Chapter 1: The Firsts

Dr. Martha Euphemia Lofton Haynes

The first African American woman to earn a Ph.D. in mathematics.

Martha Euphemia Lofton was born in 1890 and lived in Washington, DC, all her life. Euphemia, as most people knew her, was the daughter of a dentist, Dr. William S. Lofton, and his wife Lavinia Day Lofton. Euphemia was a lifelong advocate for providing better opportunities for students in the poorer neighborhoods, and she was concerned about the segregated neighborhoods. She graduated from Washington's Miner Normal School in 1909 and then earned a bachelor's degree in mathematics from Smith College in 1914. Smith is a women's college in Northampton, Massachusetts.

After she earned her B.A. degree she returned to DC, where she married childhood friend Harold Appo Haynes. Dr. Haynes's husband was also involved in education and was the deputy superintendent for DC's "colored schools". As involved as they both were with education, they had no children.

Although she lived most of her life in DC, she traveled to different parts of the country to continue her studies. She earned a master's degree in education from the University of Chicago and then returned to DC to earn a Ph.D. in mathematics from Catholic University of America in 1943.

After receiving her master's degree, she joined the faculty of Miner Teachers College, which stressed training African American teachers. She created the mathematics department at Miner. While at Miner she enjoyed teaching different grade levels and different topics. At different times, she taught first grade at Garrison School and English at Miner College, as well as being a professor at Miner Teachers College.

After nearly 50 years as an educator Dr. Haynes retired in 1959. She became the president of the Board of Education and was central to the integration of DC public schools.

In retirement, Dr. Haynes continued to work for several causes and organizations, including the Urban League and the National Association for the Advancement of Colored People (NAACP), fighting racial segregation. She was also a member of the Council of Catholic Women and the American Association of University Women. Dr. Haynes was very involved in her church and was awarded the Papal Medal from the Catholic Church.

After she died it was discovered she had left $700,000 to Catholic University of America to continue her work in the education department and to provide scholarships to students to continue their educations.

She died in 1980 at the age of 89.

African American Women Mathematicians

M Y K Q R Z B Y K H U M H Y T G V W Z D
H B U T E O P R A K M Q D V A V D U K K
E C L H W G D Y W Y E A C Y C S Z M R F
W A N G T C N R W D E I O Z U N Y U U H
I G F I M E P B I R Z J U P H N H I U U
T K Z N S A R O C G G Z R E B M E O Y N
T V I K Q O L C L V U E H K Y L B B Y T
R M N C W B M L N Z N E E S L A T R H N
B N P N S P E Q O O I V Z I T U B P X B
R A E P E E G P C Y Q E V P P L W C E P
V M A T N K C L V I T N R D X Q Y P M Y
Z E O B U V A M E V A Q E M V N N O Y F
A Z H Q N F A F G R A X G O G E O P Y S
D O B E F Y O R G Y J L A A X D T U W T
E B J R E O U E W A O H V U G R T H G Q
A T V S P Q G M V W N M S J X A U T I I
T M N P M M B L K A E N J R F D S Q P T
M K F U M I Q I Y S S H U E S E I M S E
X Y T C H B T G W A T S O N U I K H O N
A O T Z G Q D H G G R K S P I K E S N W

WORD LIST:

BOZEMAN
BROWNE
DARDEN
FALCONER
GASAWAY
GEE
GILMER
GIPSON
GRANVILLE
HAYNES
HEWITT
HUNT
HUNTE
JONES
KNIGHT
MALLOY
MAYES
MCBAY
MCCREADY
RODRIGUEZ
SMITH
SPIKES
SUTTON
SVAGER
WATSON

