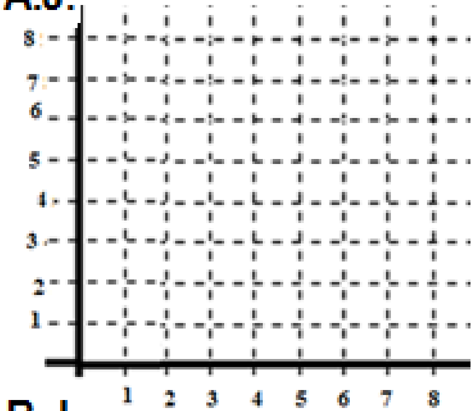
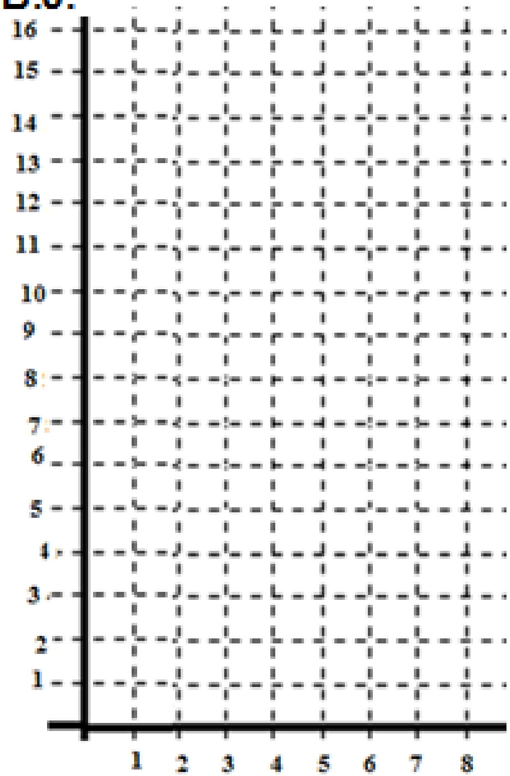
Marilyn Dibble's Similar Mouse Family -- Complete the table by following the rule below each mouse name. For example, for B.J. the rule is (x, 2x) so the x coordinate stays the same, but the y coordinate is multiplied by 2. Plot the points from the coordinates of each mouse, connecting each point to the previous one as you plot them. Finally connect the last point with the first point, add 2 eyes, a smile and a curved line in each ear. Identify which ones are members of A.J.'s family. (Hint: A.J.'s family members are all similar.)

A.J.	B.J.	C.J.	D.J.	E.J.
(x, y)	$(x, 2y)$	$(\frac{1}{2}x, \frac{1}{2}y)$	$(2x, 2y)$	$(2x, y)$
(1, 1)	(1, 2)	$(\frac{1}{2}, \frac{1}{2})$	(2, 2)	(2, 1)
(1, 3)				
(2, 3)	(2, 6)	(1, 1.5)	(4, 6)	(4, 3)
(3, 5)				
(2, 5)				
(1, 7)				
(2, 8)				
(3, 7)				
(6, 7)				
(7, 8)				
(8, 7)				
(7, 5)				
(6, 5)				
(7, 3)				
(8, 3)				
(8, 1)				

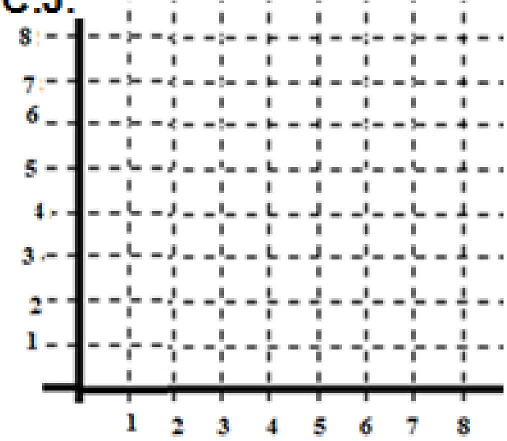
A.J.



B.J.



C.J.



