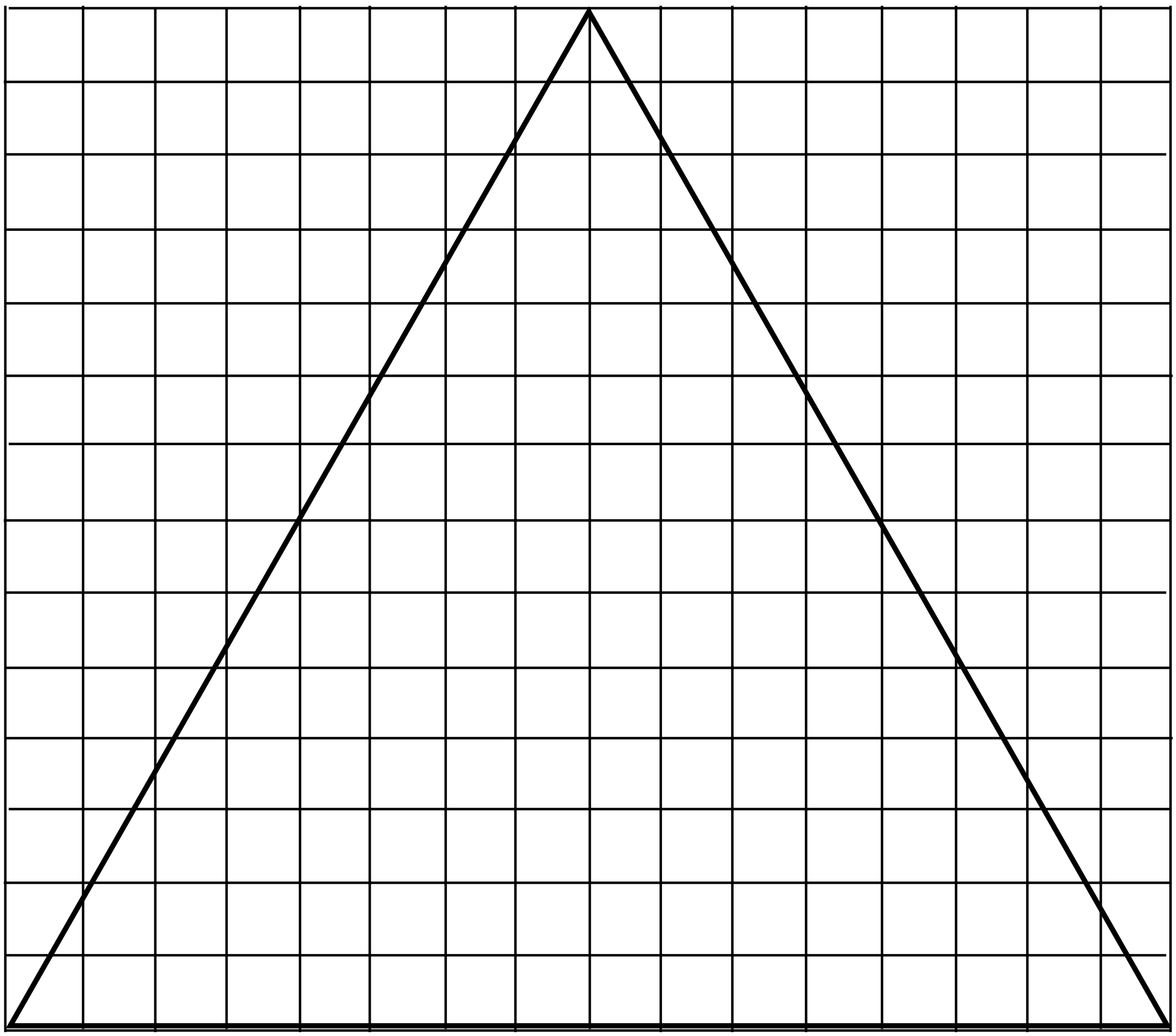
Name____Date________

Serpenski Triangle



1. Assume that the area of the triangle is 1 square unit. Make four smaller similar triangles by joining the midpoints of each pair of sides.
2. Now illustrate a hole in the design by darkening in the middle triangle.
3. Now three congruent triangles are left. What is the area of the parts left? (Remember the entire original triangle had an area of one square unit.) Repeat steps one and two with each of these triangles.
4. Now there are 9 smaller triangles left. Repeat steps one and two with each of these. What is the area after the center triangles are removed?
5. Continue repeating this pattern several times. What happens to the area after each removal?
6. If this pattern is continued indefinitely, it creates a fractal pattern known as the Serpenski Triangle.

Name____Date________

Mirror, Mirror on the Floor

In this project you will find the height of a flagpole, or other designated object by using two similar triangles. You will need:

— a mirror, with its center marked some way
— a long measuring tape (50-100 feet)
— pencil and calculator

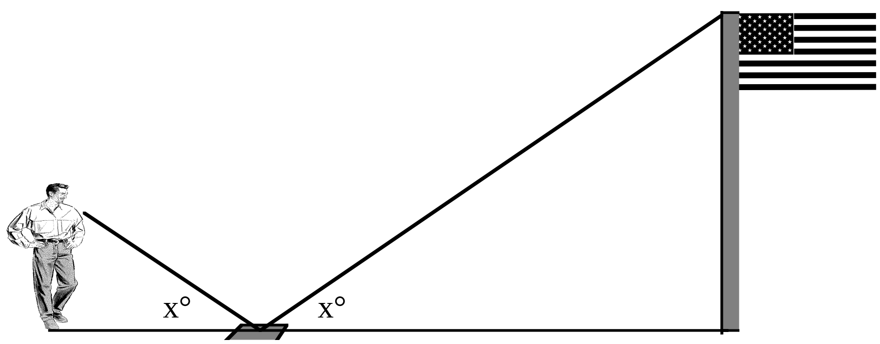
Instructions

You and your partner are going to do the experiment twice. When you are done, you can compare answers and discuss the differences, if any. Partner #1 will do steps 1 through 3; Partner #2 repeats steps 1 through 3.

1. Place the mirror on the ground a distance from the flagpole. Make sure you can see to the top of the flagpole in the mirror!

2. Now position yourself with the mirror between you and the flagpole so when you look at the mirror you see the top of the pole on the point marked on the mirror.

3. Have your partner make the following three measurements. Make the measurements to the nearest $\frac{1}{4}$ inch. Write them down in decimal form.



Measurement	**Partner #1**	**Partner #2**
Height of observer:	______________	______________
Distance from mirror center to observer:	______________	______________
Distance from mirror center to base of pole:	______________	______________

Mirror, Mirror, on the Floor continued

Now you can compute the height of the flagpole by using a proportion for two similar triangles. Remember that triangles are similar when all corresponding angles have the same measure and all corresponding sides have the same ratio. Since the flagpole and person are perpendicular to the ground, what kind of angle is formed by each? ___________________________________

What is its measure? _______ What type of triangle is formed on each side

of the mirror? _____________________

There is an important property in physics that says when light is reflected by an object, like a mirror, the angle of incidence is equal to the angle of reflection. Or, in other words, the light hits the mirror at the same angle as that formed when the light is reflected away from it. In geometry we say that the two triangles are similar because they have two pairs of corresponding angles congruent.

Since corresponding sides of similar triangles are proportional, we can write the following:

$$\frac{\text{Person's height}}{\text{Person's distance}} = \frac{\text{Flagpole height}}{\text{Flagpole distance}}$$

Now rewrite the proportion, but substitute your measurements, and use a calculator to compute the height of the flagpole for both partners.

Flagpole height by Partner #1: _______________

Flagpole height by Partner #2: _______________

Do your answers agree within a few inches? _________________

If not, why do you think they differ?

Name____**Date**________

Carolina Capers

Materials:

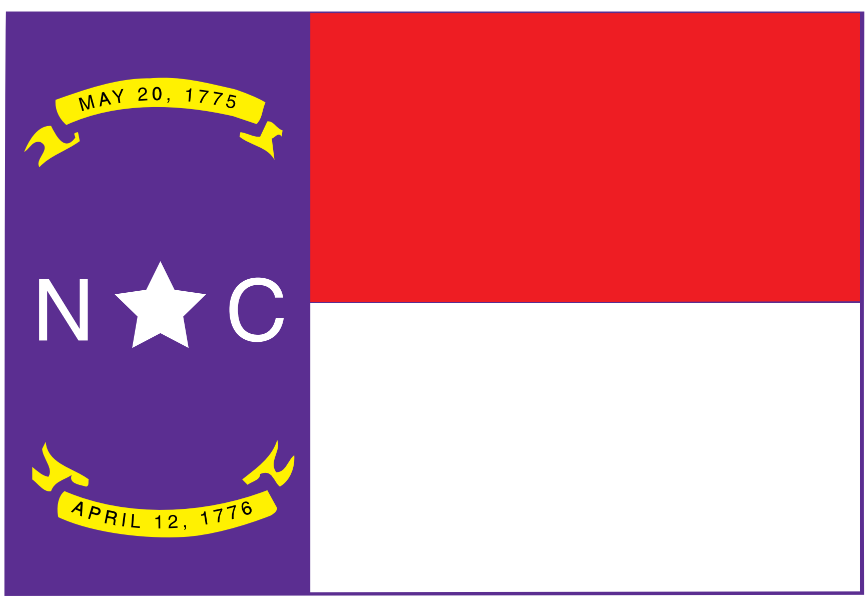
Worksheet of N.C. flag

Rulers

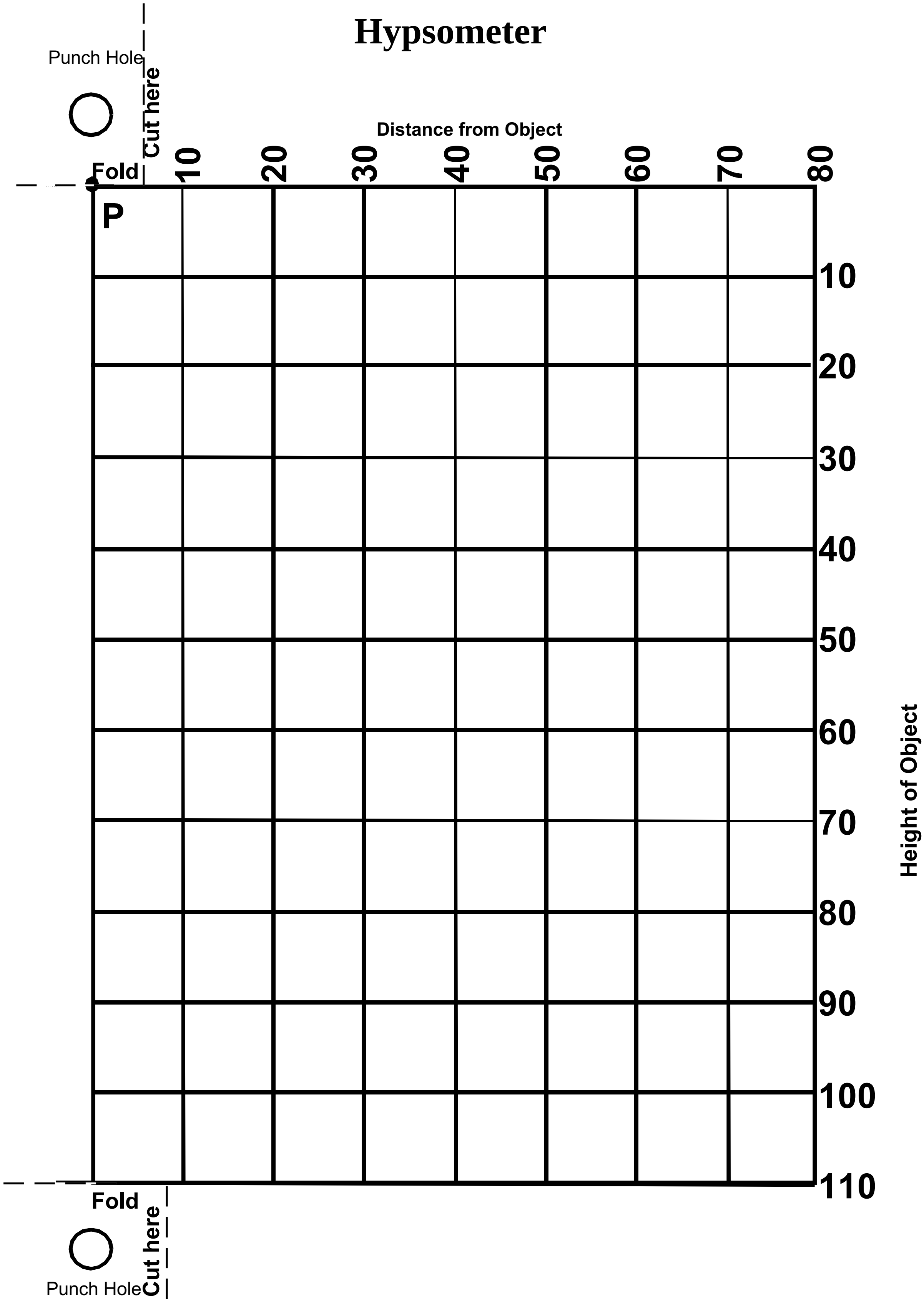
Calculators

Problems:

Robert is going to make a larger scale of the North Carolina flag for his social studies project. He knows the total width of the flag will be 36 inches. Determine the width of the solid white section for Robert.



Hypsometer



Punch Hole
Cut here
Distance from Object
Fold
10
20
30
40
50
60
70
80
P
10
20
30
40
50
60
70
80
90
100
110
Height of Object
Fold
Cut here
Punch Hole

Name____**Date**________

Rectangles with width 2

2 x Length	**Area**	**Perimeter**
2 x 2		
2 x 3		
2 x 4		
2 x 5		
2 x 6		
2 x 18		
2 x 25		
Rule: A=	Rule: P=	

QUESTIONS:

1. Each time the length increases by 1 unit, how does the area of the rectangle increase?

2. What is the rule? What will be the area of a 2 by 30 rectangle?

3. Each time the length increases by 1 unit, how does the perimeter of the rectangle increase?

4. What is the rule? What will be the perimeter of a 2 by 30 rectangle?

Name____Date________

EXTENSION IN 3-D: Consider a right rectangular prism, 2 by 2 by 2.Find the volume and the surface area.

The Blackline Master can be used to build the 3-D models. Based on previous activity, what would you predict the effect on volume and surface area of the right rectangular prism would be when one dimension changes. Find a pattern, build a rule, and make a prediction for volume and surface area of a 2 by 2 by 30 right rectangular prism.

2 x 2 x H Only one dimension will change 2 x 2 x 2	**Volume**	**Surface Area**
2 x 2 x 3		
2 x 2 x 4		
2 x 2 x 5		
2 x 2 x 6		
2 x 2 x 10		
2 x 2 x 30		
Rule: V=	Rule: SA =	

QUESTIONS:

1. Each time the height increases by 1 unit, how does the volume of the prism increase?

2. What is the rule? What will be the volume of a 2 x 2 by 50 prism?

3. Each time the height increases by 1 unit, how does the surface area of the prism increase?

4. What is the rule? What will be the surface area of a 2 by 2 by 50 prism?

2-D ACTIVITY GRID PAPER

Situation 1 – Changing Dimensions

The dimensions of a rectangular solid are 2 cm, 3 cm, and 4 cm. How do the surface area and volume of the figure change when all three dimensions are doubled?
What is the new surface area and volume?

Situation 2 – Changing Dimensions

The length of a rectangular solid is 6 cm, the width is 4 cm, and the height is 7 cm. What happens to the surface area and volume of the figure when the length is doubled, the width is halved, and the height remains the same?
What are the original and new surface areas and volumes?

Situation 3 – Changing Dimensions

The dimensions of a rectangular solid are 4 cm, 8 cm, and 10 cm. How do the surface area and volume of the figure change when all three dimensions are halved?
What are the original and new surface areas and volumes?

Situation 4 – Changing Dimensions

The dimensions of a rectangular solid are 3 cm, 4 cm, and 7 cm. The two larger dimensions are doubled. What effect does this change have on the surface area and volume?
What are the original and new surface areas?

Name____Date________

Grandpa's Buried Treasure

Tom found a letter from his grandfather and a map of the town. Grandpa's letter explains where some treasure is buried. Help him locate the treasure. For your information, all roads and paths in this town are straight, but not necessarily horizontal or vertical.

Grandpa's Instructions

1. "First find the oak tree that is at the midpoint of Post Road. You know the one Tom. When I used to walk you home from school on Post Road (the shortest route), we always stopped midway to rest at that oak tree."

2. "Now find an old shed east of here on Market Way. Heh, I used to race on that road. It took me just as long to get from the shed to the oak as it did to get from the oak to your house, Tom." Tom knows that Market Path is on the perpendicular bisector of Post Road. Where is the shed?

3. "Do you remember where Abe's old mailbox is, boy? We used to pass it on Post Road. It took us 30 minutes to walk from home to your school, but only ten minutes to pass Abe's place." Where is the mailbox?

4. "We call that road from our house to the shed Robber's path. Short Way is a path that starts at the mailbox and runs parallel to Market Path. Short Way ends on Robber's Path. At the midpoint of Short Way there is a boulder. You need to find that boulder, boy" Where is the boulder?

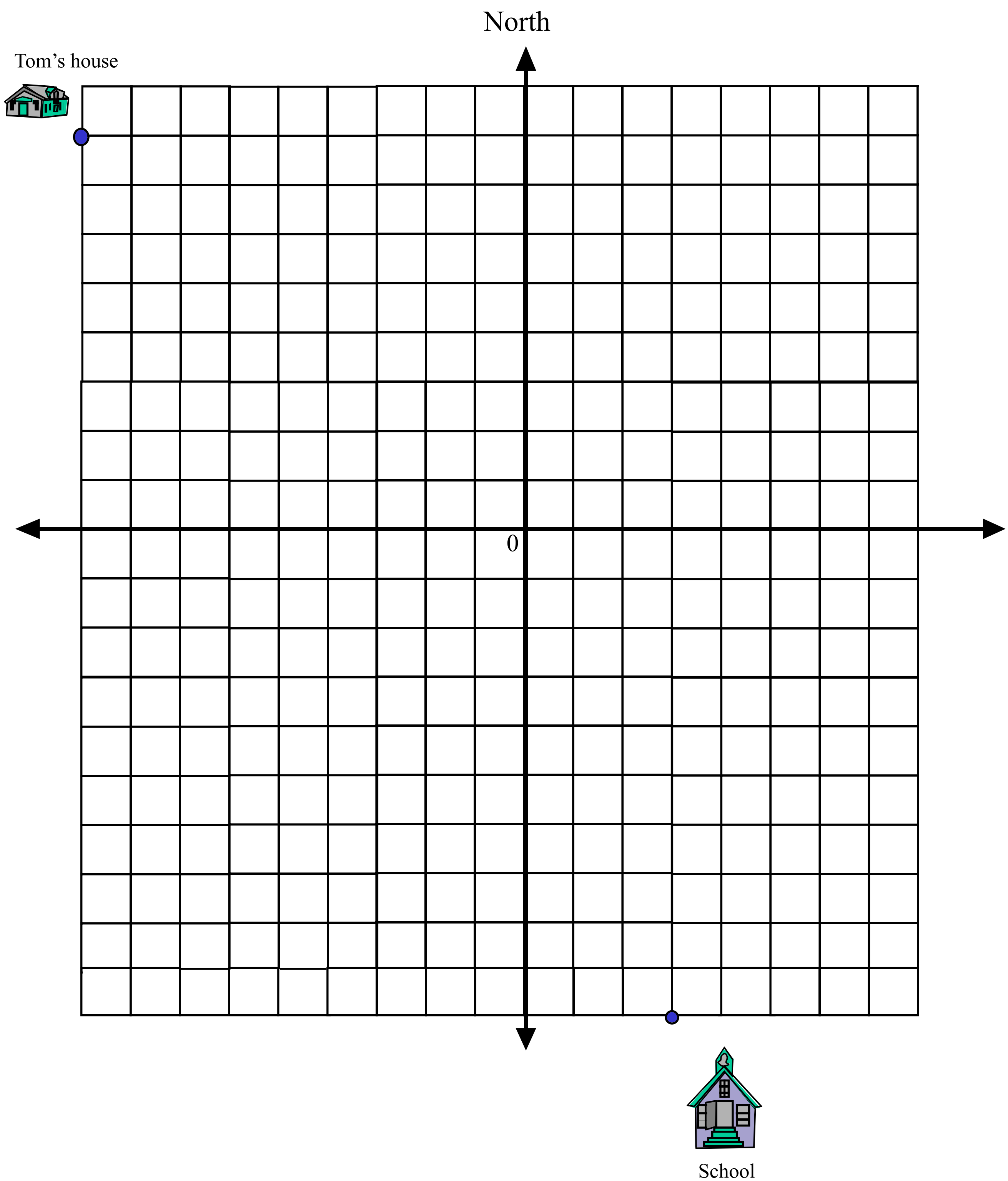
5. "Old Road runs from the shed to the school. The gate to my cousin Sally's house is on Old Road. Guess you don't remember her, she's long gone. But I used to carry wood from the shed to Sally and to the school. The distance from Sally's gate to the school is half the distance from the gate to the shed." Where is the gate?

6. "Another road called Creek run begins at the boulder and ends at the gate. Along Creek Run you can find an old dry well. The well is the midpoint of the section of Creek Run that runs from the gate to the intersection with Market Path." Where is the well?

7. "Now walk a straight path from the well to the Oak tree. I buried the treasure at the midpoint of that path." Where is the treasure?

Name____**Date**_________

Grandpa's Buried Treasure



Name____**Date**________

Ladders and Saws

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Cut out any type of triangle from stiff paper, and color each angle a different color. (If each student has a different triangle, the conclusions reached seem even more powerful to them.) Draw a straight base line fairly near one edge of a blank sheet of unlined paper and line one edge of the triangle up along the base line. Trace one edge of the triangle away from the base line, and mark the point where the third vertex meets the base line. (See Figure 1.)

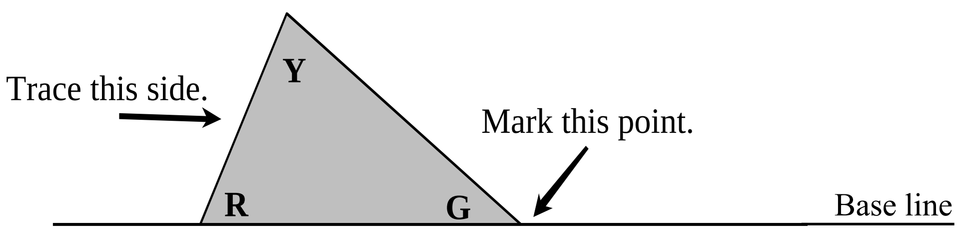


Figure 1

Then slide the triangle down the base line to the marked point and repeat -- trace the top edge and mark the lower vertex as shown in figure 2. Color in each angle as you make it.