Connect the Coordinate Points

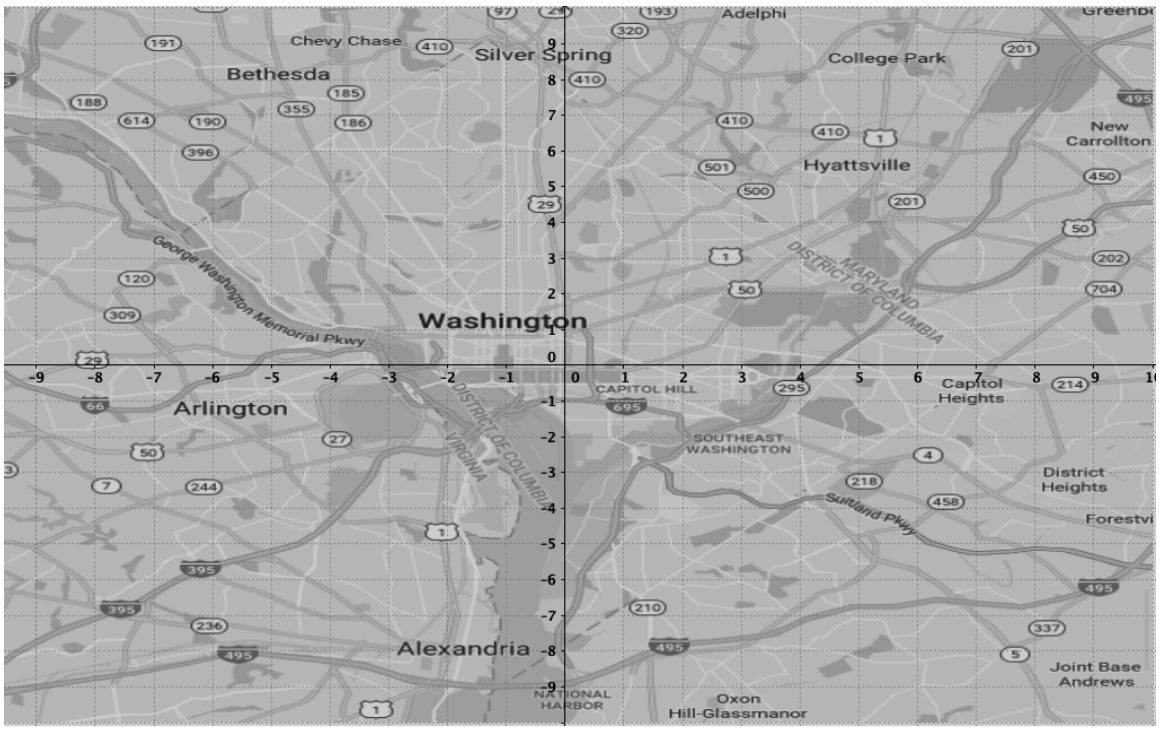
Using the map below and the coordinate plane, complete the following tasks:

Task 1
Using a dark pencil, plot the following points and connect them in the order that they are plotted. This will provide you with the outline of Washington, DC.

(-6.5, 3.8); (-1.2, 9); (7.2, 0); (-1, -9); (-1, -5);
(-0.8, -4); (-1.5, -2); (-6.5, 3.8)

Task 2
Use a different colored pencil for each location below. Plot and label the points representing the schools that Dr. Haynes attended or taught at in Washington, DC.

A. Armstrong High School: Point A (0.5, 1.5)
B. Catholic University of America: Point B (1.5, 4.5)
C. M Street High School: Point C (0.5, 2)
D. Miner Normal School: Point D (-0.3, 2.5)
E. Miner Teachers College (University of District of Columbia): Point E (-3.5, 4.5)
F. Smith College: Point F (-1.5, 2.5)



Dr. Evelyn Boyd Granville

The second African American woman to earn a Ph.D. in mathematics.

Evelyn Boyd was born May 1, 1924, in Washington, DC, to William and Julia Walker Boyd. Washington, DC, was segregated at the time, but as a child that didn't prevent Evelyn from enjoying the books from the libraries and the interesting things at all the museums that were available. She told everyone that she loved school and her favorite subject was math. She graduated as one of five valedictorians from Dunbar High School.

For her bachelor's degree, she chose to attend Smith College, an all-girls school in Northampton, Massachusetts. She earned her first degree in 1945. For her graduate work, she attended Yale University in New Haven, Connecticut, and earned a double master's degree in mathematics and physics in only one year. She continued at Yale to study functional analysis for her doctorate degree, which she completed in 1949.

After graduating she became a mathematics professor at Fisk University in Nashville, Tennessee. Fisk is a historically Black university and was formally called The Fisk Freed Colored School. Both Vivienne Malone-Mayes and Etta Zuber Falconer (also in this book) enjoyed her classes and later, under her influence, earned doctorate degrees in mathematics. Willing to try new experiences, Boyd temporarily left teaching and went to work at the National Bureau of Standards (later renamed the Diamond Ordnance Fuze Laboratories), where she worked on developing fuel for rocket ships. After four years in that position she moved to New York City to take a position at IBM (International Business Machines) as a computer programmer. One of Dr. Granville's most interesting jobs was when she went back to Washington, DC, to work as part of the IBM team responsible for the formulation of orbit computations and computer procedures for NASA's Projects Vanguard and Mercury.

