallies the information on the board. The students love to participate like this and it leaves the teacher free to monitor the class and deal with any disruptive behavior without interrupting the progress of the lesson.

It is also helpful in classes where students have not had much graph experience to model the bar graph on the board while they construct their own on paper.

Multiplication Facts



Name: _____

$$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ \times 4 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ \times 2 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ \times 1 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ \times 4 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ \times 6 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ \times 5 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 7 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ \times 7 \\ \hline \end{array} \quad \begin{array}{r} 3 \\ \times 1 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ \times 2 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ \times 4 \\ \hline \end{array} \quad \begin{array}{r} 5 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ \times 9 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ \times 6 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ \times 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ \times 9 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ \times 6 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ \times 5 \\ \hline \end{array} \quad \begin{array}{r} 6 \\ \times 4 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ \times 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ \times 7 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ \times 6 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ \times 8 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ \times 6 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ \times 1 \\ \hline \end{array} \quad \begin{array}{r} 7 \\ \times 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ \times 7 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ \times 8 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ \times 5 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ \times 3 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ \times 1 \\ \hline \end{array} \quad \begin{array}{r} 2 \\ \times 2 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ \times 4 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ \times 5 \\ \hline \end{array} \quad \begin{array}{r} 9 \\ \times 1 \\ \hline \end{array} \quad \begin{array}{r} 10 \\ \times 2 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ \times 2 \\ \hline \end{array}$$

Division Facts



Name: _____

$$5 \overline{)35} \quad 4 \overline{)16} \quad 3 \overline{)18} \quad 2 \overline{)6} \quad 1 \overline{)5} \quad 4 \overline{)36} \quad 6 \overline{)48} \quad 6 \overline{)30} \quad 3 \overline{)9} \quad 8 \overline{)72}$$

$$7 \overline{)56} \quad 7 \overline{)49} \quad 1 \overline{)3} \quad 2 \overline{)12} \quad 4 \overline{)28} \quad 3 \overline{)15} \quad 9 \overline{)90} \quad 6 \overline{)36} \quad 3 \overline{)21} \quad 1 \overline{)6}$$

$$4 \overline{)20} \quad 3 \overline{)12} \quad 2 \overline{)18} \quad 3 \overline{)30} \quad 9 \overline{)81} \quad 6 \overline{)60} \quad 5 \overline{)40} \quad 4 \overline{)24} \quad 2 \overline{)8} \quad 5 \overline{)50}$$

$$5 \overline{)25} \quad 3 \overline{)24} \quad 7 \overline{)63} \quad 6 \overline{)42} \quad 8 \overline{)64} \quad 6 \overline{)54} \quad 1 \overline{)2} \quad 2 \overline{)14} \quad 7 \overline{)70} \quad 4 \overline{)32}$$

$$8 \overline{)80} \quad 5 \overline{)10} \quad 3 \overline{)27} \quad 1 \overline{)8} \quad 2 \overline{)4} \quad 4 \overline{)40} \quad 5 \overline{)45} \quad 1 \overline{)9} \quad 2 \overline{)20} \quad 2 \overline{)16}$$

