STUDENT COMPANION

NAME: _____

PROBLEM SOLVING WITH SUPERHEROES

Miss Calculated's crossbow releases "sonic-fire" arrows. When Miss Calculated fires her crossbow it takes a "sonic-fire" arrow $\mathbf{1\ \frac{1}{4}\ seconds}$ to travel 150 meters.

- Based on the information above, how many meters per second (unit rate) is the "sonic-fire" arrow traveling?

- How long would it take for a "sonic-fire" arrow reach a target 450 meters away? Construct a proportion to solve. Utilize the calculated unit rate to solve. Show all computation.

- Challenge: Using the unit rate (meters per second), calculate how fast Miss Calculated's "sonic-fire" arrow can travel in miles per hour. Construct a proportion to solve.

KARMA

If Karma can fly at a constant rate of 60 mph for 15 minutes, how much distance could Karma cover in that amount of time?

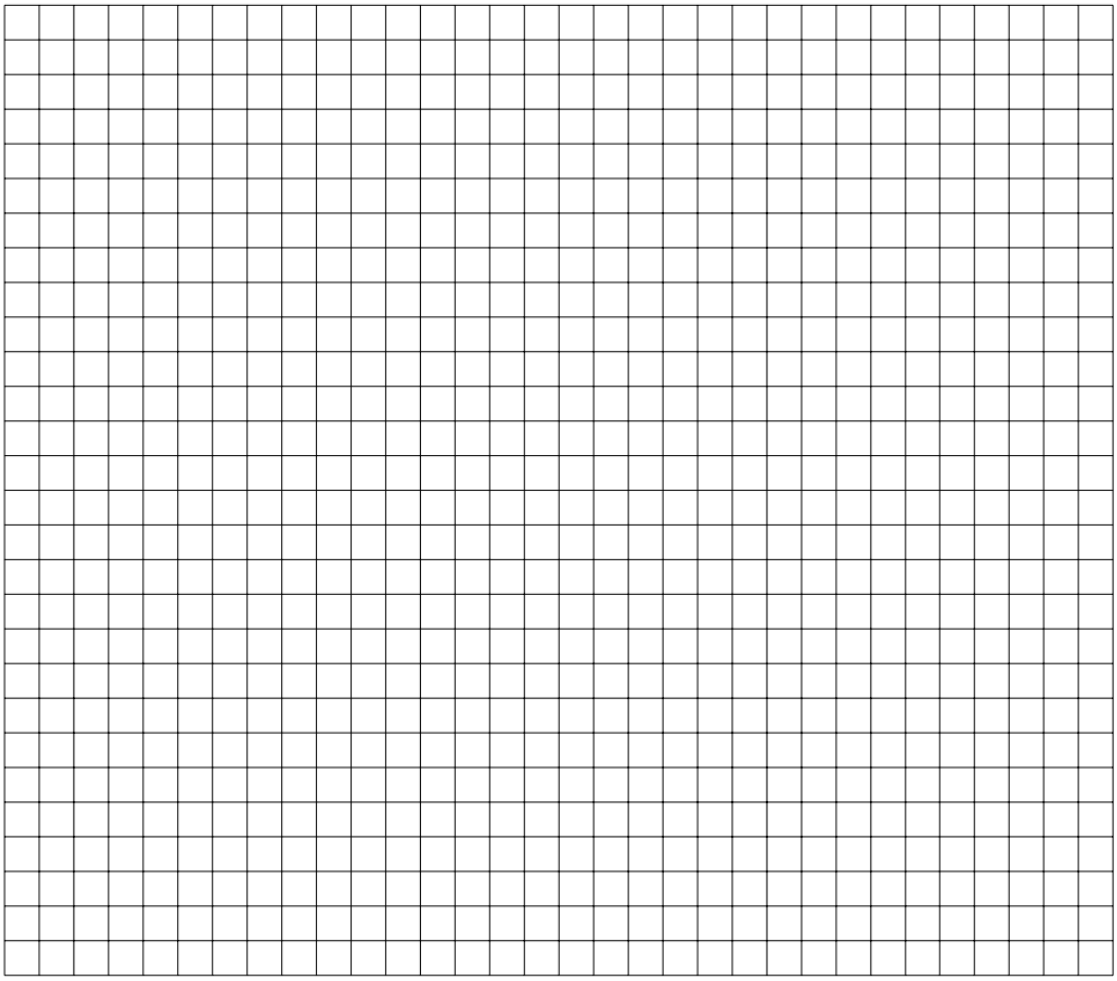
- Distance= rate x time
- Don't forget to convert the minutes to hours.

Utilize the calculations previously ascertained to find the missing values in the table below

TIME (hours)	0.25		1.5		2	2.25		3.5
Distance (miles)	15	45	90	105	120		180	210

KARMA: continued

Graph the relationship between the distance and time on a coordinate grid.