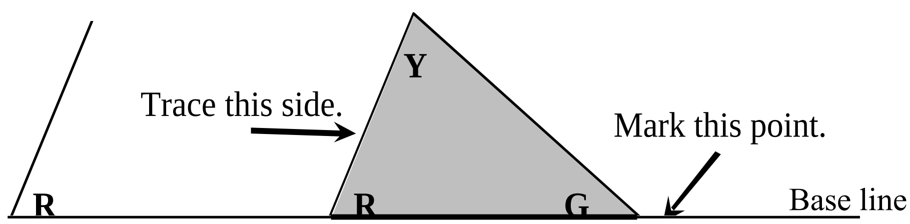


Figure 2

Continue this process all the way down the base line, creating a series of parallel lines, as shown in Figure 3. The resulting figure is called a "ladder."

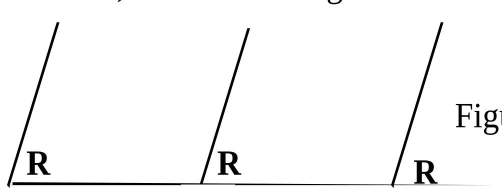


Figure 3

Ladders and Saws continued

To create a "saw," line up the triangle along the base line and trace its other edges. Color in the angles as you go. (See figure 4).

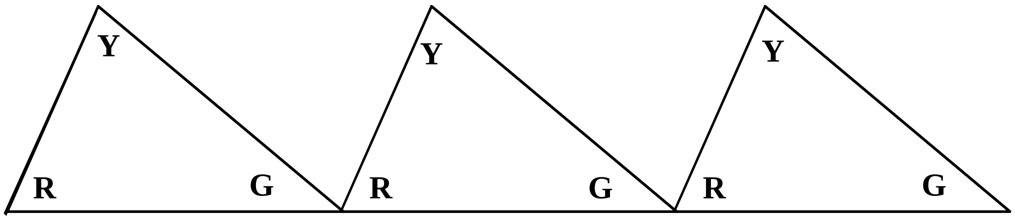


Figure 4

Now, rotate the triangle so that the vertex marked Y fits snugly against the base line, and the side marked YG fits against its tracing as shown in Figure 5. Then trace the top side.

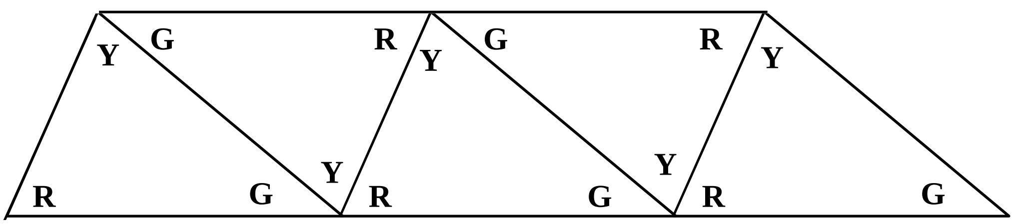


Figure 5

The "ladders" in Figure 3 illustrate corresponding angles formed by parallel lines cut by a transversal. The "saw" in Figure 4 shows alternate interior angles formed by parallel lines and parallel transversals. What conclusions can you make about each type of angle?

On a blank piece of paper, start with a base line, and make a row of ladders, coloring the angles as you go. Then turn your triangle around to complete the saws, again coloring in angles to match the original triangle. Repeat until the entire page is covered. Parts of two rows are shown in Figure 6.

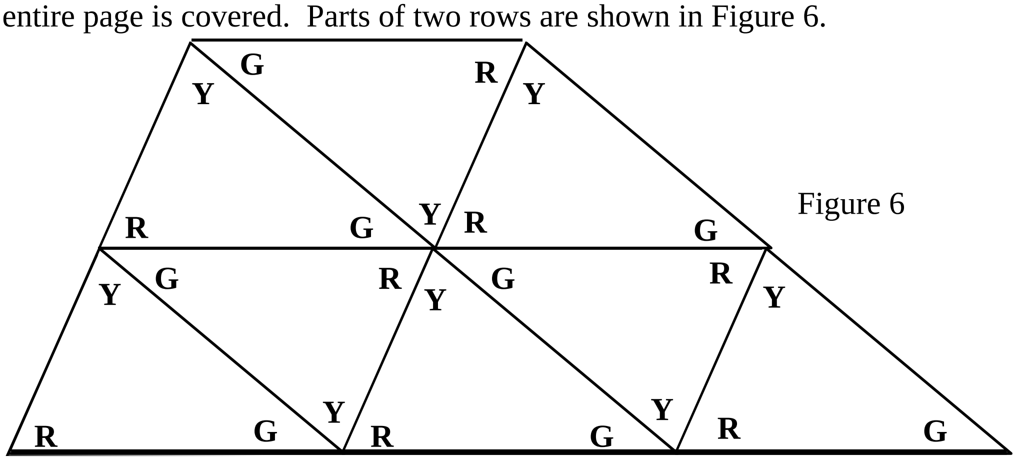


Figure 6

Ladders and Saws continued

Once the page is covered with ladders and saws, look carefully at the figure and make as many conclusions as you can. You may want to outline or highlight certain parts of the figure, or cover up certain parts to make your conclusions stand out. How many conclusions can you make based on your diagram? Do your conclusions hold when you look at someone else's diagram? What would happen if you started with a special kind of triangle? Can you make any special conclusions about these figures?

Some seventh grade students have come up with as many as 15 different conclusions. Can you top them?

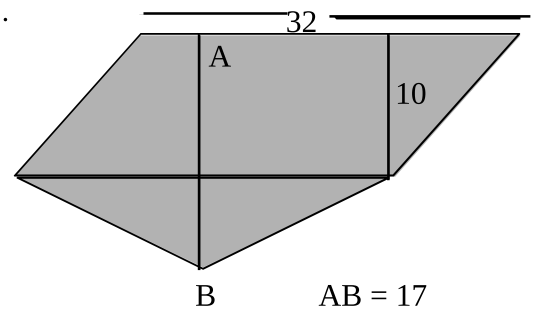
Some Observations

1. The sum of the angles of any triangle equals 180°.
2. The sum of the angles of any quadrilateral is 360°.
3. The sum of the angles of any polygon is (n-2)180°.
4. The opposite angles of a parallelogram are always equal.
5. Angle size is preserved in similar figures.
6. Compare area of similar figures.
7. Circles are 360°.
8. Vertical angles are equal.
9. Alternate interior angles are equal.
10. Alternate exterior angles are equal.
11. Corresponding angles are equal.
12. Supplements of the same angle are equal.
13. An exterior angle of a triangle is equal to the sum of the two non-adjacent interior angles.
14. Triangles will tessellate.
15. Diagonals in a parallelogram bisect each other.
16. The diagonal of a parallelogram divides it into two congruent triangles.
17. Explore transformations, reflections, and rotations.

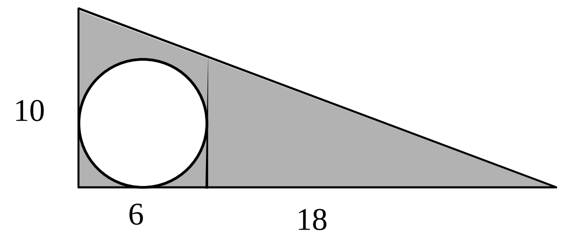
Area Challenge

Name____________________

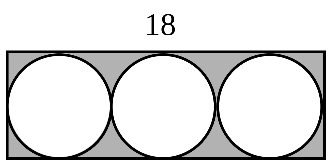
1.



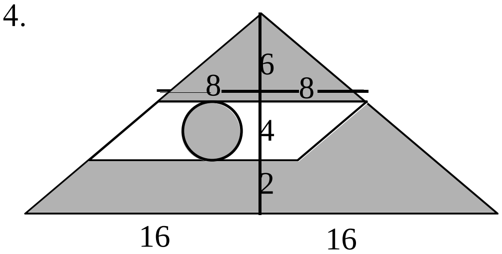
2.



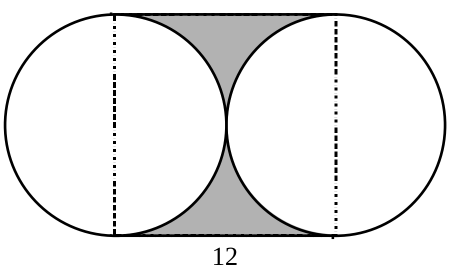
3.



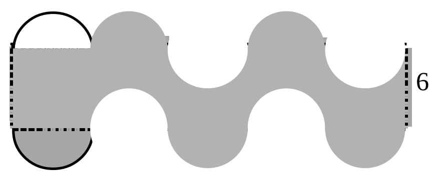
4.



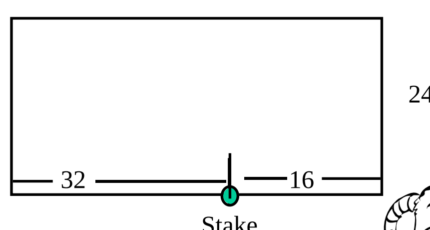
5.



6.



7. A farmer leaves his goat tied to a stake near the wall of his barn which sits in the middle of a large grassy field. The rope is 48 feet long. The goat is free to graze on all the grass he can reach. What is the area of the grass that the goat can reach?



Cooperative Measurement 1

Marcia is sending a package to her brother at camp. The package contains 3 baseballs, 2 mitts, and 1 bat.

How much does one ball weigh?

Cooperative Measurement 1

The total package weighs 6 lb1 oz.

How much does one ball weigh?

Cooperative Measurement 1

The bat weighs 40 oz.

How much does one ball weigh?

Cooperative Measurement 1

Each mitt weighs 1 lb 2 oz.

How much does one ball weigh?

Cooperative Measurement 2

To make punch for a party, Joe pours in 3 qt of pineapple juice.

How much lemonade should they add to the recipe?

Cooperative Measurement 2

The punch also contains 5 pt of cranberry juice.

How much lemonade should they add to the recipe?

Cooperative Measurement 2

The punch has 6 c of peach nectar.

How much lemonade should they add to the recipe?

Cooperative Measurement 2

For the party, 2 gal of punch is needed.

How much lemonade should they add to the recipe?

Cooperative Measurement 3

Jill has 8 paving stones she wants to use in a rectangular area in her garden.

What is the best way to arrange the stones?

Cooperative Measurement 3

The garden plot where the stones will go is 3 yd 4 in long.

What is the best way to arrange the stones?

Cooperative Measurement 3

The garden plot is 7 ft 1 in wide.

What is the best way to arrange the stones?

Cooperative Measurement 3

Each paving stone is a rectangle which is 3.5 ft long and 2 ft 4 in wide.

What is the best way to arrange the stones?

Cooperative Measurement 4

Mrs. Clark has 12 cans in her shopping bag.

How much does a can of tuna weigh?

Cooperative Measurement 4

Each can of beans weighs 485 gm.
The other cans have tuna inside.

How much does a can of tuna weigh?

Cooperative Measurement 4

She has two more cans of tuna than of beans.

How much does a can of tuna weigh?

Cooperative Measurement 4

The total weight of the cans in the bag is 4 kg.

How much does a can of tuna weigh?

Cooperative Measurement 5

A postage stamp has a perimeter of 11cm.

What is the area of the stamp in sq cm?

Cooperative Measurement 5

The width of the stamp is 24 mm.

What is the area of the stamp in sq cm?

Cooperative Measurement 5

The stamp has a rectangular shape.

What is the area of the stamp in sq cm?

Cooperative Measurement 5

The length of the stamp is .7cm more than the width of the stamp.

What is the area of the stamp in sq cm?