Salute



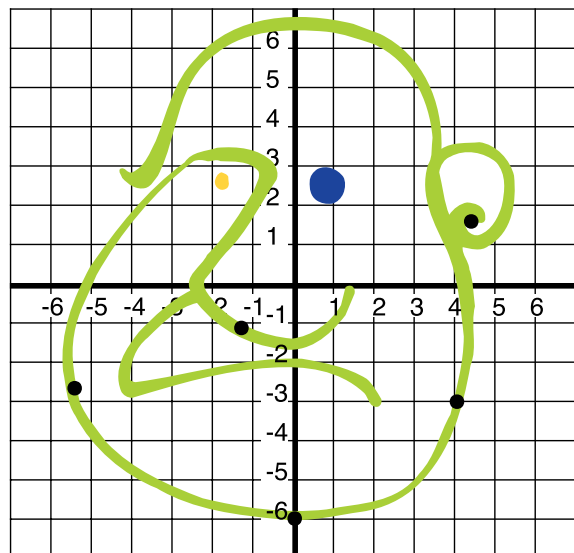
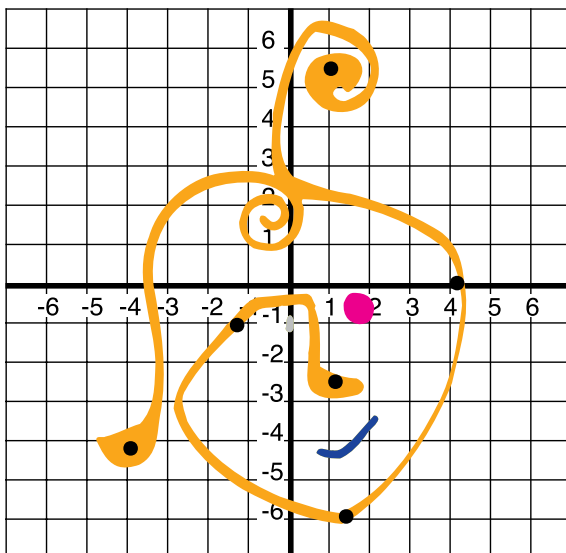
Time:	5–30 minutes
Materials Needed:	<ul style="list-style-type: none">• One deck of numbered cards per group• Scratch paper, if needed
Objective:	Students will enjoy a fast-paced review of addition, subtraction, multiplication, and division math facts. Salute is a small-group math facts activity that requires two players and one dealer.
Procedures:	<ol style="list-style-type: none">1. Three students work as a group. The dealer holds the deck of cards and deals one card, face down, to each player.2. Both players “salute” with the card by placing the card face out while holding it on their foreheads. This process should allow the dealer to see both cards and the players to see each others cards, but not his/her own card.3. After the players “salute,” the dealer adds or multiplies the cards together and tells the players the answer.4. When the players hear the answer, they will use an opposite operation and orally respond with the number on the card s/he is holding.

Graph Art



Time:	15-20 minutes
Materials Needed:	<ul style="list-style-type: none">• Graph Art Worksheets• Pencils• Crayons
Advance Preparation	Copy worksheets and determine six points to be used in the art activity.
Objective:	Students will learn to plot points on a graph and create an image that incorporates several plotted points.
Procedures:	<ol style="list-style-type: none">1. Teach or review with students how to plot a point on a graph2. Distribute graph worksheets and get students to plot six pre-determined points.3. Make sure the points are dark enough to be seen on the back side of the paper.4. Demonstrate or show examples of graph art.5. Explain the rules for Graph Art.<ol style="list-style-type: none">A. All dots must be connected.B. A dot may connect more than once.C. All dots must be used.D. Other lines may be added to create the picture.6. Get the students to turn their paper over and use the dots to create their own graph art.

Graph Art Examples



7. If time allows, color the artwork.
8. Turn in artwork for classroom display. It is fun to see different pictures that all contain the same six dots.

Extension:

Number and display pictures without the students' names visible. Have each class member vote by secret ballot for their three favorite works of art. Tally the votes on the board and award a prize to the classroom winner.

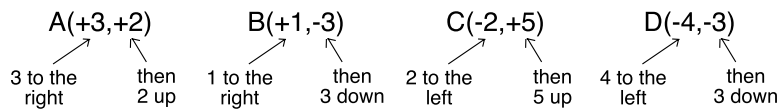
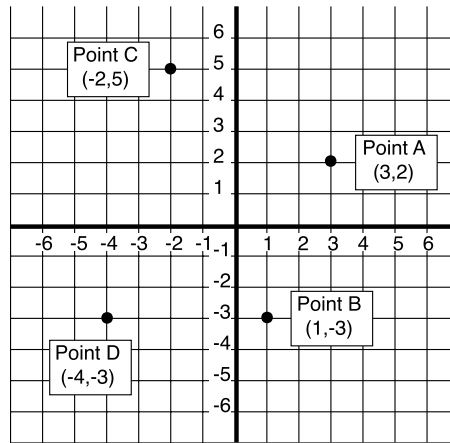


TIPS FOR Success:

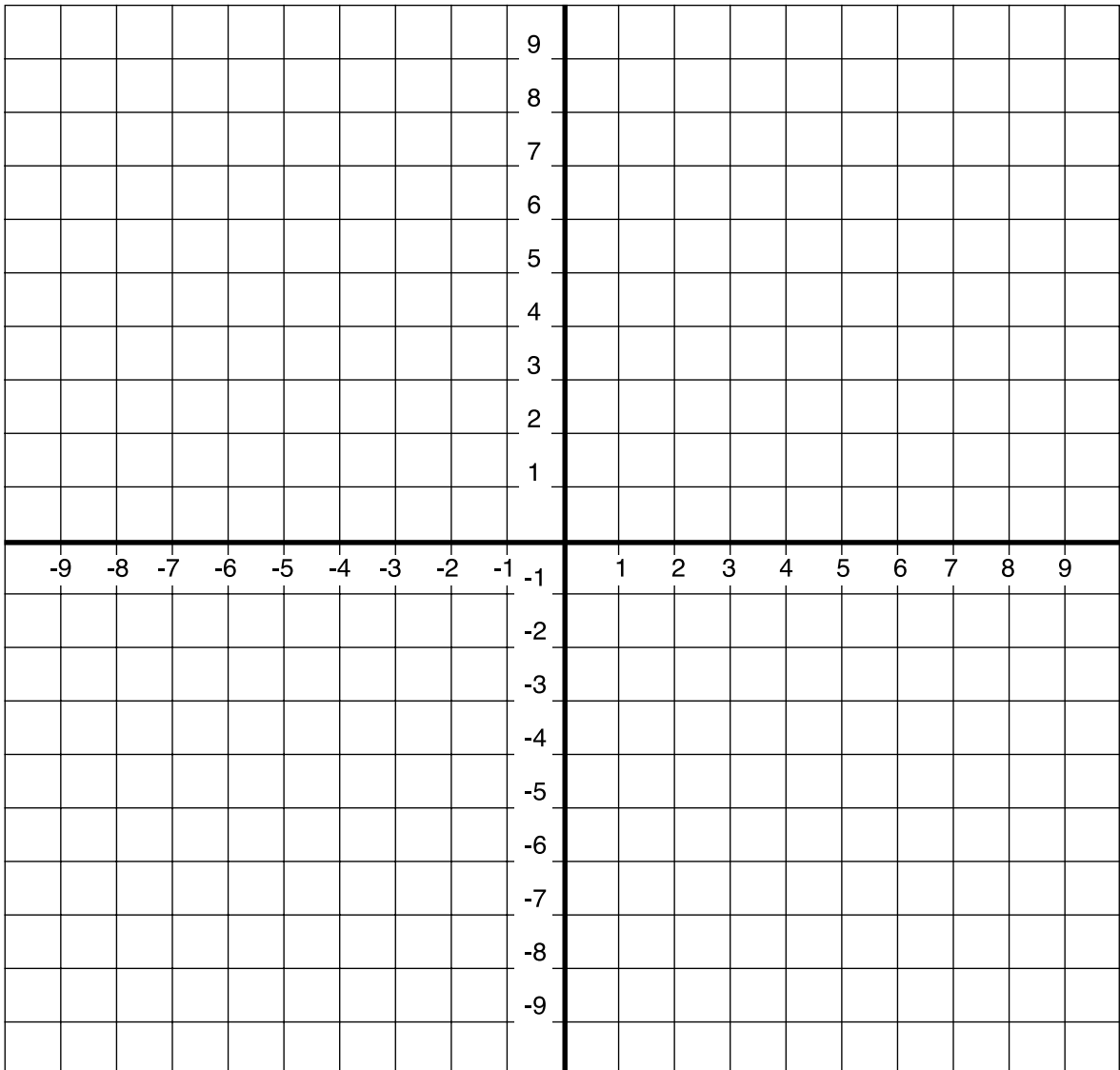
Making copies of or keeping graph art done by previous classes is a great way to collect a portfolio of examples. Often students who finish early are more than willing to make another picture for you to keep and show to other classes.

Background Information On Plotting Points

A point on a graph can be found using a pair of numbers. The pair of numbers for a point is called its coordinates. The first number in the pair tells how far to go right or left. The second number in the pair tells how far to go up or down. Below are examples of how to find points from coordinates.



Graph Art



Calendar Math




January	February	March
S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
April	May	June
S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
July	August	September
S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
October	November	December
S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	S M T W Th F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1. How many days are there between March 5th and October 30th?.....
2. How many months have names with four or less letters in their name?.....
3. How many days are in these "short name" months combined?.....
4. How many days are there in the month you were born?.....
5. Laws require that there are 180 days in a school year. If school started on August 15 and you went seven days a week without any days off for holidays or weekends, when would summer vacation begin?.....