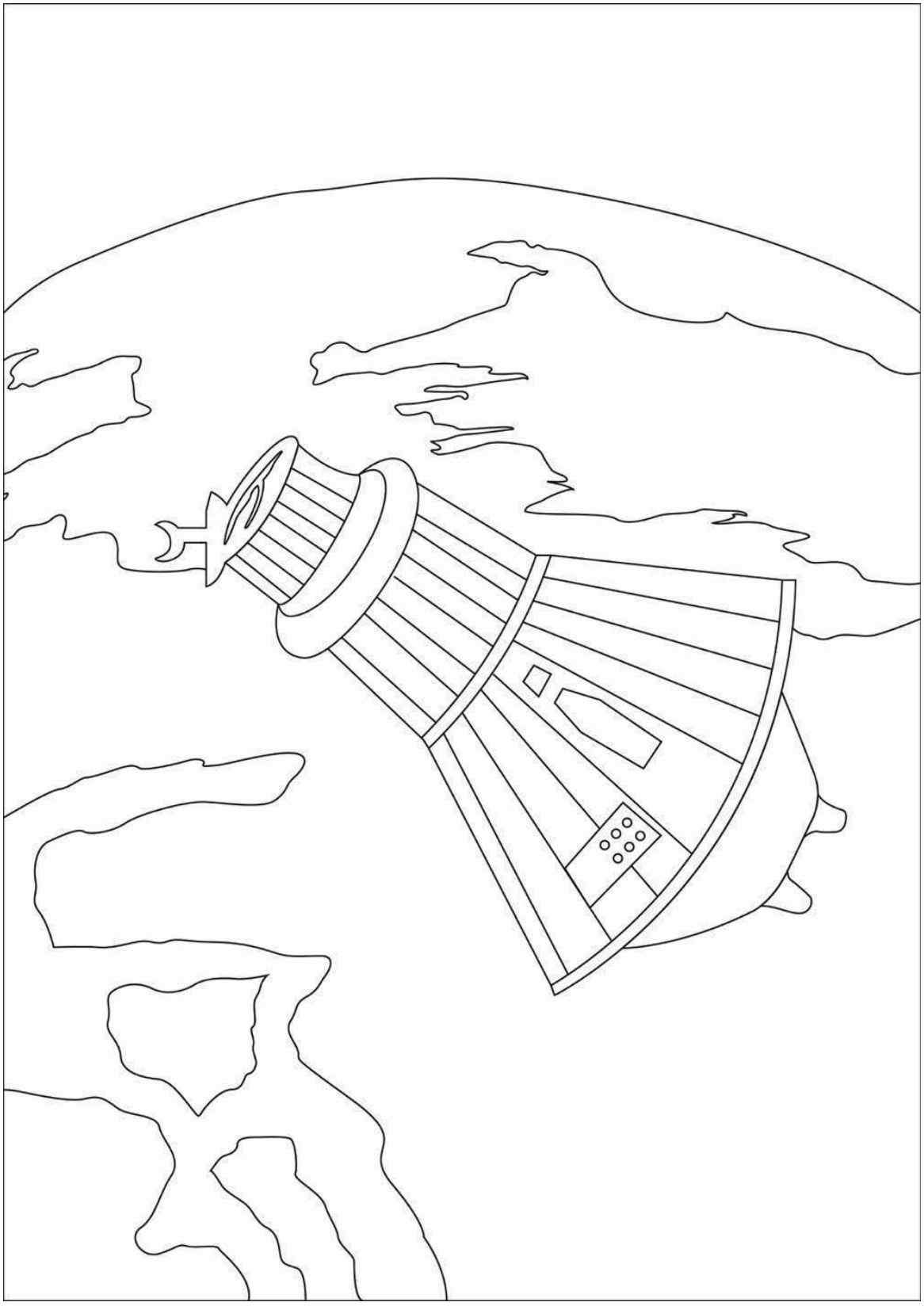
In 1960 she met and married her first husband, and they moved to California. She worked with several companies in the aviation business but eventually became an assistant professor of mathematics at California State University in Los Angeles (CSULA). At CSULA she was very involved in training future teachers on how to teach mathematics in elementary-school classrooms. This interest in teaching math encouraged her to coauthor a college mathematics textbook for future teachers.