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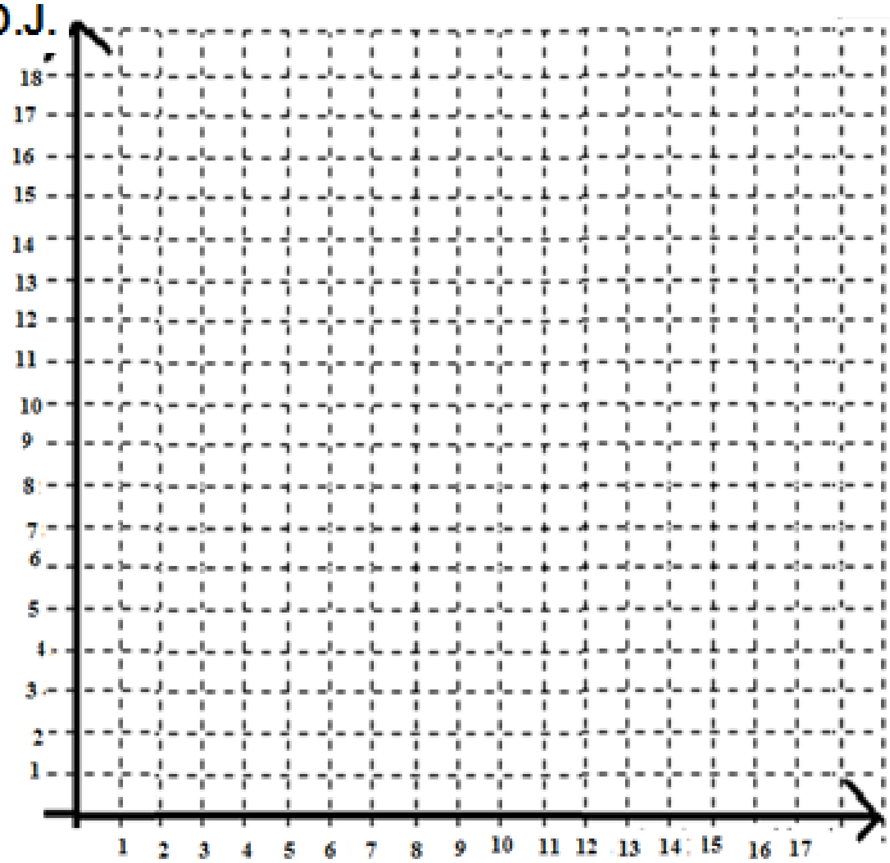
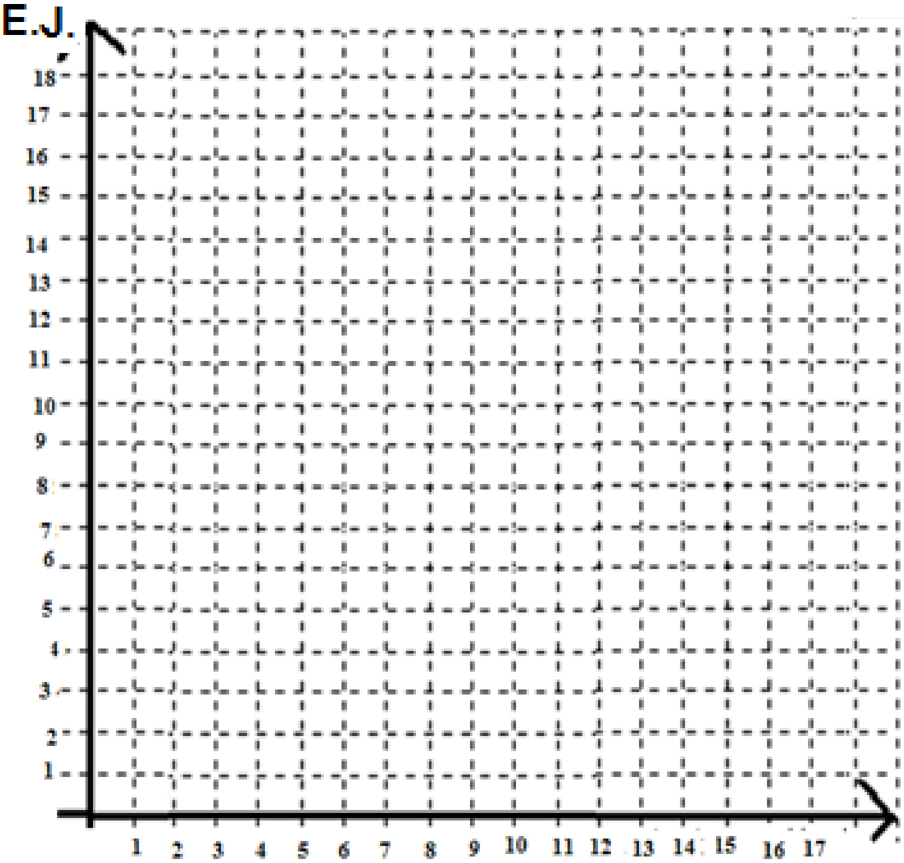
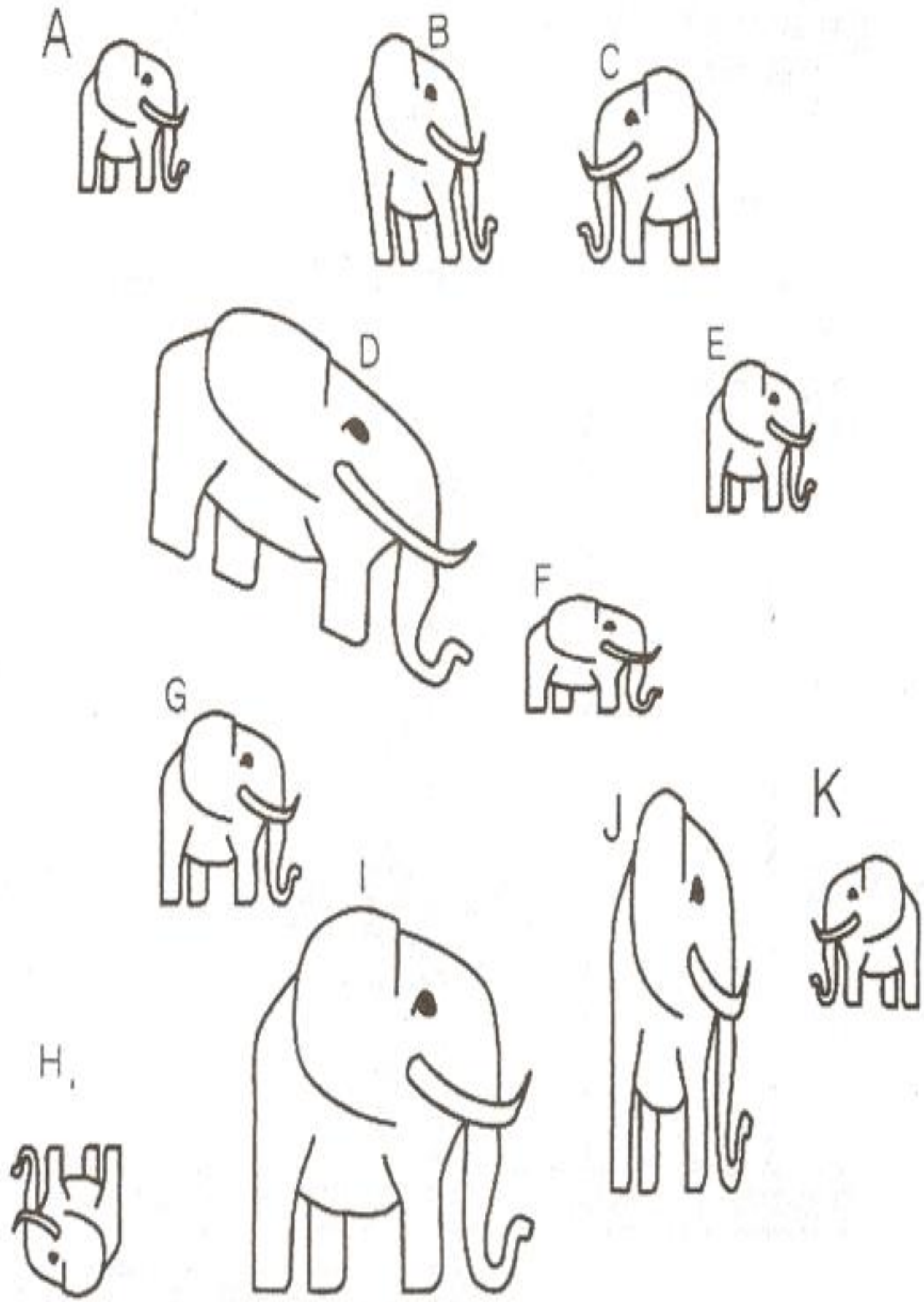


E.J.



Comparing elephants

How does each elephant compare to Elephant A?



B.________________

C.________________

D.________________

E.________________

F.________________

G.________________

H.________________

I.________________

J.________________

K.________________

*From NCTM publication…*Navigating through Geometry in Grades 6–8

Appendix 1

Self-Reflection: Frayer Model

A Frayer model is a visual organizer for key words and concepts.
Students can benefit from creating Frayer models using their own pictures, numbers, and words.
For more information on Frayer models download:
Think Literacy: Subject-Specific Examples Mathematics Grades 7-9
http://www.edu.gov.on.ca/eng/studentsuccess/thinkliteracy/library.html#subjects

Proportional Reasoning

Definition

Proportional reasoning involves the deliberate use of multiplicative relationships to compare quantities and to predict the values of one quantity based on the values of another.

It is assumed that proportional reasoning involves conceptual and not just procedural thinking.

Facts/Characteristics

- thinking about quantities and change
- comparing using multiplication/division
- using the same "whole" for comparing fractions
- using rational numbers
- thinking about multiplicative relationships
- partitioning
- unitizing
- making sense of ratios
- using relative thinking (as opposed to absolute thinking)

Examples

Thinking about ...

- skip counting
- side lengths in similar triangles
- scale factors
- rates, unit rates, interest rates
- solving proportions
- linear relationships that have direct variation

Reasoning that ...

- if a car is traveling at a rate of 90 km/h, it will take 2.5 h to travel 225 km
- $\frac{18}{37}$ is a bit less than $\frac{1}{2}$ because 18 is a bit less than half of 37
- an increase from 1 to 5 is more significant than an increase from 96 to 106 because the percent increase is much more substantial
- if $y = 3x + 2$ and I multiply an x value by 100 then the y value is almost, but not quite, also multiplied by 100

x	20	30	40	...	200	300	400
y	62	92	122		602	902	1202

($y = 3x + 2$ is pretty much the same as $y = 3x$ when x is big). When you realize that if you multiply x by 100, you almost, but not quite, multiply y by 100, you are using proportional reasoning.