6. Suppose there was a law that allowed you to attend school only on odd numbered dates, Monday to Friday. How many days would you attend school in the month of October?
.....
7. There are 24 hours in one day. How many hours are there in the month of June?
.....
8. There are 365 days in a year (excluding leap year). Work out, as of today, how many days old you are.....
9. Which months have 30 days?
.....
.....
- Which have 31 days?
.....
.....
.....
.....
10. Which month did you not list in the previous question?
11. If you left on April 26th for a 14 day vacation to Hawaii, on what day would you return home?
.....
12. How many school days are there between February 26 and April 19?
.....
13. What is something you remember from last year?
14. If school finishes for summer vacation on June 1 and begins again on August 28, how many days of summer vacation do you get?
15. How many Mondays are there in the month of October?.....
16. How many days are there between Christmas Day and New Year's Day?.....
17. Do any months in the calendar have a Friday the 13th?
- Which one(s)?
18. How many days are there between Valentine's Day and Independence Day?
19. Suppose you only went to school on Monday, Wednesday, and Friday. How many days would you go to school in the month of March?
20. Think up your own Calendar Math Question and get someone else to answer it.
Question:
-
- Answer:

Calendar Math
ANSWER KEY

1. 238 days
2. 3 months
3. 92 days
4. answers will vary
5. February 10
6. 11 days
7. 720 hours
8. answers
9. 30 Days: will vary
April, June, September, November
1. 31 Days: January, March, May, July, August
- October, December
10. February
11. May 9
12. 37 days
13. answers will vary
14. 88 days
15. 5 Mondays
16. 6 days
17. Yes; October
18. 140 days
19. 14 days
20. answers will vary

Number Patterns



Find the next three numbers in the sequences below.

1. 150, 200, 250, 300, _____, _____, _____

2. 1, 7, 49, 343, _____, _____, _____

3. 654, 641, 628, 615, _____, _____, _____

4. 13312, 3328, 832, 208, _____, _____, _____

5. 72, 78, 84, 90, _____, _____, _____

6. 23, 27.5, 32, 36.5, _____, _____, _____

7. 123, 234, 345, 456, _____, _____, _____

8. 115, 105, 96, 88, _____, _____, _____

9. 86, 84, 80, 74, _____, _____, _____

10. 2, 3, 4.5, 6.75, _____, _____, _____

11. 99, 98, 96, 93, _____, _____, _____

12. 11, 43, 75, 107, _____, _____, _____

13. 2, 5, 11, 20, _____, _____, _____

14. 842, 759, 676, 593, _____, _____, _____

15. 1, 2, 4, 7, _____, _____, _____

16. 5, 16, 38, 82, _____, _____, _____

17. 12, 18, 27, 40.5, _____, _____, _____

18. 2, 3, 5, 8, 13, _____, _____, _____

19. 4, 13, 40, 121, _____, _____, _____

20. 888, 448, 228, 118, _____, _____, _____

Number Patterns
ANSWER KEY

- | | |
|--|---|
| 11. 99, 98, 96, 93, 89, 84, 78 (-1, -2, -3, -4, -5...) | 1. 150, 200, 250, 300, 350, 400, 450 (+50) |
| 12. 11, 43, 75, 107, 139, 171, 203 (+32) | 2. 1, 7, 49, 343, 2401, 16807, 117649 ($\times 7$) |
| 13. 2, 5, 11, 20, 32, 47, 65 (+3, +6, +9, +12) | 3. 654, 641, 628, 615, 602, 589, 576 (-13) |
| 14. 842, 759, 676, 593, 510, 427, 344 (-83) | 4. 13312, 3328, 832, 208, 52, 13, 3.25 |
| 15. 1, 2, 4, 7, 11, 16, 22 (+1, +2, +3, +4, +5) | 5. 72, 78, 84, 90, 96, 102, 108 (+6) |
| 16. 5, 16, 38, 82, 170, 346, 698 (+3 then $\times 2$) | 6. 23, 27.5, 32, 36.5, 41, 45.5, 50 (+4.5) |
| 17. 12, 18, 27, 40.5, 60.75, 91.125, 136.6875 | 7. 123, 234, 345, 456, 567, 678, 789 drop |
| 18. 2, 3, 5, 8, 13, 21, 34, 55 (add the two previous numbers together) | 8. 115, 105, 96, 88, 81, 75, 70 (-10, -9, -8, -7...) |
| 19. 4, 13, 40, 121, 364, 1093, 3280 ($\times 3$ then +1) | 9. 86, 84, 80, 74, 66, 56, 44 (-2, -4, -6, -8, -10...) |
| 20. 888, 448, 228, 118, 63, 35.5, 21.75 | 10. 2, 3, 4.5, 6.75, 10.125, 15.1875, 22.78125 ($\times 1.5$) |

A Dozen Puzzlers



1. A lady goes to the well with two jugs. One holds exactly nine quarts and the other holds exactly five quarts. She needs exactly three quarts of water for her soup. Using only two jugs, which she cannot mark in any way, how can she get the three quarts?