Cooperative Measurement 6

A flower garden is shaped like a parallelogram. The shorter side of the garden measure is 16 ft.

How many roses can be planted in this flower garden?

Cooperative Measurement 6

The perpendicular distance between the two longer parallel sides is 5 yd.

How many roses can be planted in this flower garden?

Cooperative Measurement 6

Each rose bush needs a sq yd of ground to grow in.

How many roses can be planted in this flower garden?

Cooperative Measurement 6

The remaining sides of the garden are 2 ft longer than the shorter sides.

How many roses can be planted in this flower garden?

Cooperative Measurement 7

Jill is making a pennant full of stars for her club. The shape will be a right triangle.

What is the maximum number of stars that can go on the flag?

Cooperative Measurement 7

The height of the flag will be 15 inches.

What is the maximum number of stars that can go on the flag?

Cooperative Measurement 7

The length of the flag will be 1.5 feet.

What is the maximum number of stars that can go on the flag?

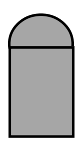
Cooperative Measurement 7

Each star needs 2 square inches of background.

What is the maximum number of stars that can go on the flag?

Cooperative Measurement 8

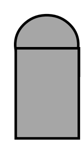
A window is made with a semicircle on top of a rectangle.



What is the minimum number of panes of glass that will be needed to fill this window?

Cooperative Measurement 8

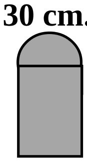
The rectangle is 1 meter tall.



What is the minimum number of panes of glass that will be needed to fill this window?

Cooperative Measurement 8

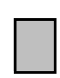
The radius of the semicircle is 30 cm.



What is the minimum number of panes of glass that will be needed to fill this window?

Cooperative Measurement 8

One pane of stained glass will fill 240 square cm.



What is the minimum number of panes of glass that will be needed to fill this window?

Cooperative Measurement 9

A parking lot is shaped like a rectangle. It is 50 yd long.

What is the greatest number of cars that could fit into the lot?

Cooperative Measurement 9

The perimeter of the parking lot is 180 yd.

What is the greatest number of cars that could fit into the lot?

Cooperative Measurement 9

The area of a parking space is 75 sq ft.

What is the greatest number of cars that could fit into the lot?

Cooperative Measurement 9

The width of the parking is 10 yd less than the length of the lot.

What is the greatest number of cars that could fit into the lot?

Cooperative Measurement 10

A fish tank has a hexagonal base. The length of each side around the base is 20 cm.

How many fish can Joe put in the tank?

Cooperative Measurement 10

The distance from the midpoint of each side to the center of the base is about 173 mm.

How many fish can Joe put in the tank?

Cooperative Measurement 10

The water in the tank will be filled to a depth of 0.4 m.

How many fish can Joe put in the tank?

Cooperative Measurement 10

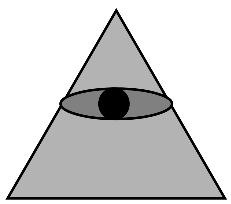
The fish Joe wants to put in this tank require about 1 L of water each to have enough room.

How many fish can Joe put in the tank?

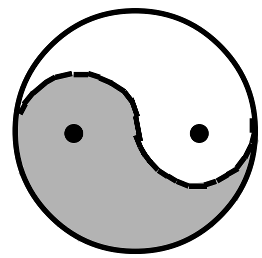
Name____Date________

Geometry – Ancient and Modern

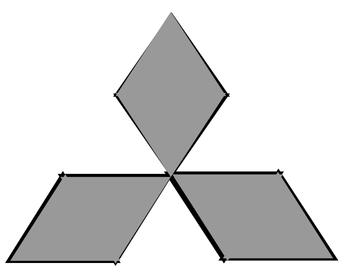
Can you find ways to construct these designs using only compass and straight edge?



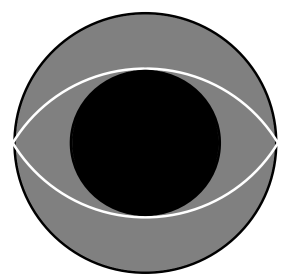
Eye of God - Egypt



Yin Yang - China



Mitsubishi - Japan



CBS - USA

Can you find other logos that can be constructed with compass and straight edge?

Design a logo of your own for your middle school team.

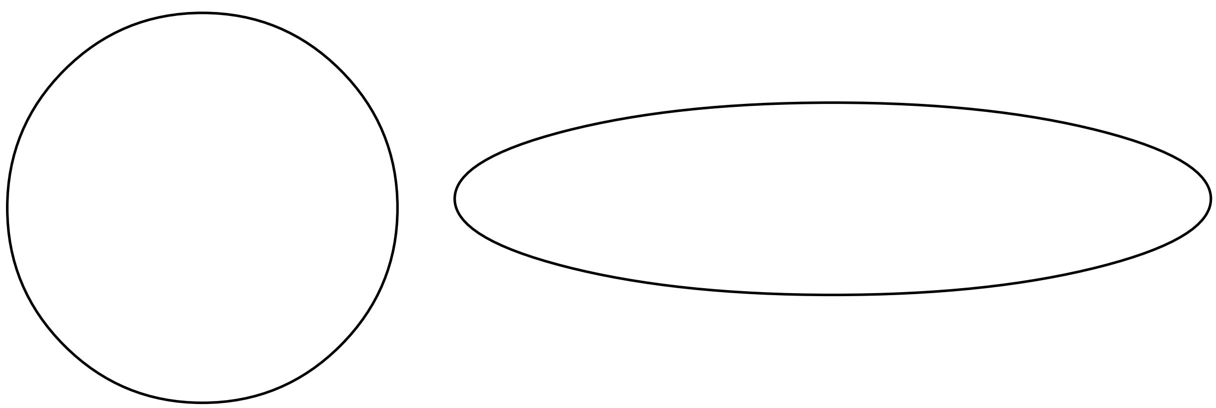
Name____**Date**_________

Cook's Trick Extension

Darryl's restaurants have been serving some salads and other dishes on very long, elliptical plates. Customers can hardly believe their eyes when the dish arrives. It looks much larger than an entrée served on a normal sized dinner plate.

If the normal plate has a 12 inch diameter, what is the area of the plate?

The formula for the area of an ellipse is $\frac{1}{2}$ **AB** where **A** is half of the major axis (long "diameter")
and **B** is half of minor axis the (shorter "diameter").
If the oval plate has a "width" of six inches, how "long" would it have to be to have the same area as the circular plate?

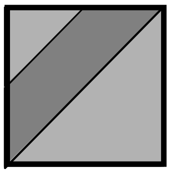


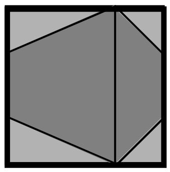
If the elliptical plate is 18 inches long and 5 inches wide, and the dinner plate has a diameter of 12 inches, which plate holds more? What is the percent of increase/decrease in the area? (Use the round plate as the basis for this comparison.)

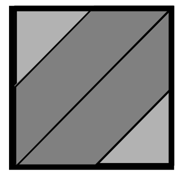
Name____Date________

Symmetry Challenge Extension

Use the quilt block patterns shown to create a quilt with four lines of symmetry. The quilt should have 81 blocks with 9 across and 9 down.

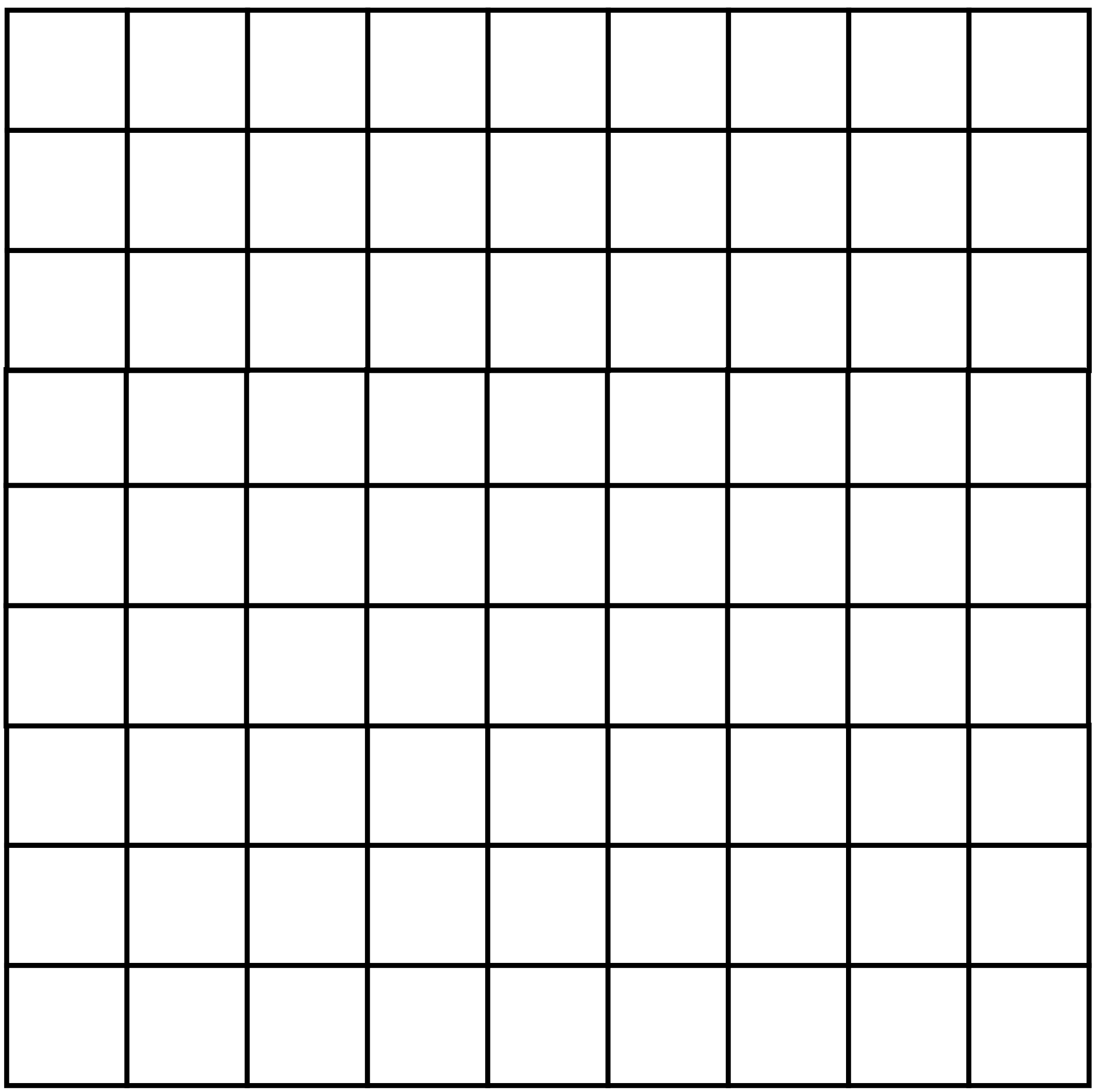






Use only one of these

Design your own blocks to make a new quilt. What restrictions are there on the blocks you use if you want to end up with four lines of symmetry?



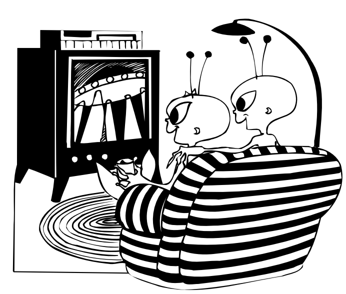
Name____Date________

Television Screens

Find whole number values for the length and height which would give the diagonal screen size indicated (round to the nearest inch). Would these shapes be practical for TV screens?