Non-Examples

One container has 2 cups of water with 6 tsp. of sugar. Another container has 4 cups of water with 10 tsp. of sugar. Non-proportional thinking would say the second liquid is sweeter because it has more sugar.

When someone thinks that doubling the length and width of a rectangle doubles the area, it is non-proportional thinking.

$y = 2x + 3$ is not a proportional relationship (but for large values of x it is close to $y = 2x$ which is a proportional relationship commonly referred to as direct variation).

Adapted from Marilyn Dibble's I have who has cards

6	24
Where is the answer to $\frac{8}{16} = \frac{12}{w}$	Where is the answer to $\frac{2.8}{n} = \frac{5.6}{24}$
8	2
Where is the answer to $\frac{c}{7} = \frac{10}{35}$	Where is the answer to $\frac{12}{4} = \frac{4.5}{D}$

1.5

Where is
the answer to

$$\frac{30}{40} = \frac{x}{2.4}$$

1.8

Where is
the answer to

$$\frac{x}{32} = \frac{12}{8}$$

7

Where is
the answer to

$$\frac{24}{15} = \frac{4}{Q}$$

2.5

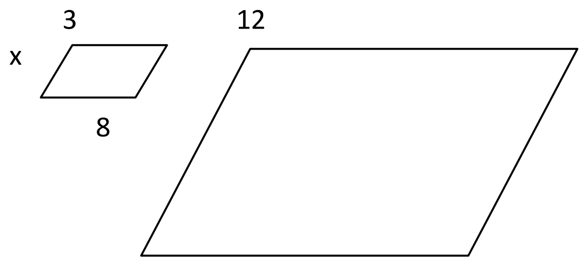
Where is
the answer to

$$\frac{9}{36} = \frac{B}{14}$$

48	**5**
Where is the answer to $\frac{2.5}{L} = \frac{10}{20}$	**Where is the answer to** $\frac{18}{6} = \frac{21}{P}$
3.5	**16**
Where is the answer to $\frac{4}{8} = \frac{8}{t}$	**Where is the answer to** $\frac{27}{54} = \frac{u}{13.5}$

Marilyn Dibble's similar figures cards

1)



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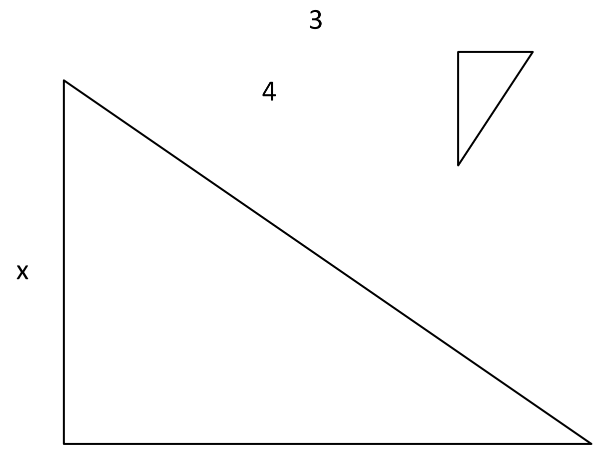

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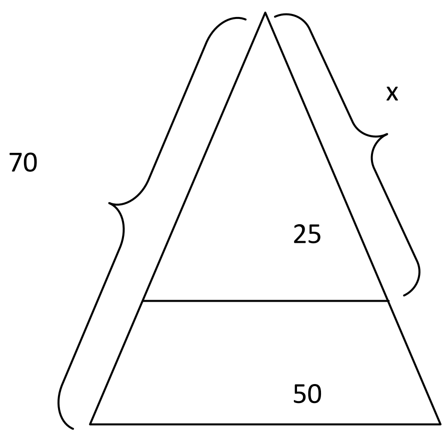

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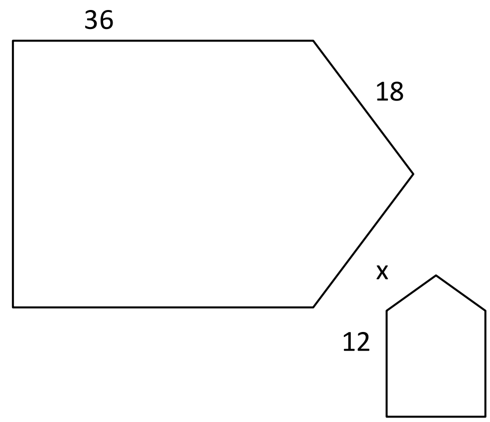

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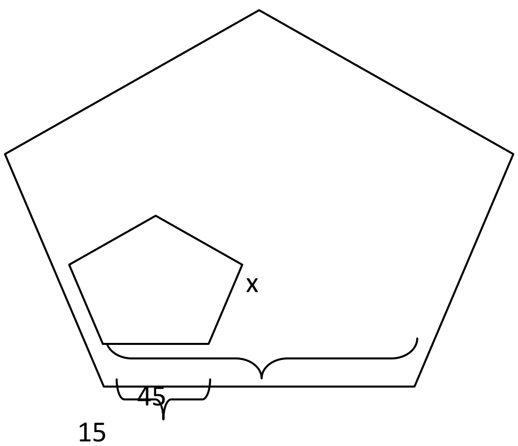

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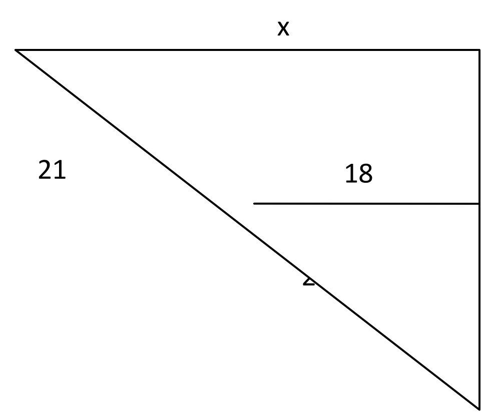

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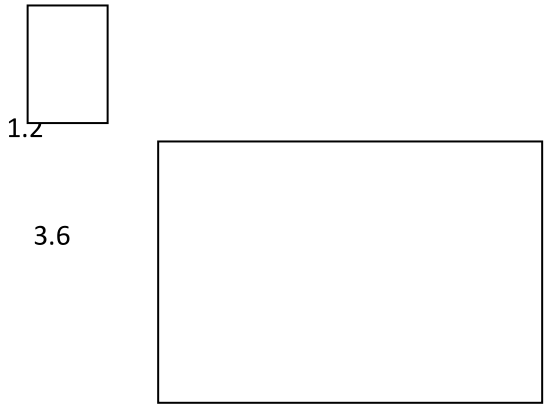

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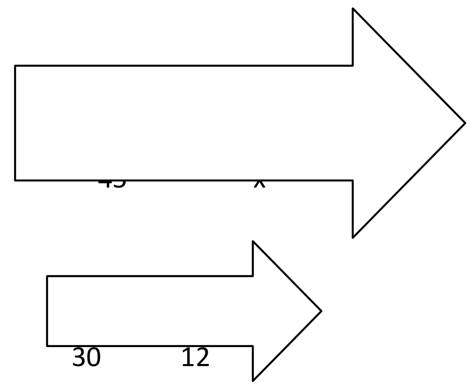