Answer: *She fills the nine-quart jug and pours five quarts from it into the five-quart jug. She empties the five-quart jug and pours the remaining four-quarts left in the nine-quart jug into the five-quart jug. Now she fills the nine-quart jug again and pours one quart in to fill up the five-quart jug. Then she empties the five-quart jug and fills it again with five quarts from the eight quarts that are in the nine-quart jug. And now, she has three quarts left in the nine-quart jug—just enough to make her soup!*

2. Five hundred people shopped in a candy store and spent a total of \$500. The women each spent \$1, the children spent one cent each, and the men each spent \$5. How many men shopped in the store? How many women? How many children? There is at least one shopper in each category.

Answer: *Four hundred children, one woman, ninety-nine men.*

3. The zoo just bought exactly one ton of animals (2000 pounds): a zebra, a wolf, a Lynx, a peacock, and a buffalo. The zebra makes up forty-five percent of the total weight, and the wolf weighs nine times the combined weight of the Lynx and the peacock. The average weight of the Lynx and the peacock is five-tenths percent of the weight of the zebra. How much does the buffalo weigh?

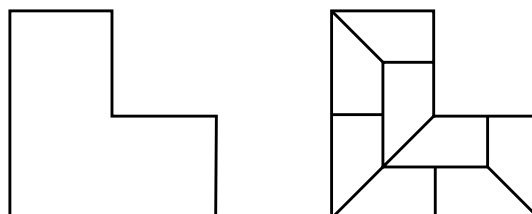
Answer: *1,010 pounds.*

4. Millie, the marble packer, arranged all her marbles in one solid square and found that she had two hundred marbles left over. She then received a new shipment of one thousand marbles. She increased two sides of her original square by five marbles and found she was twenty-five marbles short of completing the second square. How many marbles did Millie have to start with?

Answer: *14,600 marbles.*

5. If you had just bought the land pictured below and wanted to subdivide it into eight lots, each of the exact same size and shape, how would you do it?

Answer:



6. Draw a square and divide it into nine smaller squares by drawing two vertical and two horizontal lines. Using each number only once, arrange the numbers one through nine in the squares so that they total fifteen across, down, and diagonally.

Answer:

2	9	4
7	5	3
6	1	8

7. Without leaving any digit out or repeating a digit, arrange the numbers one to seven so that when added together, they equal one hundred.

Answer: $15 + 36 + 47 + 2 = 100$

8. Write down any number. Multiply by two. Add eighteen. Divide by two. Subtract your original number. No matter what you started with, your answer is nine!

Answer:

$$43 \times 2 = 86$$

$$86 + 18 = 104$$

$$104 \div 2 = 52$$

$$52 - 43 = 9$$

9. Write down a three-digit number. Do not repeat any digit within your number. Reverse the number—if you had one hundred twenty-three, write three hundred twenty-one—and subtract the smaller from the larger. Write down the answer. Now reverse the answer and add. Your answer is one thousand eighty-nine, no matter what number you started with!

Answer:

873

-378

495

+594

1089

10. If you will tell me which column or columns the age of your car is in, I will tell you how old it is.

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1	2	4	8
3	3	5	9
5	6	6	10
7	7	7	11
9	10	12	12
11	11	13	13
13	14	14	14
15	15	15	15

Answer Add the top number of the columns you find the age in. The total will give you the age.

7. Without leaving any digit out or repeating a digit, arrange the numbers one to seven so that when added together, they equal one hundred.

Answer: $15 + 36 + 47 + 2 = 100$

8. Write down any number. Multiply by two. Add eighteen. Divide by two. Subtract your original number. No matter what you started with, your answer is nine!

Answer:

$43 \times 2 = 86$

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9. Write down a three-digit number. Do not repeat any digit within your number. Reverse the number—if you had one hundred twenty-three, write three hundred twenty-one—and subtract the smaller

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

Answer: A few of them are: all rows, all columns, the two diagonals, four corner squares, four center squares. Carry on!