Size of Screen	Length	Height	Practical?
19"			
19"			
19"			
19"			
20"			
20"			
20"			
20"			
26"			
26"			
26"			
26"			
26"			

Explain how you determined “practical".



Name____Date________

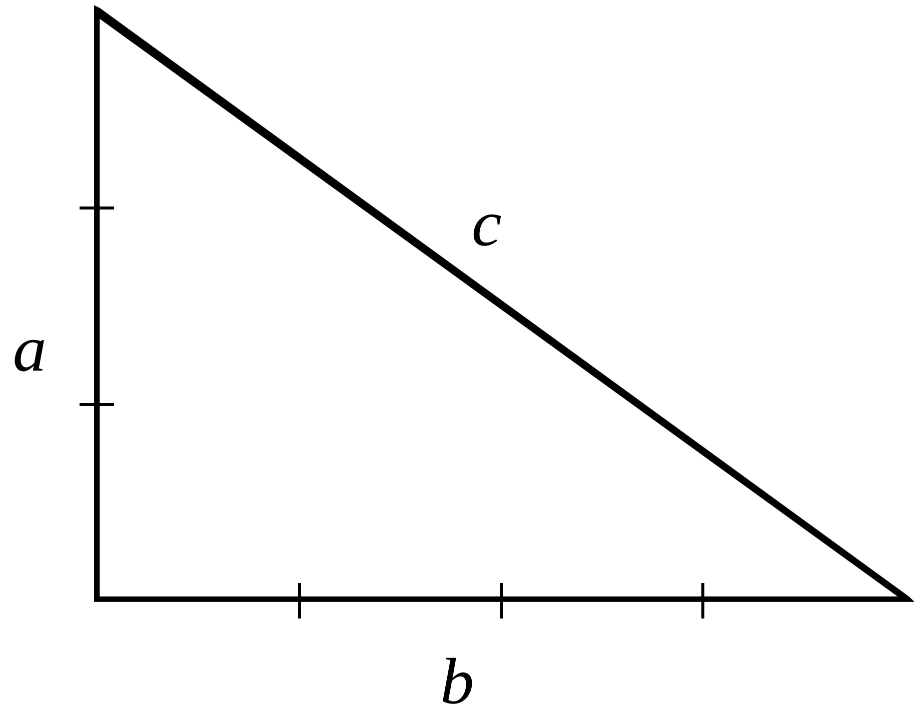
Centimeter Grid Paper

Name____Date________

Pythagorean Theorem with Tiles

Materials needed: square tiles, centimeter paper, scissors
Record your results in the table below.

Procedure: Build squares along the sides of the triangle shown below. One square will have side length *a*, one *b*, and one *c*.



Legs		**Hypotenuse**	**Area of Squares**		
a	***b***	***c***	a^2	b^2	c^2
3	**4**	________	____	____	____

Make other triangles with grid paper and complete the chart below.

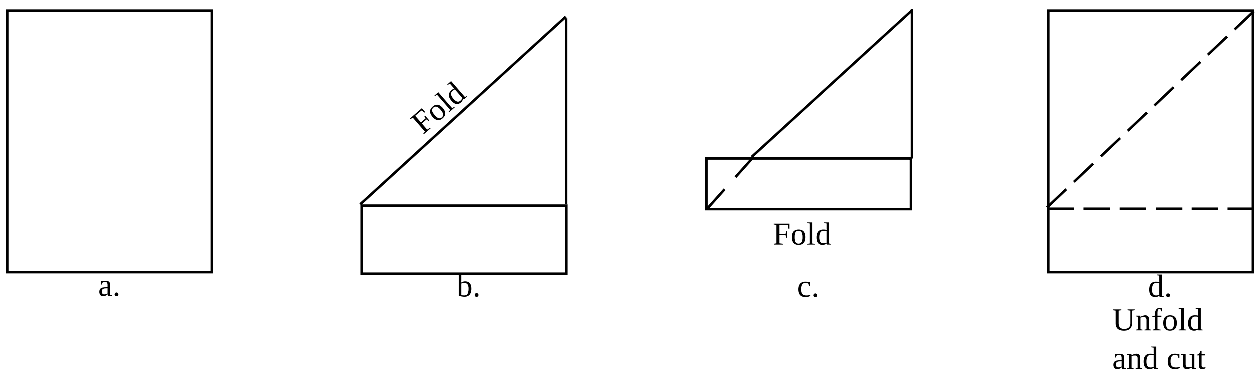
6	**8**	________	____	____	____
5	**12**	________	____	____	____
8	**15**	________	____	____	____

What pattern do you see?

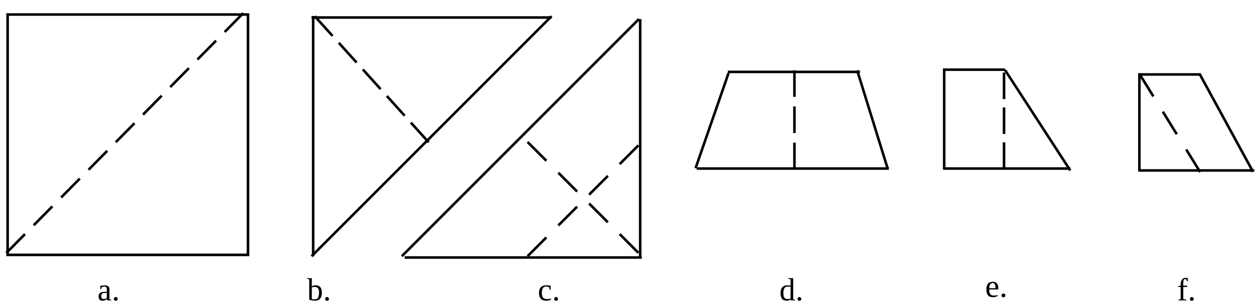
Name____Date________

Pythagoras with Tangram Pieces

First make a square from a rectangle. Give each student a rectangular piece of paper. Fold and cut as follows:



Now use the square to make a set of tangram pieces. Cut and fold as instructed below:



a. Fold square into two large congruent triangles. Cut apart on the fold.

b. Fold both large triangles into two right triangles. Cut one of them on the fold and set these two pieces aside.

c. Fold the second large triangle so that the right angle corner touches the midpoint of the base. Unfold and cut the triangle from the trapezoid. Set the triangle aside.

d. Cut the trapezoid in half (on the fold).

e. Fold one of the quadrilaterals into a square and a right triangle. Cut apart and set these pieces aside.

f. Fold the remaining quadrilateral into a parallelogram and a right triangle. Cut along the fold to complete the set.

Name____**Date**________

THE AMAZING PYTHAGORAS

Needed: Centimeter ruler

Pythagoras was a Greek mathematician who lived about 2500 years ago. He made many mathematical discoveries. One of his most famous discoveries was about certain kinds of triangles.

Triangle	a	b	c	a^2	b^2	c^2
A						
B						
C						
D						
E						
F						
G						
H						
I						

Study the triangles on the next page. Triangles A, B, E, F, G, and I are particular kinds of triangles. Draw another triangle that also fits this category.

Place a check in front of the 6 letters in the table that represent right triangles.

1. Measure the sides of each triangle to the nearest half-centimeter. Place your measurements in the left part of the table.

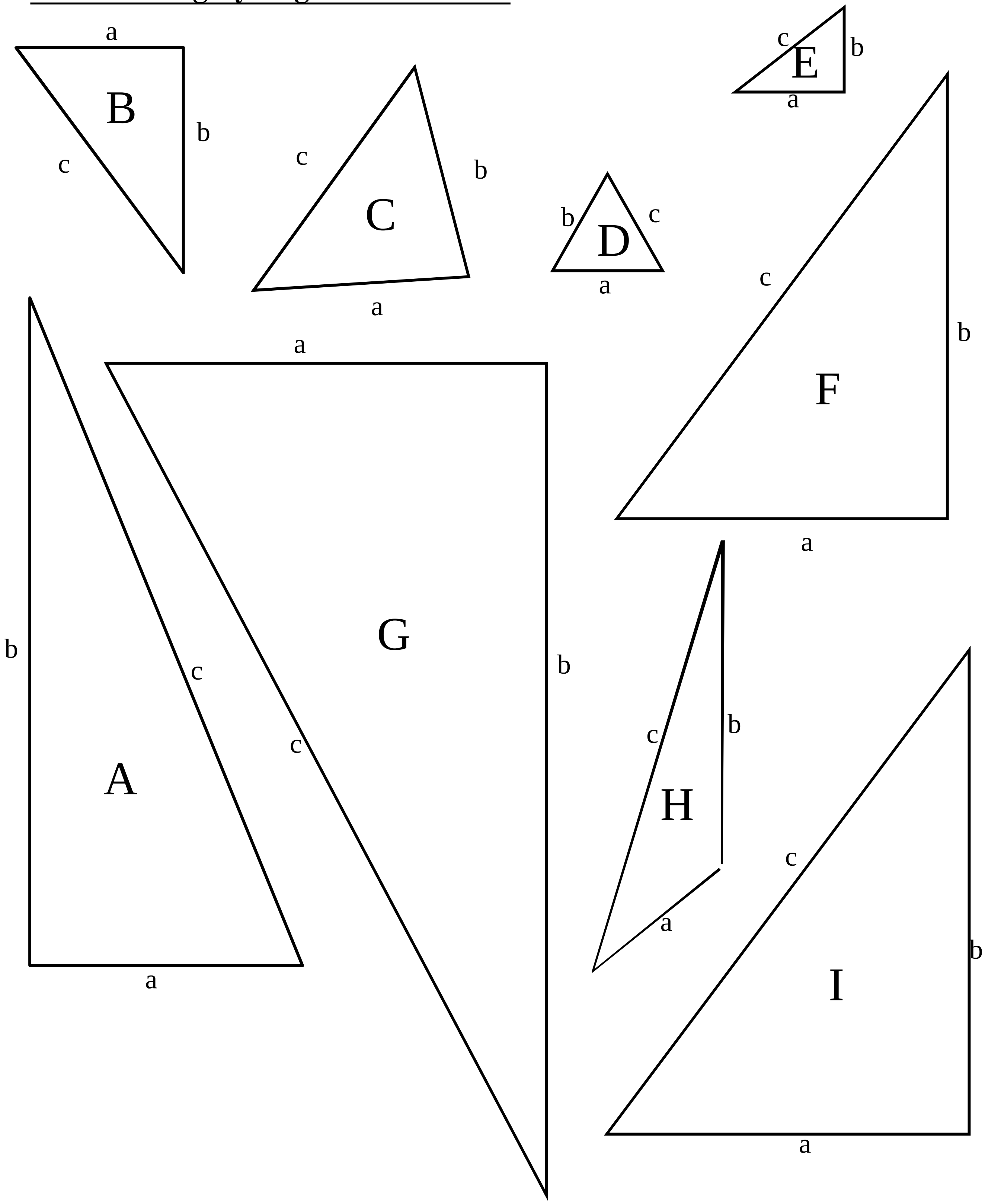
2. Make the computations necessary to complete the right side of the table.

3. Study the results in the right side of the table. Look closely at the numbers that correspond with the right triangle. Write about any observations you've made.

4. Do you think a 9x10x11 cm triangle is a right triangle? First make a prediction. Then check your prediction by making a drawing.