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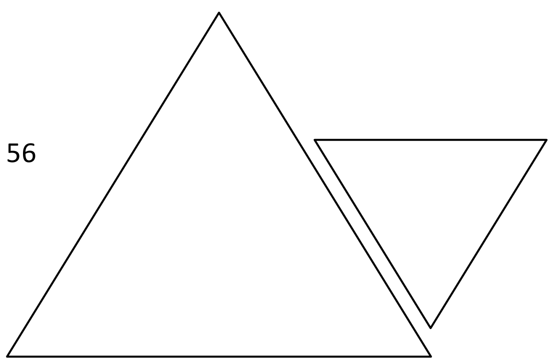

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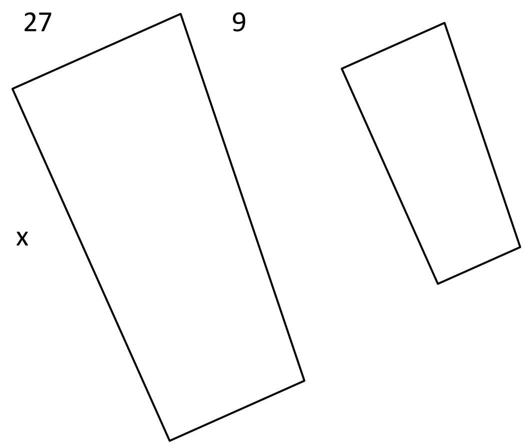

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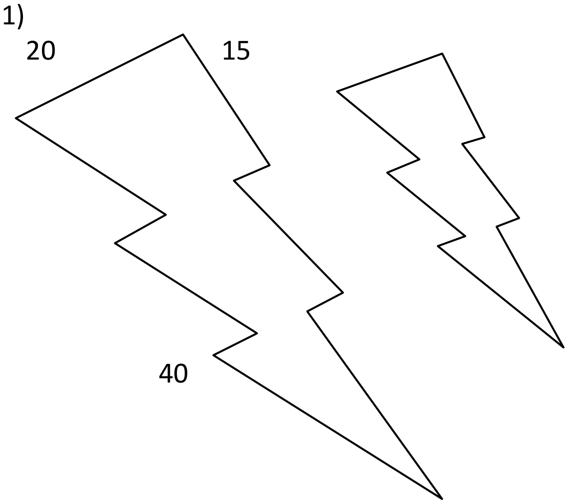

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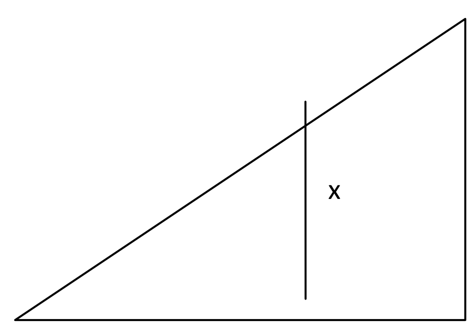

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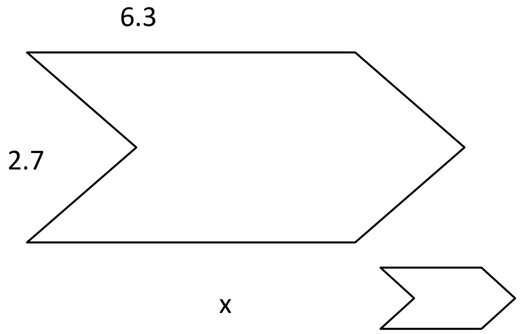

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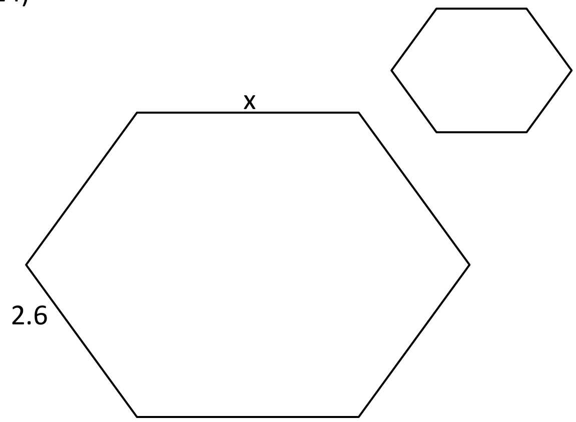

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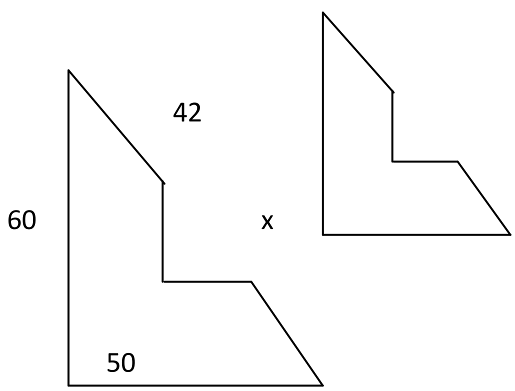

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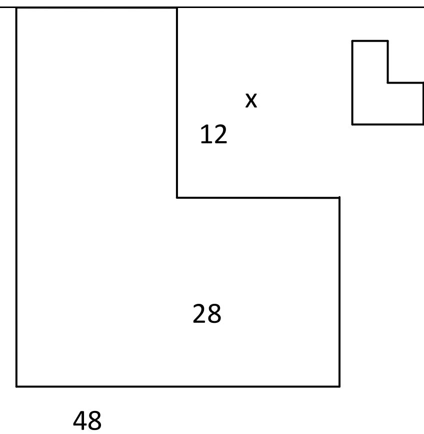

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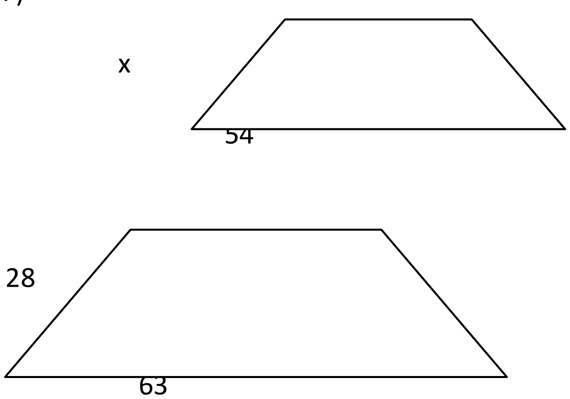

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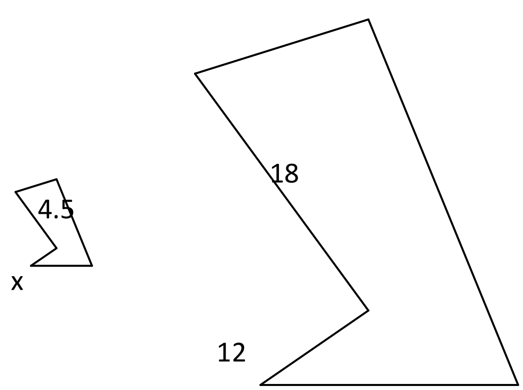

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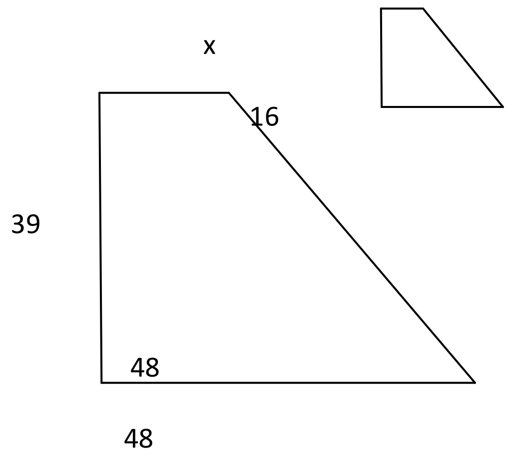