In 1984, she married Edward V. Granville and moved to Tyler, Texas, where she embarked on a 30-year career as a professor at Texas College. She was a professor of computer science. While teaching at Texas College she, and her husband, raised 800 chickens and sold their eggs.

In 1989, Dr. Granville was awarded an honorary doctorate degree from Smith College, the first one given by an American college to an African American woman in mathematics. She received a second honorary doctorate degree from Spelman College in 2006.

Dr. Evelyn Boyd Granville was a mathematician, computer scientist, and educator. After her retirement in 1997, she continued to be involved with mathematics by encouraging students to explore the value of mathematics, as well as serving as a national speaker for many different associations. When someone asked her what she thought her biggest contribution to math was, she stated, "Being an African American woman, and letting people know that we have brains too".

Color the Mercury Friendship 7 Spacecraft



NASA Facts

What is the name of the oldest artificial satellite still in space today?

V								
1	**23**	**19**	**5**	**11**	**13**	**12**	**4**	**7**

Which NASA program launched the first Americans into space?

	R												
9	**2**	**15**	**17**	**18**	**20**	**16**	**10**	**8**	**22**	**14**	**21**	**3**	**6**

To answer the questions, complete the following tasks for each problem below:

1. Work the problem (the first two are done for you).
2. Find the code for the correct answer.
3. Write the code in the blank space that corresponds to the problem number.

1) (-2) + 3 = 1 (find 1 in the answer column, the code is V)
2) (-14) + (-7) = -21 (find -21 in the answer column, the code is R)
3) -13 + (-8) =
4) (-9) + 14 =
5) (-8) − (-2) =
6) 5 + (-8) =
7) (-27) − 24 =
8) (-41) + (-40) =
9) 38 − (-17) =
10) (-44) + (-9) =
11) (-16) − (-36) =
12) (-6) − 15 =
13) (-16) − 6 + (-5) =
14) 15 − 13 + 2 =
15) 16 − (-13) − (-5) =
16) (-7) − (-2) – 9 =
17) (-11) − (-14) + 7 =
18) 7 + (-1) – 6 – 81 =
19) 6 + (-7) + (-5) − (-2) =
20) (-3) + 5 + (-5) + 7 =
21) (11) + 8 + 1 =
22) -10 + (-10) – 1 =
23) -6 – 5 – 16 =

CODE	ANSWER
A	-27
B	2
C	4
D	5
E	-81
F	-2
G	-6
H	0
I	2.5
J	10
K	0.7
L	-55
M	-53
N	-4
O	34
P	55
Q	100
R	-21
S	-100
T	-14
U	20
V	1
W	-0.50
X	13
Y	-3
Z	-13
1	-51

Dr. Marjorie Lee Browne

The third African American woman to earn a Ph.D. in mathematics.

Marjorie Lee was born September 9, 1914, in Memphis, Tennessee. Her parents were Lawrence Johnson Lee and Mary Taylor Lee. Marjorie's father had attended some college, which was something very unusual in 1914. Around their hometown, he was known as a whiz at mental mathematics, and he shared his enthusiasm with his children. Marjorie said she always loved mathematics. Growing up, Marjorie attended both public and private schools. Most notably she attended LeMoyne High School, a private school started after the Civil War by the Methodist Church to educate Negroes.

By the time she was old enough to go to college, the Great Depression had begun. With a combination of scholarships, jobs, and loans she was able to attend Howard University in Washington, DC. She graduated with honors with a bachelor's degree in mathematics from Howard University in 1935. After a brief teaching position at the Gilbert Academy in New Orleans, Louisiana, she received a master's degree from the University of Michigan in 1939. After earning her master's degree, she became a faculty member at Wiley College in Marshall, Texas. It was during that time she began working on her doctorate degree at the University of Michigan.

Dr. Browne received a Ph.D. in mathematics from the University of Michigan in 1950. This made her the third African American woman to receive a mathematics doctorate degree, just six months after Dr. Evelyn Boyd Granville. After receiving her Ph.D., Dr. Browne taught at North Carolina Central University (NCCU), the nation's first public liberal arts college founded for African Americans, located in Durham.