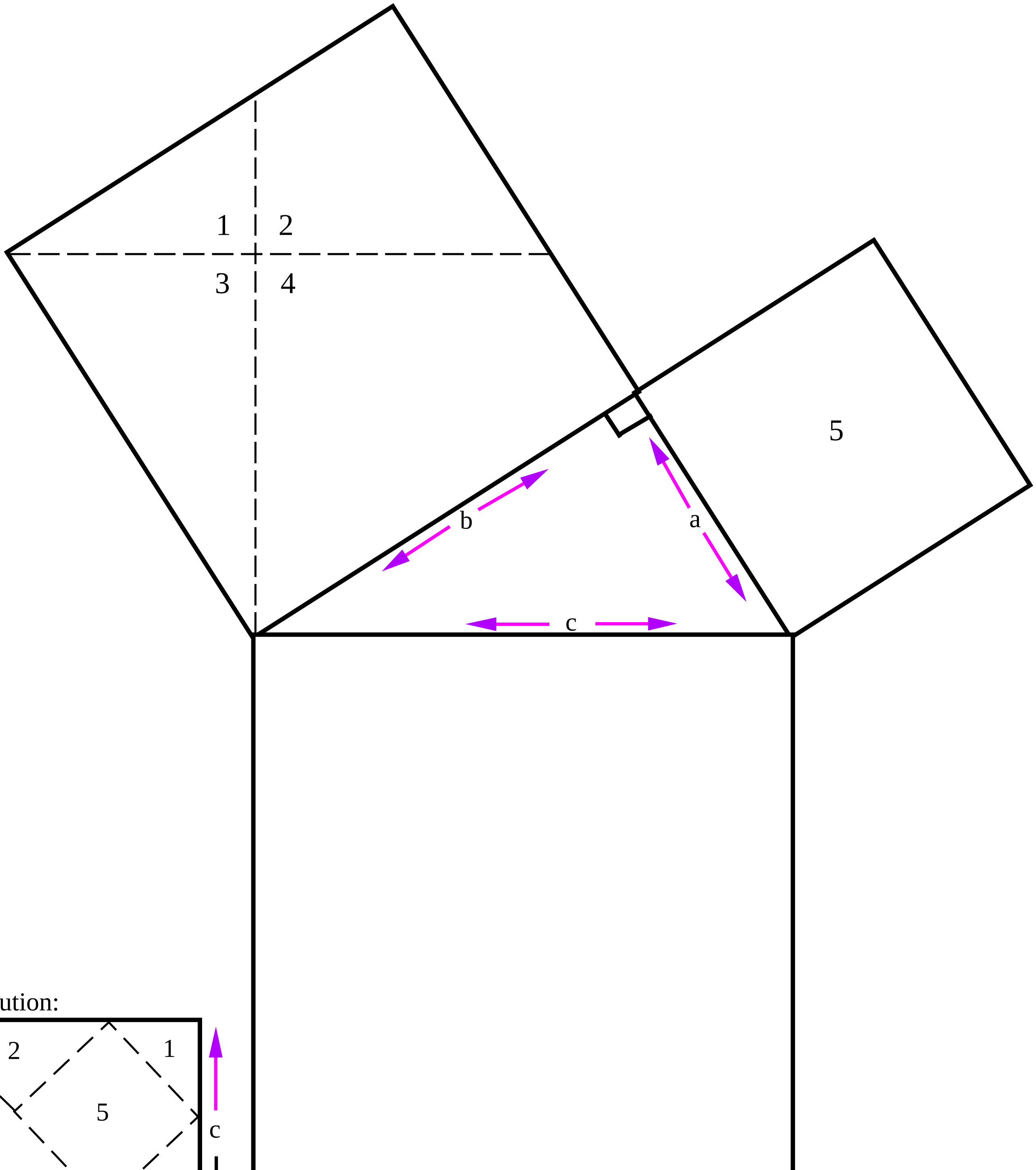
5. Is a 9x12x15 cm triangle a right triangle? First make a prediction. Then check your prediction by making a drawing.

The Amazing Pythagoras continued

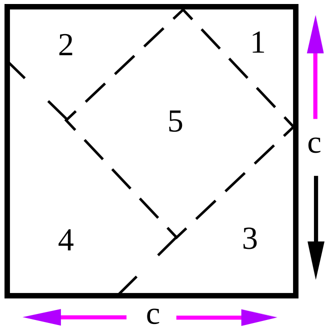


Name____**Date**________

CUT AND TAPE PROOF OF THE PYTHAGOREAN THEOREM



Solution:



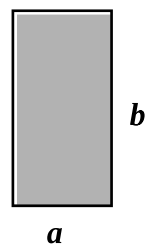
Name____**Date**________

Pythagorean Construction - A

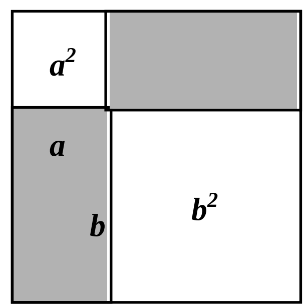
Materials needed: Centimeter grid paper and scissors

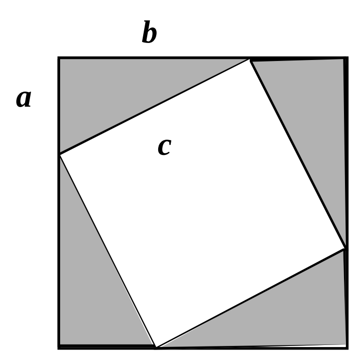
Procedure:

1. Cut two congruent rectangles of any size from your grid paper. Let ***a*** represent the length of the shorter side of the rectangle, and ***b*** represent the length of the longer side.



2. Now cut out a square that has each side equal to the length ***a***+***b***. Arrange the rectangles on the square as shown in this diagram.
   What is the area of each of the two smaller squares?
   Denote these with a^2 and b^2.



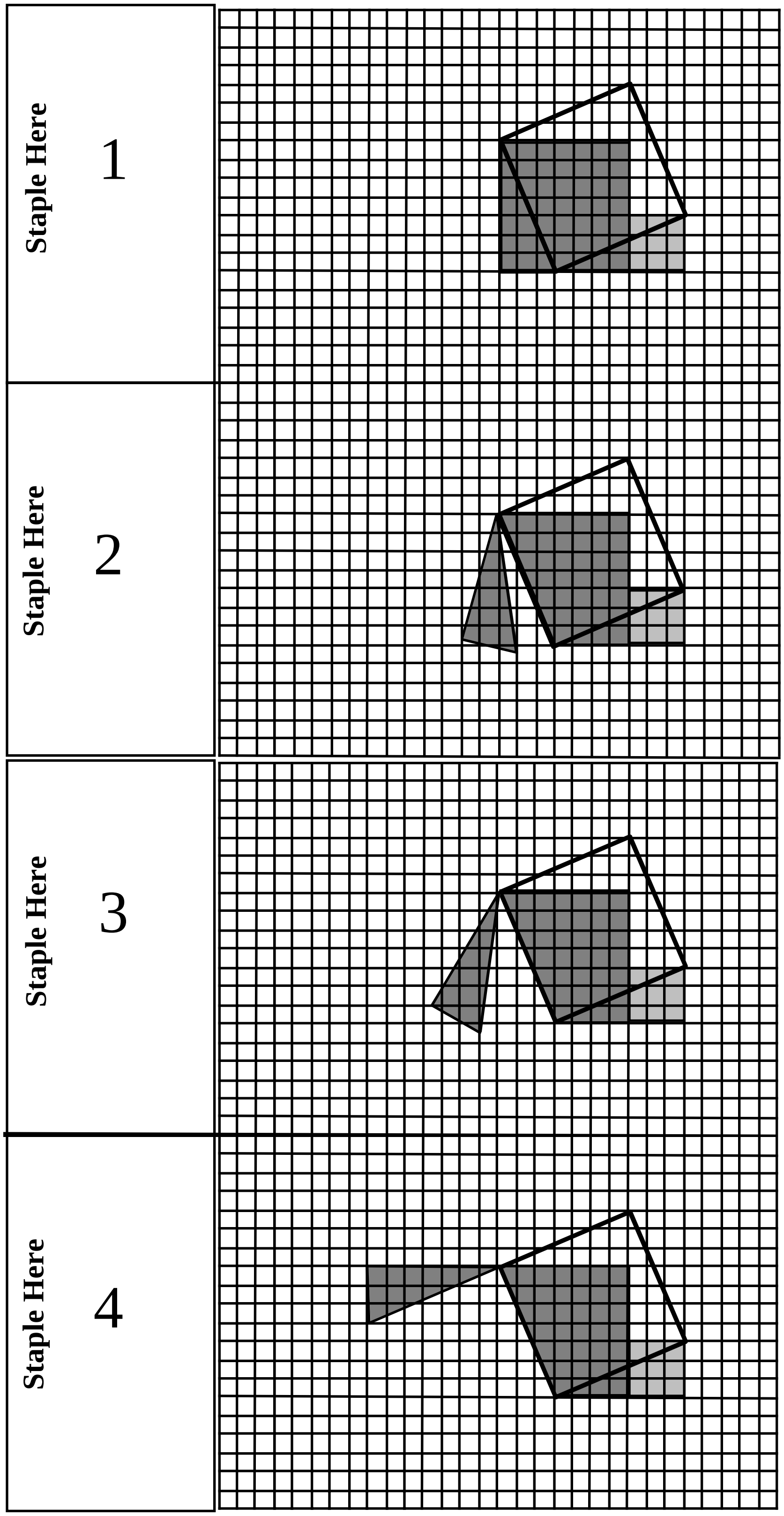


3. Now cut each rectangle diagonally into two right triangles. Let ***c*** represent the length of the hypotenuse of each of these triangles.
   Arrange the triangles as shown here.

   Why must it be true that $a^2 + b^2 = c^2$?

Pythagorean Theorem Flip Book

Have students cut out the following diagrams and staple them into a flip book. The resulting animation is a proof of the Pythagorean Theorem.

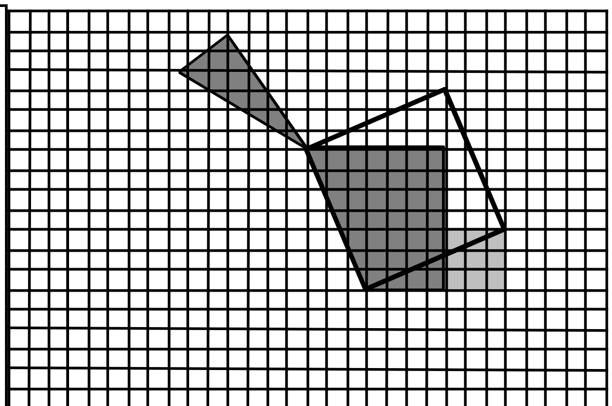


Pythagorean Theorem Flip Book

Have students cut out the following diagrams and staple them into a flip book. The resulting animation is a proof of the Pythagorean Theorem.