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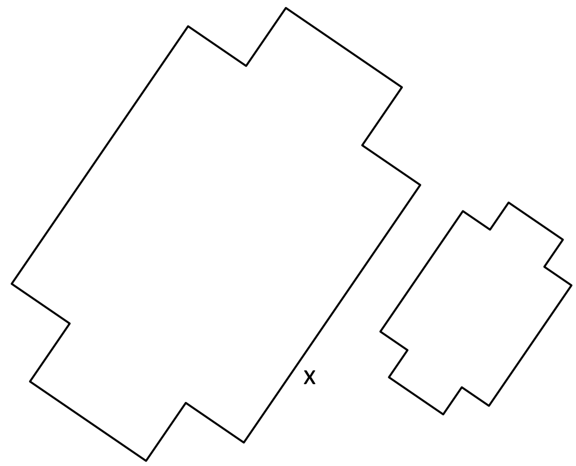

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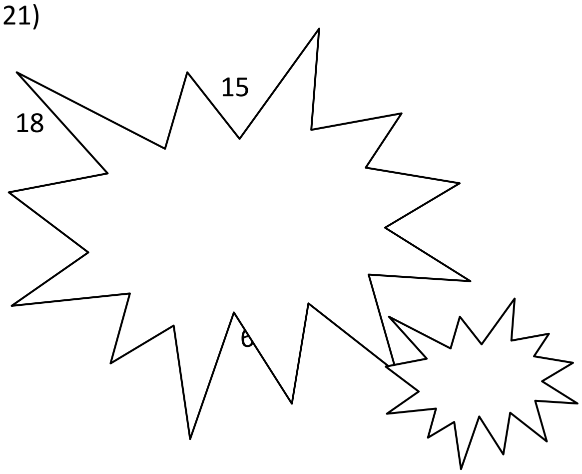

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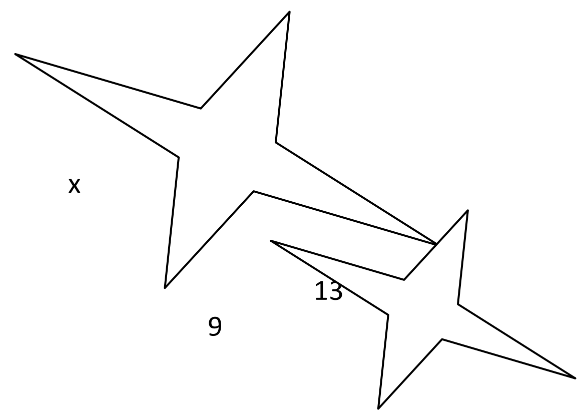

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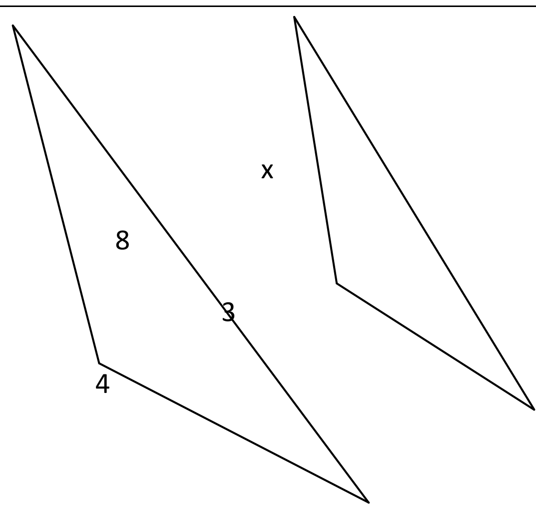

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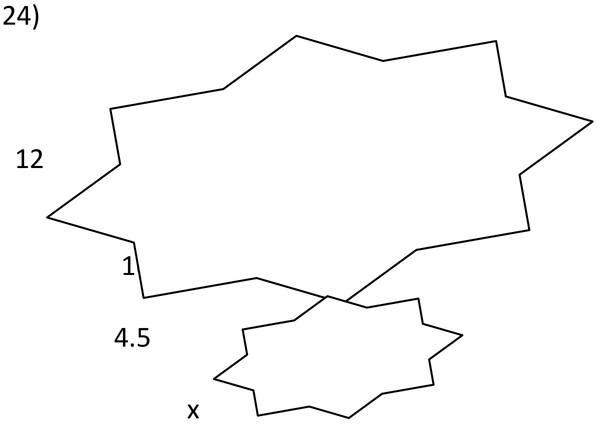

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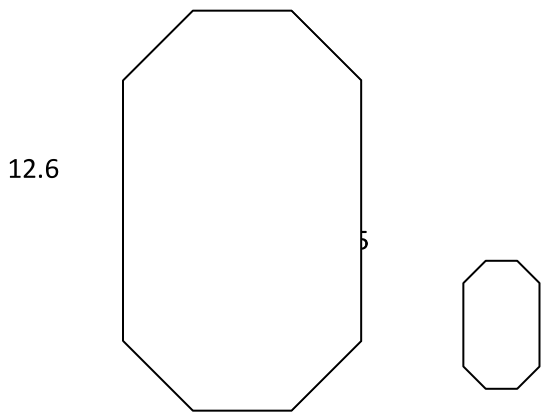

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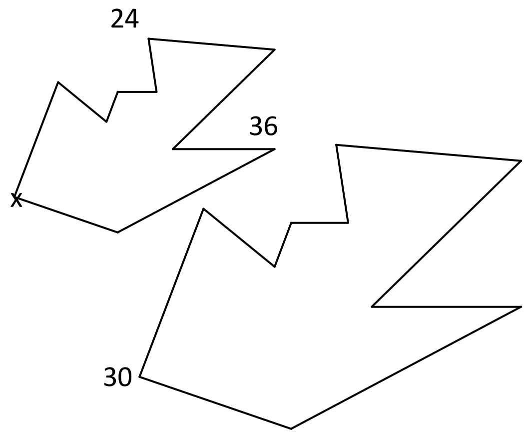

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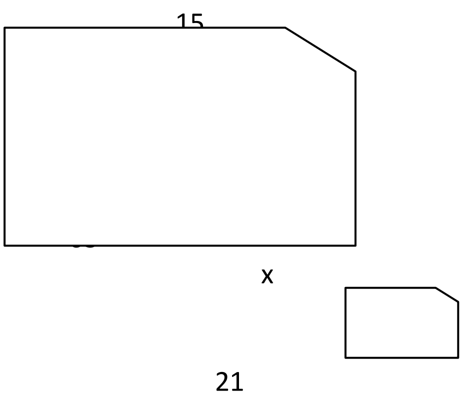

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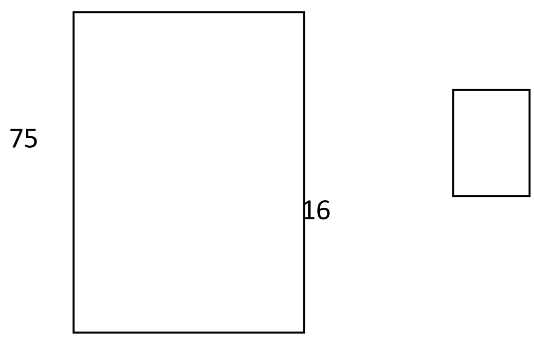