Browne's work offered her many opportunities to travel and teach. She even went to Cambridge University in England, where she studied topology. Topology is what happens when you change the shape of an object by bending and/or twisting. Topology is a type of geometry that became her specialty.

Dr. Browne became aware of the importance of the new field of computers. She applied for, and received, an IBM grant to set up a computer center. The computer center was one of the first for a minority college. Due to her work, the college became a National Science Foundation center for secondary education in mathematics. Because of her deep interest in continuing education for secondary school teachers, she continued to direct summer institutes for teachers for 13 years.

In addition to her work at NCCU, Dr. Browne belonged to many different organizations and received many awards. She worked at NCCU until the time of her death in 1979 at the young age of 65.

In 2001, the University of Michigan–Ann Arbor began a lecture series honoring Marjorie Lee Browne.

Color by Shape!

1. Color all 3-sided polygons green. What is the name of a 3-sided polygon? _____

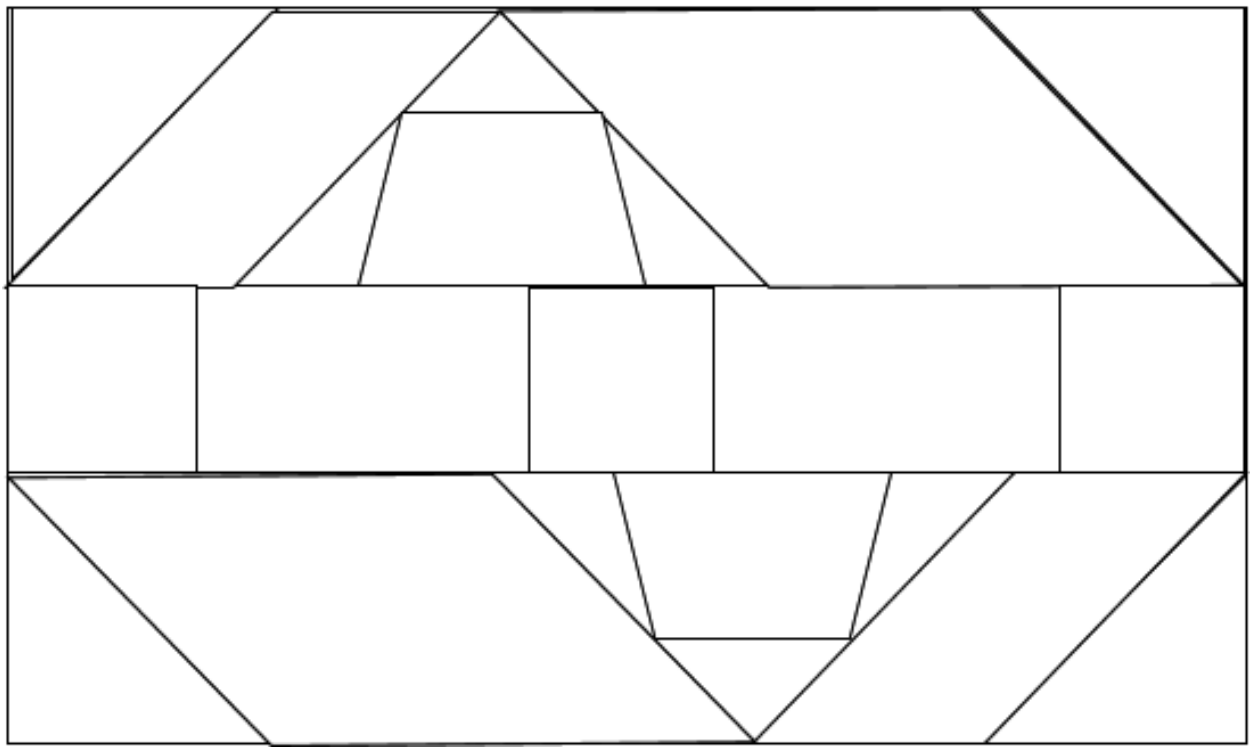
2. Color all parallelograms with no right angles blue. Write the properties of a parallelogram. _____