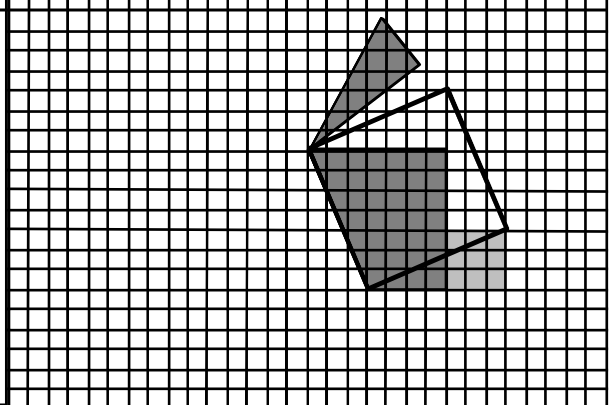
Staple Here

5



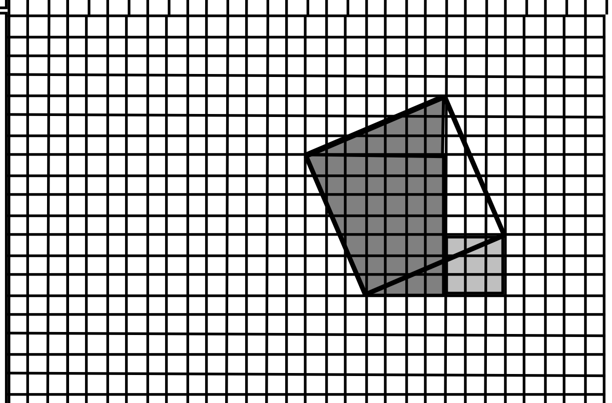
Staple Here

6



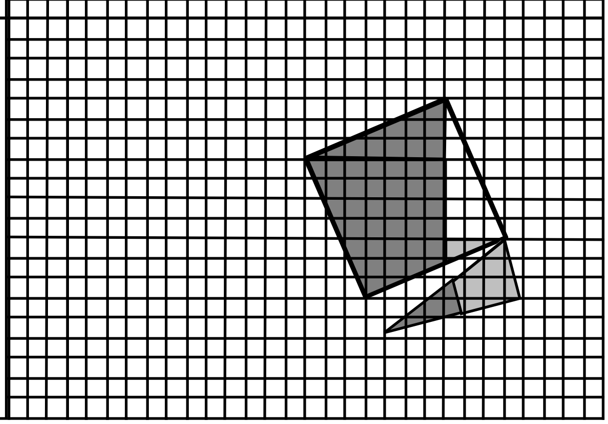
Staple Here

7



Staple Here

8



Pythagorean Theorem Flip Book

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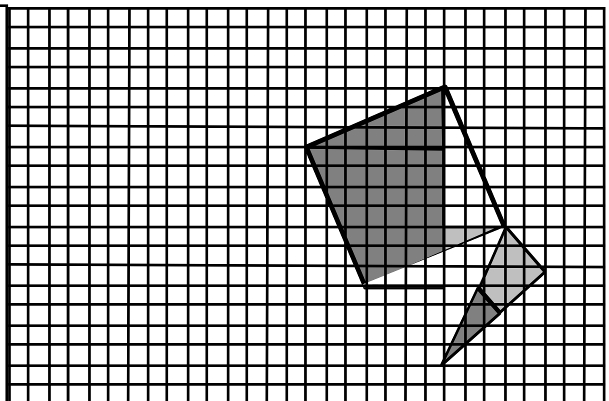
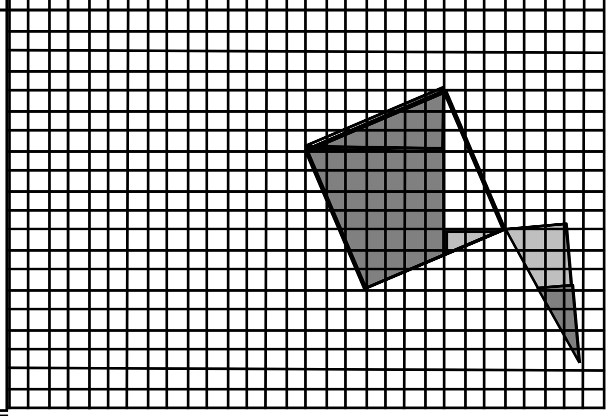
Staple Here

9



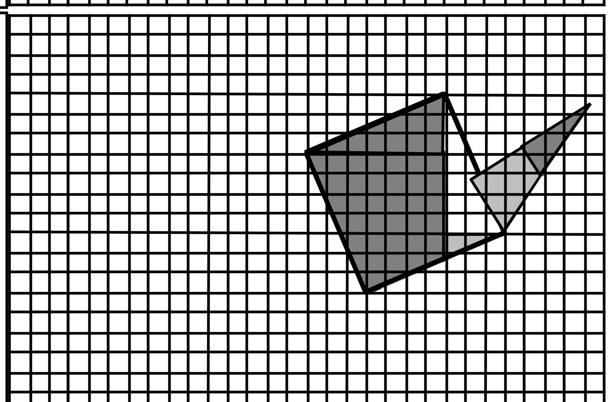
Staple Here

10



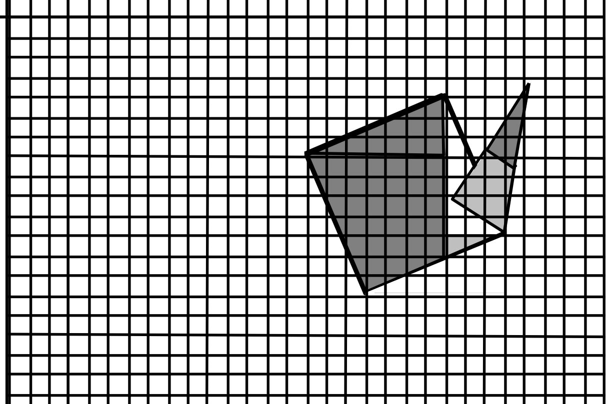
Staple Here

11



Staple Here

12



Pythagorean Theorem Flip Book

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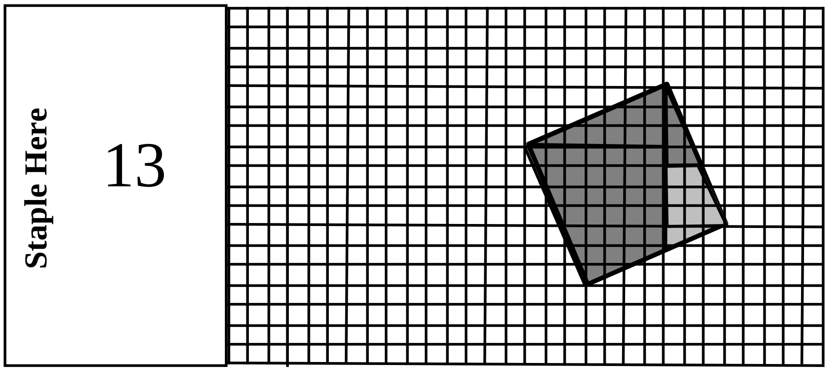
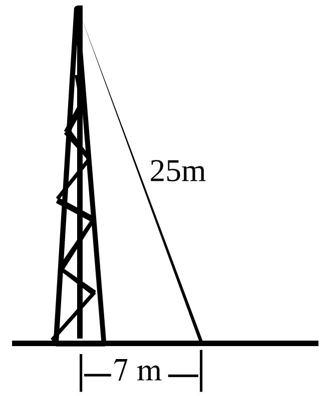


Name____Date________

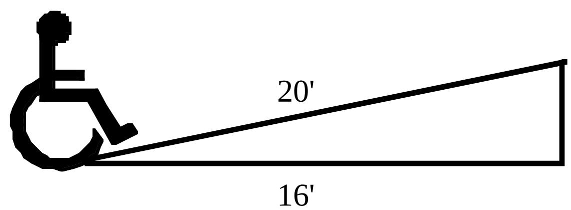
Real World Pythagoras



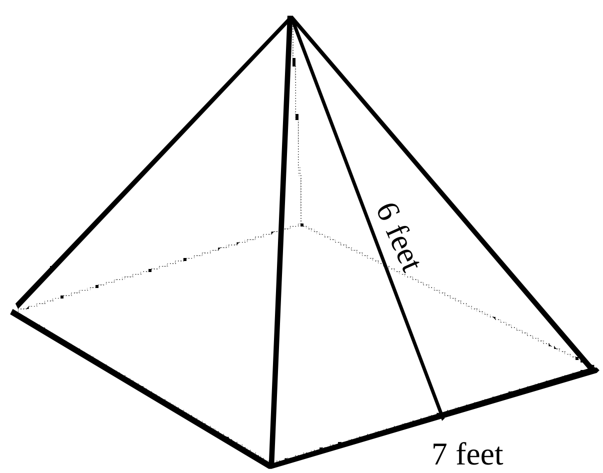
1. A guy wire is 25 m long. It is attached to an anchor on the ground 7 meters from the base of the TV tower. How tall is the tower?

2. John left his campsite to go on a hike. He plans to keep in touch with his father by a walky-talky system which has a range of 5 miles. John walks 4.3 miles north and then 2.4 miles east. Will he be able to talk to his father?

3. A ramp is designed to help individuals in wheelchairs move from one level to another. What is the height of the ramp?



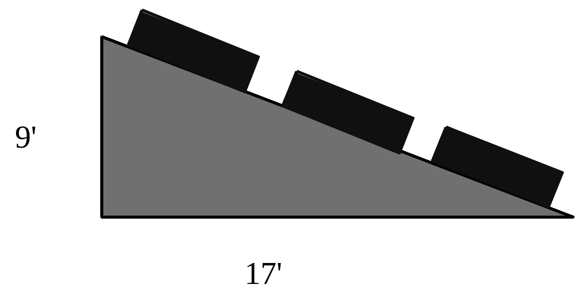
4. Mark is building a pyramid with a square base. Each side of the base is 7 feet long. The isosceles triangles that make the sides of the pyramid have an altitude of 6 feet. If Mark is 5′ 3″ tall, can he stand up in the pyramid?



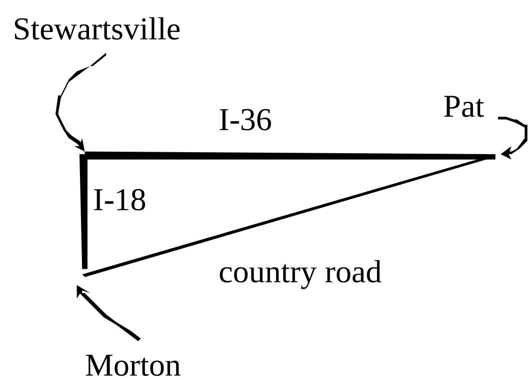
Name____Date________

Real World Pythagoras

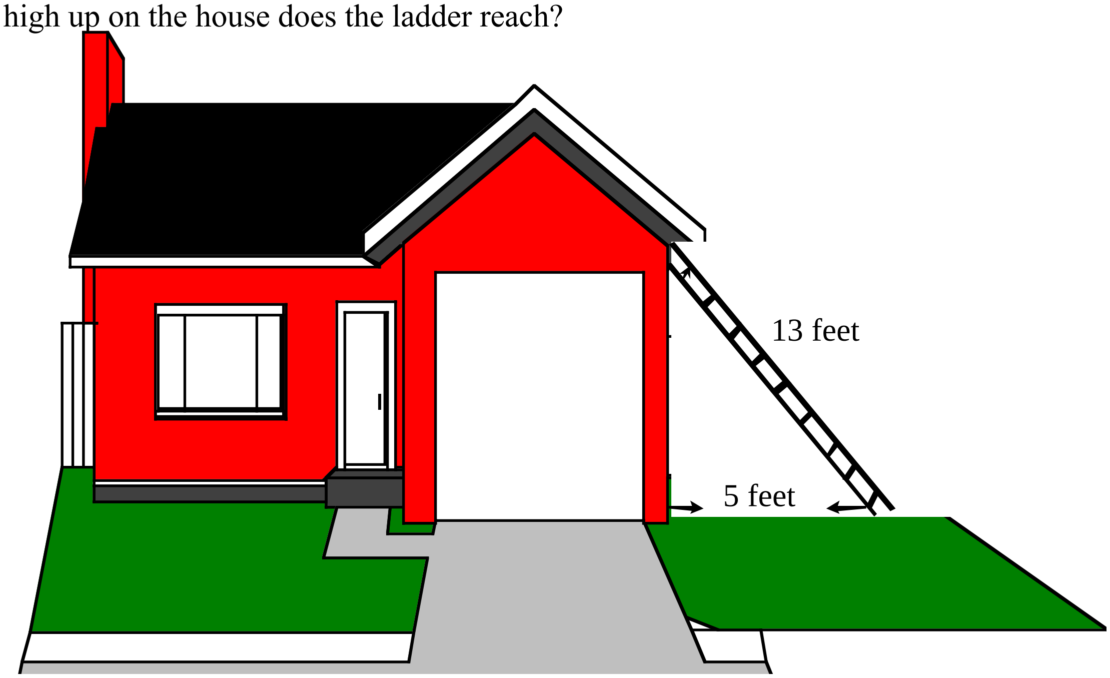
5. A conveyor belt moves boxes up this ramp. If the ramp has the dimensions shown, how far do the boxes move along the belt?