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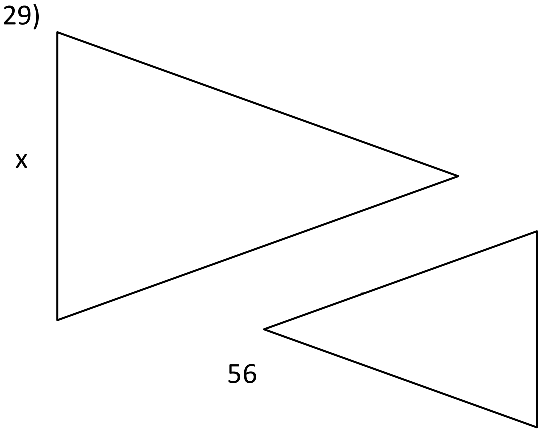

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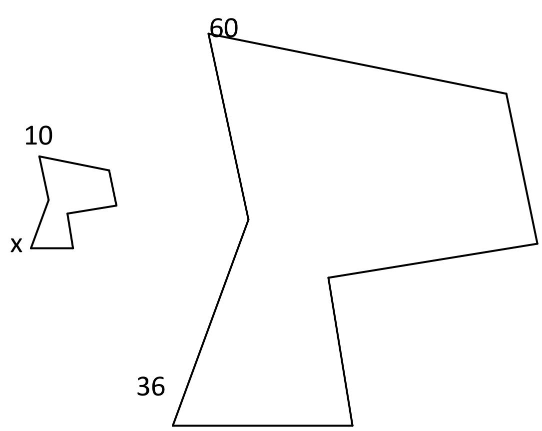

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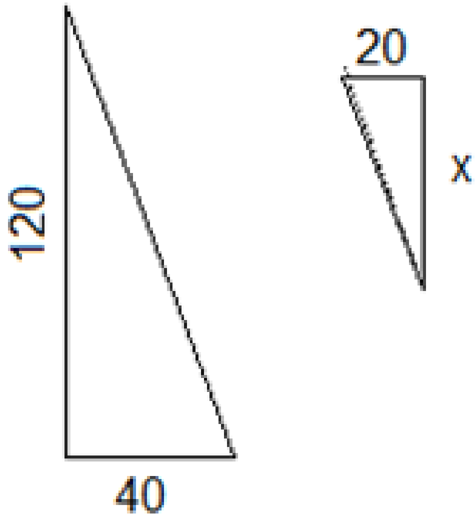

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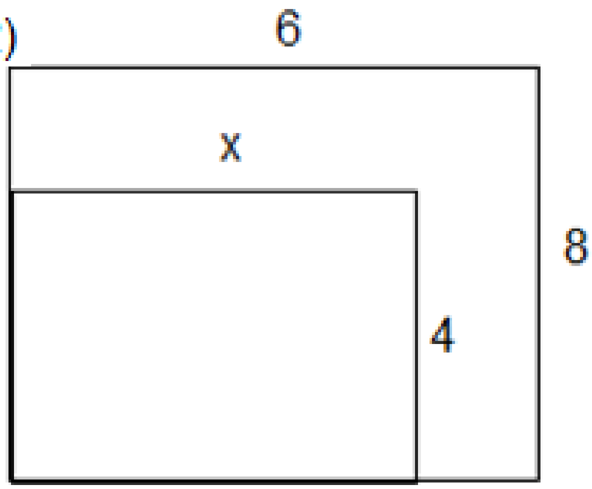

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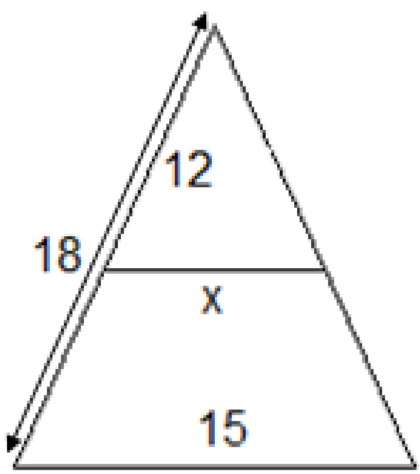

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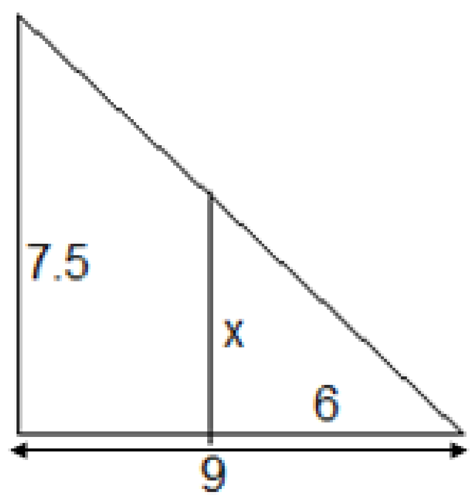

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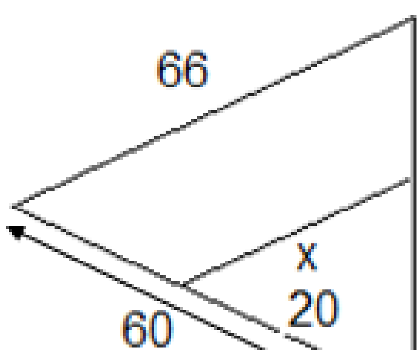

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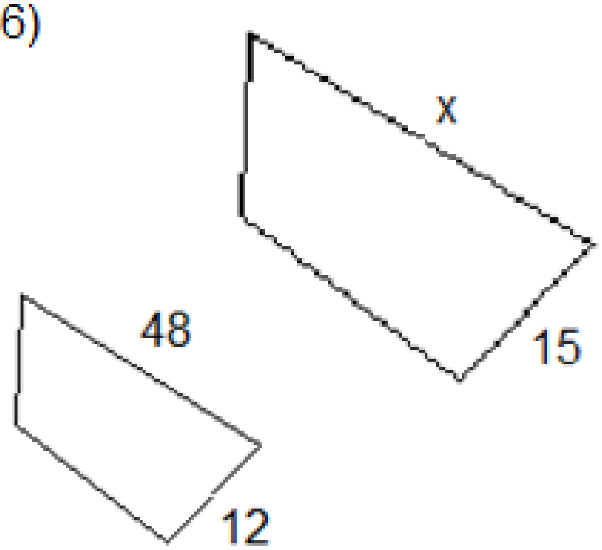


Similar figure Proportions Student record sheet

Write a proportion and solve it to find the length of each missing side. Show your work for extra credit.