3. Color all rhombi pink or purple (your choice). What is another name for these polygons? _____

4. Color all rectangles yellow. Are rectangles also parallelograms? How do you know? _____

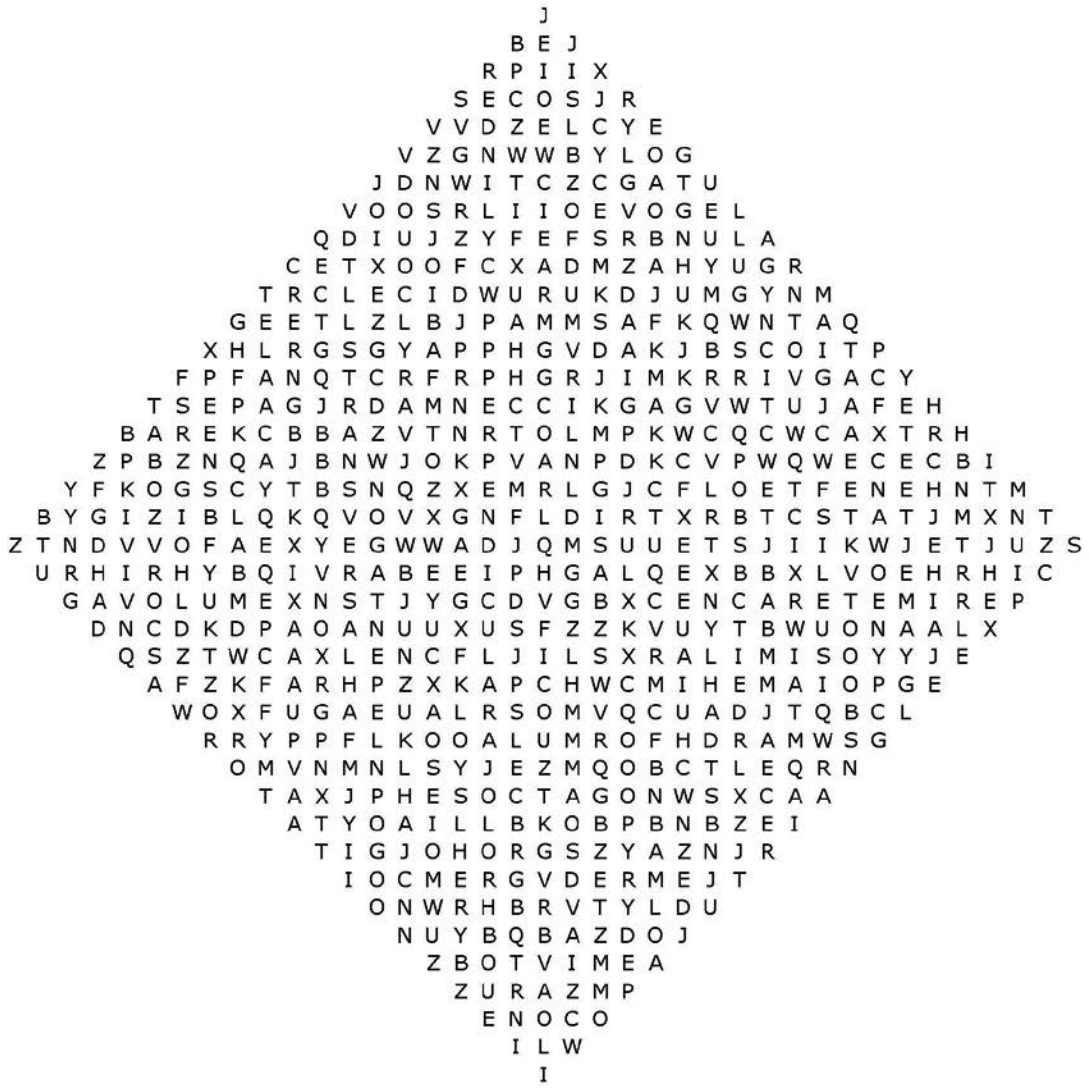
5. Color all trapezoids red. Write the geometric properties of a trapezoid.

   _____



Geometry Vocabulary Word Search

Have fun finding interesting geometry vocabulary. Can you define each term?



WORD LIST:

ANGLE
AREA BISECT
CENTER CONE
CONGRUENT
CYLINDER
EQUILATERAL
FORMULA
HEXAGON
OCTAGON
PARALLELOGRAM
PENTAGON
PERIMETER
PERPENDICULAR
PI
POLYGON
RECTANGLE
REFLECTION
REGULAR
ROTATION
SIMILAR
SPHERE
SQUARE
TRANSFORMATION
TRANSLATION
TRANSVERSAL
TRAPEZOID
TRIANGLE VOLUME