6. Pat believes that Interstate 36 makes a right angle with Interstate 18 in Stewartsville. She is traveling along I-36 and plans to get on I-18 in Stewartsville and then travel down I-18 to Morton. She is now 38 miles from Stewartsville. Morton is another 15 miles from Stewartsville. Pat has found a country road going from her present location straight to Morton. If she gets off the interstate, how many miles will she save?



7. How high up on the house does the ladder reach?



Name____**Date**_________

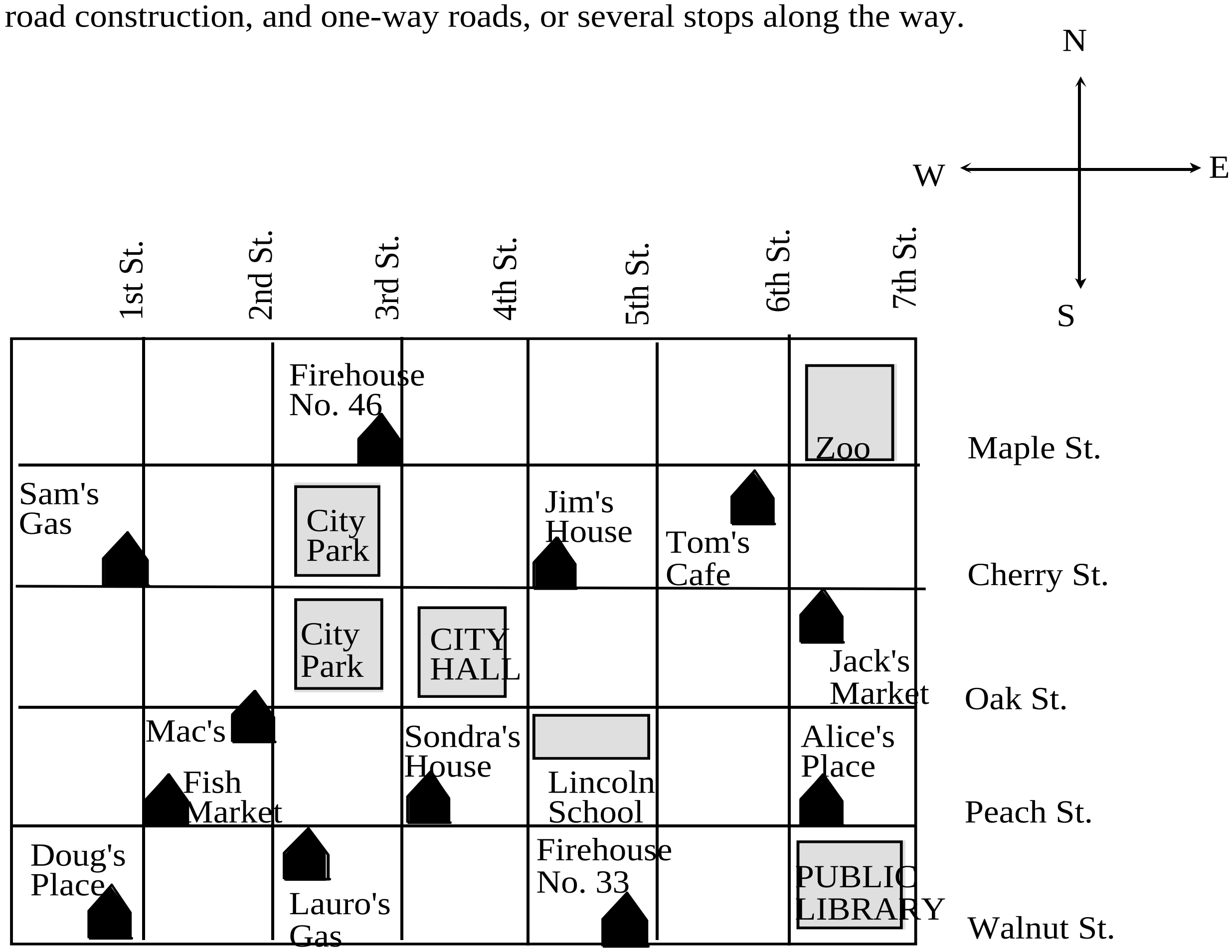
Taxi Cab Geometry and City Maps

1. Joe is at the intersection of Walnut and Third St. If he takes a passenger to Alice's place, what is his road distance? What is the direct distance (as the crow flies)?

2. Firehouse No. 46 responds to a fire at Jack's Market. What is the road distance? What is the direct distance?

3. Jim needs a ride from his house to the public library. Find the best route and the direct distance.

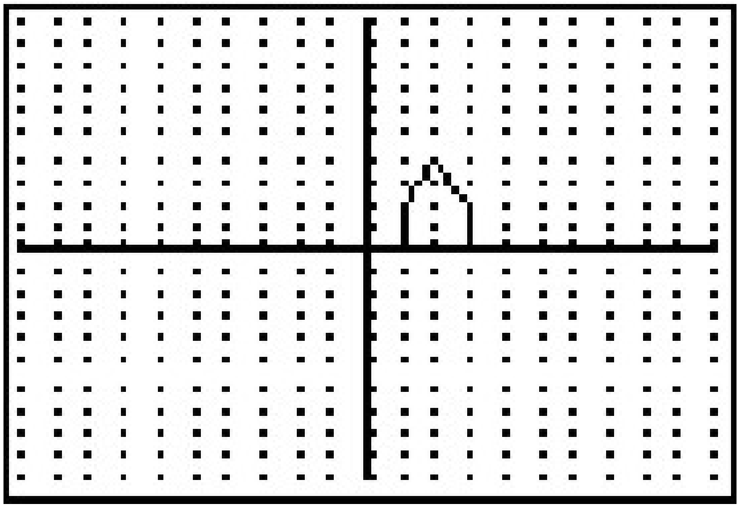
4. Make up a problem for someone else to solve. You may want to include road construction, and one-way roads, or several stops along the way.



The figures on the map are located near corners where passengers might leave and arrive.

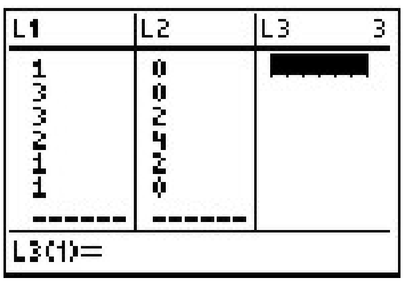
Extension: Doug needs to get to the zoo. He will walk only north and east. How many different routes are there?

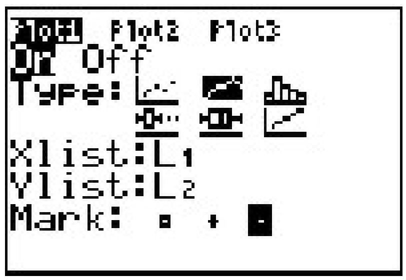
Name____Date________

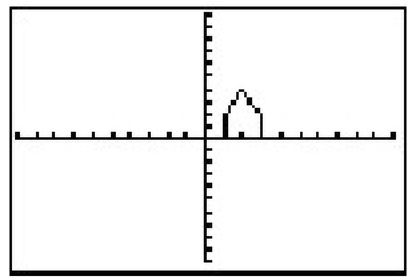


House Hunting

Teacher notes:

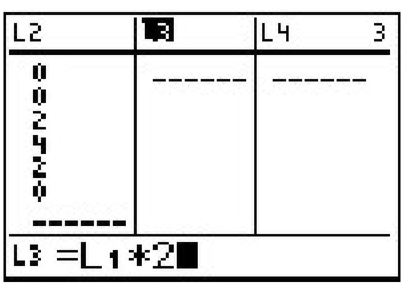


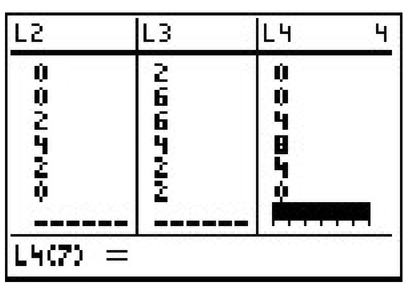


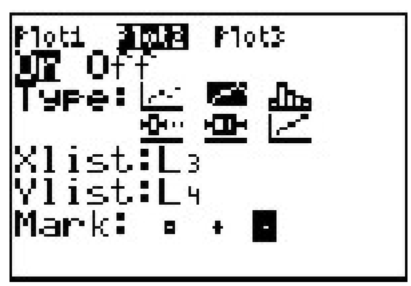


To get the grid on the screen, 2nd FORMAT (above ZOOM), cursor to GridOn, ENTER.

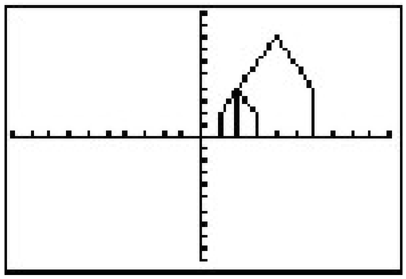
To make a dilation of double the size of the house, cursor to the top of L3 and multiplying L1 times 2. (L1 is above the 1 key.) Cursor to the top of L4 and enter L2*2. . Turn on a second STAT PLOT and graph the new house.

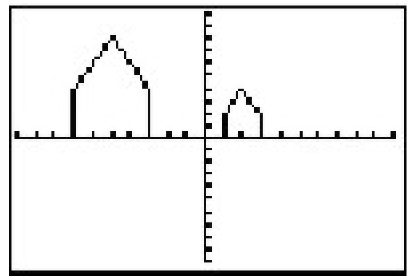






Move the larger house to Quadrant II by subtracting 9 from elements in L3. This can be done by cursoring to the top of L3 and entering L3-9, ENTER





TEACHER INFORMATION:
It is preferable that the teacher collect real data from the current classroom.

However, a set of data that was collected from a high school Algebra II class is given. The teacher should explore both LINREG and MED-MED lines on the graphics calculator.

With this data, the **LINREG linear regression** is <u>not</u> a good model because the outlier point (120, 35) has too much effect on it. This can be determined by viewing the line through the data and examining predicted grades when one studies 0 minutes, 15 minutes, 30 minutes, 45 minutes, and 60 minutes. The correlation coefficient should also be noted.

A better alternative is the **Median-Median line**, option #3, on the TI graphics calculator. Basically, this line is not affected by outliers because the data is organized in three groups and the median of the x-coordinates and the median of the y-coordinates is computed and used to determine the best fit line. Find this line and graph it through the data. Use the table value to make predictions.

Time studied (Minutes)	Grade / Chapter Test
20	72
0	64
30	70
60	81
30	60
30	58
0	51
0	88
30	61
0	55
25	46
10	51
20	67
0	49
60	54
15	73
32	88
18	69
25	43
0	54
30	95
90	100
50	90
15	65
120	35

CONCLUSION: If the class has said that studying for 30 minutes for a test is sufficient, does this data help convince them that more time on task is needed?