1)	9)	17)	25)	33)
2)	10)	18)	26)	34)
3)	11)	19)	27)	35)
4)	12)	20)	28)	36)
5)	13)	21)	29)	
6)	14)	22)	30)	
7)	15)	23)	31)	
8)	16)	24)	32)	

Similar Figures Yahtzee (from Marilyn Dibble)

Materials:

- Score Chart, similar figures cards, pencil and paper (calculators - optional)

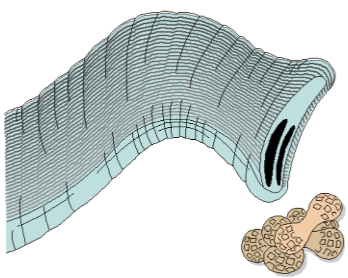
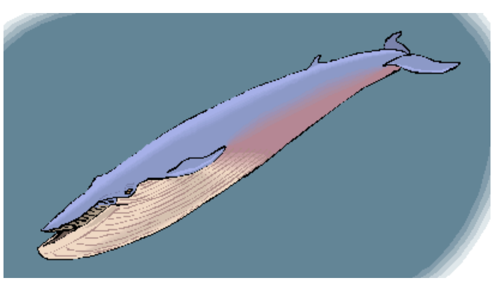
Rules:

- Write your name in a player space.
- Player 1 will draw a card and write the proportion and figure out the missing side.
- Check the Score Card below to see if your answer will fit a category below.
- Players score the same amount of points as the missing side of the figure.
- Take turns playing until everyone has had 10 turns.
- If an answer **will not** fit a category, enter a score in **Chance** (if available) or enter a **zero** in the box of your choice.
- If you have no **zero** answers after 10 turns, score 10 extra bonus points.
- Total your columns. The highest score wins.

Score Chart

Category	Player 1	Player 2	Player 3	Player 4
The answer is ≤ 3.				
The answer is 5.				
The answer is 6.				
The answer is between 6 and 11.				
The answer is a number in the teens.				
Chance **(10 points)**				
The answer > 19 but < 25.				
The answer is 25.				
The answer is in the thirties.				
The answer is ≥ 50.				
Bonus Points **(10 points)**				
GRAND TOTAL				

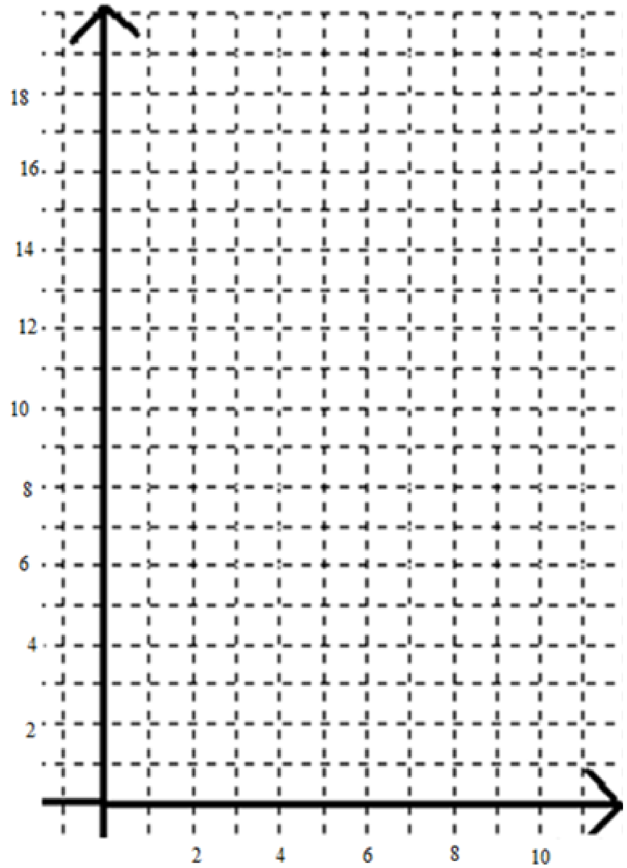
4.1.2: Who Eats the Most? Cards

Vampire Bat  Daily Food Intake: 28 g Weight: 28 g	**Queen Bee**  Daily Food Intake: 9 g Weight: 0.113 g
Tiger  Daily Food Intake: 6.4 kg Weight: 227 kg	**Hamster**  Daily Food Intake: 11 g Weight: 100 g
Elephant  Daily Food Intake: 180 kg Weight: 4100 kg	**Hummingbird**  Daily Food Intake: 2 g Weight: 3.1 g
Blue Whale  Daily Food Intake: 4.5 tons Weight: 118 tons	**Giant Panda**  Daily Food Intake: 15 kg Weight: 125 kg

Adapted from: NCTM "World's Largest Math Event 2000."

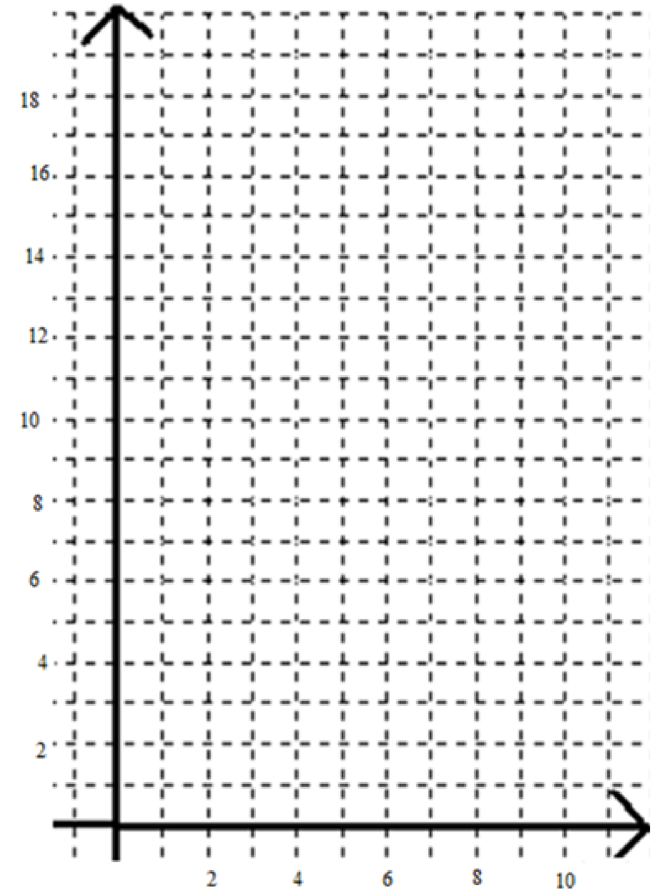
Measure the length (*x*) and height (*y*) of the rectangle using a nonstandard unit (cheerios, paper clips, etc.) and graph the point (x, y). then remeasure using a different measurement unit, and graph that point. Try this several times, with several different units, and see what happens.

– from Patrick Vennebush



Measure the length (*x*) and height (*y*) of the rectangle using a nonstandard unit (cheerios, paper clips, etc.) and graph the point (x, y). then remeasure using a different measurement unit, and graph that point. Try this several times, with several different units, and see what happens.

– from Patrick Vennebush

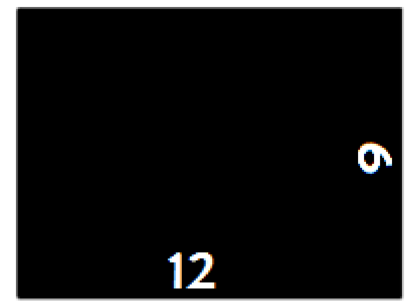
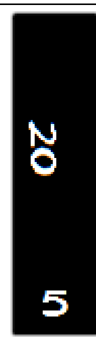
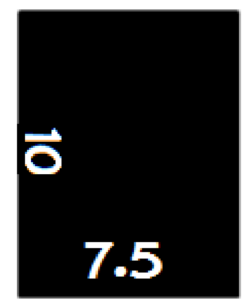


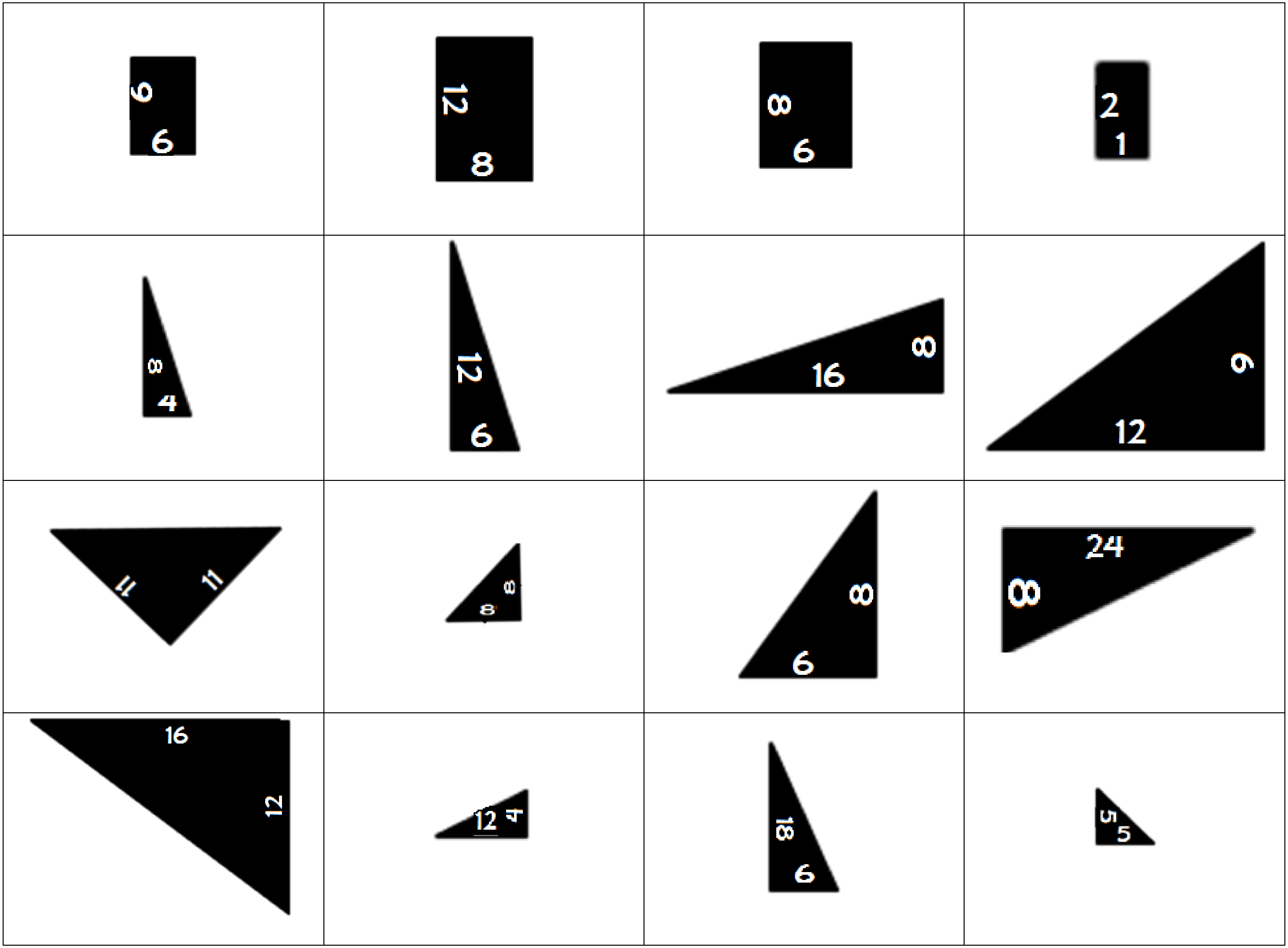
Sense or Nonsense Sort

Sort the cards according to their reasonableness. Be ready to explain your ideas.

A. Sammy is rock collecting. She finds a rock with a mass of 2 grams. If she finds 5 rocks, they will weigh 10 grams all together.	B. Twelve cookies cost $1.80, so 48 of the same cookies will have a price of $7.20 .
C. If Raejean can text 20 characters in 15 seconds, then she can text 80 characters in a minute.	D. If it takes 20 minutes to bake a half a sheet of cookies, then it will take 40 minutes to bake a whole sheet of cookies.
E. Steve can hop 20 feet in one minute. If he hops for 5 minutes he will hop 100 feet.	F. 12 oz. of popcorn will make 6 cups of popped corn, so 20 oz. will make 10 cups.
G. A cruise ship usually takes 30 people on a 2-hour tour, but if only 15 people take the tour, the ride will probably last 1 hour.	H. If an orchestra can play a symphony in 1 hour, then 2 orchestras can probably play it in a ½ hour.

I. If you can clean your room in 3 hours, then you and a friend could clean your room in 6 hours.	J. 8oz. of lemon concentrate will make 12 cups of lemonade, so 20oz. will make 24 cups.
K. Jasmine buys 3 tickets for $4. That means she could buy 9 tickets for $10.	L. Jerry takes 6 minutes to jog 2 laps around the track. That means if he jogs with his friend they will take 3 minutes to jog the two laps.
M. If 4 boys can deliver papers in 2 hours, then 8 boys could do that route in 4 hours.	N. Six candy bars cost $4.20, so a dozen of the same candy bars will have a price of $8.40

Similar Figures Concentration			
			
			



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Gulliver's Shapes

Part 1

In Jonathan Swift's novel Gulliver's Travels, Gulliver finds himself in the great city of Lilliput. Here everything, including its citizens, the Lilliputians, are very small in comparison to Gulliver and his belongings. If the Lilliputians had a set of Pattern Blocks in their schoolroom, Gulliver would find them much too small for his use. Can you build enlargements of each of the Pattern Block shapes that Gulliver could use?

- Working with your group, try to build at least 4 different-sized enlargements of each shape in the Pattern Block set. For each enlargement, use only blocks that are congruent to the original shape, and only one layer of blocks.
- Record the number of blocks used to build each enlargement. Look for patterns as you work. If you are unable to build an enlargement of a shape, try to figure out why.
- Trace only the outlines of each enlargement onto unlined paper and cut them out.
- Compare the angle measures of each enlargement to those of the original Pattern Block shape. Compare the lengths of the sides of each enlarged shape to those of the original shape.
- Summarize the findings of your group.

Part 2

What if... ***Gulliver found himself in Brobdingnag, an imaginary land of giants, where students used Pattern Block shapes that were much too large for him to work with? Can you create reductions of each of the enlarged Pattern Block shapes that Gulliver could use?***

- Exchange the cutouts of the biggest enlargement for each Pattern Block shape with those of another group. Imagine these enlargements are congruent to the Pattern Blocks used in Brobdingnag.
- Working from your cutouts, try to build at least 3 different scaled-down, similar versions of each Brobdingnag block. You may use a protractor and ruler and/or paper folding techniques on the cutouts, but you may not use Pattern Blocks or your other enlargements.
- Trace the outlines of these smaller shapes onto unlined paper.
- Compare your reductions to the original cutouts by considering corresponding angle measures and corresponding side lengths.
- Be ready to explain your methods.

Suppose a friend wants to come to your house after school to visit. Using your knowledge of similarity, draw a scale map of the route he must follow from the school to your house. Be sure to include the scale factor, landmarks, and street names.

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