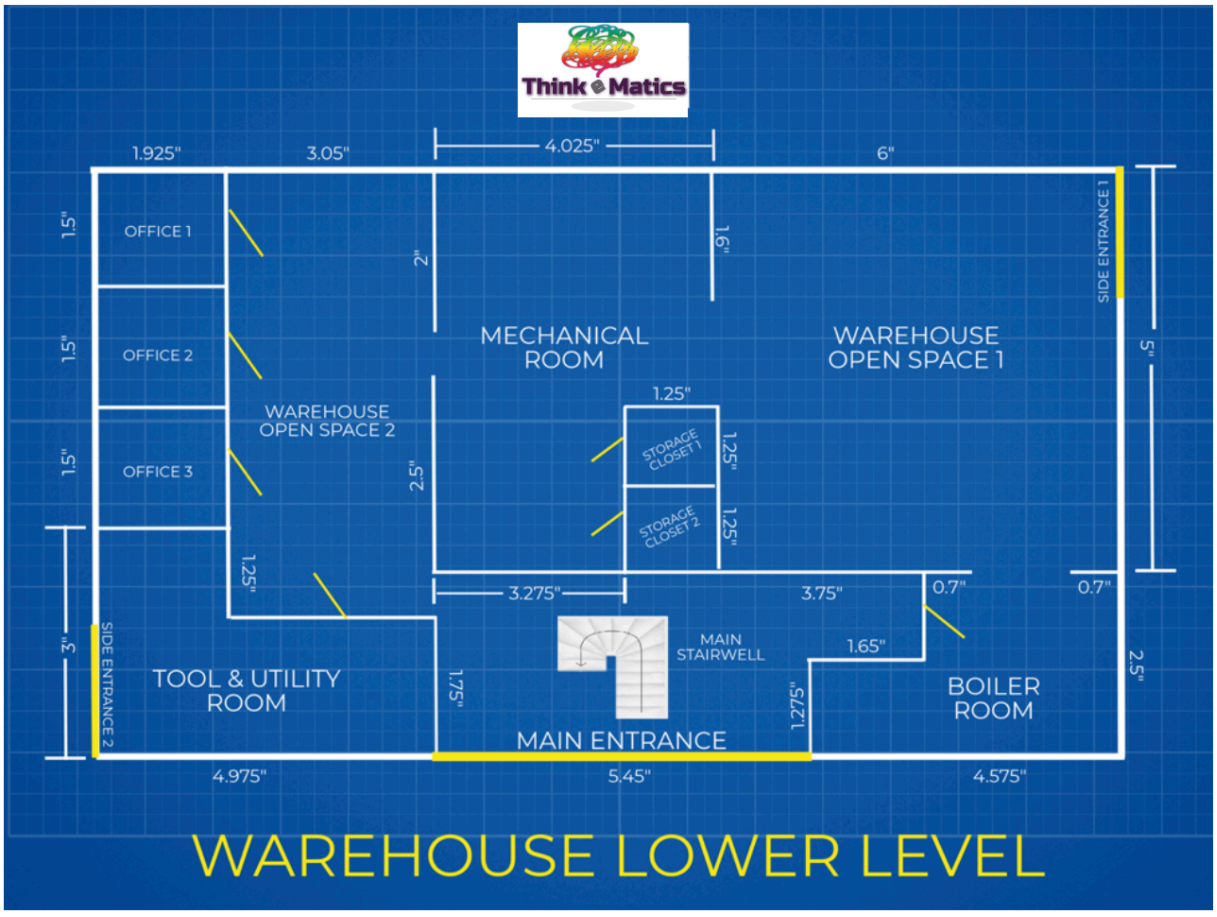
Is the relationship proportional?

KARMA: continued

Explain how you determined if the relationship was proportional or not proportional.

_____
_____
_____
_____
_____
_____

The Blueprint



The Blueprint: continued

Examine the diagrams of the Tool & Utility Room. The top image shows some of the dimensions on the blueprint (inches). The image below it shows some of the dimensions (feet) of the actual room in the warehouse.

- Calculate the scale factor. Express the scale factor as a ratio.

The Blueprint: continued

- Why is it necessary to calculate the scale factor in this situation?

_____
_____
_____
_____
_____
_____
_____

- Construct a proportion and solve for x on the blueprint image.

The Blueprint: continued

Examine the diagrams of the Warehouse Open Space 3. The top image shows the dimensions of the actual space in the warehouse (feet). The image below it shows some of the dimensions (inches) of the open space in the warehouse.

- Calculate the scale factor. Express the scale factor as a ratio.

- Construct a proportion and solve for x for the dimension shown on the blueprint.

Extend

1 

Your Thinking

THE BLUEPRINT

If the actual room in the warehouse has a width of 15 feet, what is the length of the room in feet?

Explain how you ascertained the length.

_____
_____
_____
_____
_____
_____
_____

What is the area of the room in square feet where the Phantom Hex is hiding?

Extend Your Thinking 1: "The Blueprint" continued

What does it mean if figures are classified as similar? Are the rooms described on the blueprint and the actual room where the Phantom Hex is hiding similar? Explain.

_____
_____
_____
_____
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_____

If the figures are similar, what is the scale factor of the two rectangles in feet?

Describe how you could use the scale factor to create a key or scale for the blueprint.

_____
_____
_____
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_____

Extend Your Thinking 1: “The Blueprint” continued

Create a vlog describing scale factor and how you could utilize it in our everyday lives. Discuss at least three ways. If you are unable to make a vlog, write out a script that you could use!

"THE CAMERA"

Write an equation that would model the situations described for each camera. Do any of the equations represent a proportional relationship? Explain how you determined if the relationship was proportional. If none of the relationships are proportional, how could you rewrite situation for camera 3 to make the relationship proportional?

Extend Your Thinking 2: "The Camera" continued

Construct a table of values and graph each relationship. Examine your graph. If the Silk Shadow wants to get the camera in and out of the warehouse in ten minutes, which camera would have the most battery life remaining? Explain how this is represented on your graph.

Camera 1

Time (Minutes)	Battery Life (Percentage)
0	
10	
20	
30	
40	
50	
60	

Camera 2

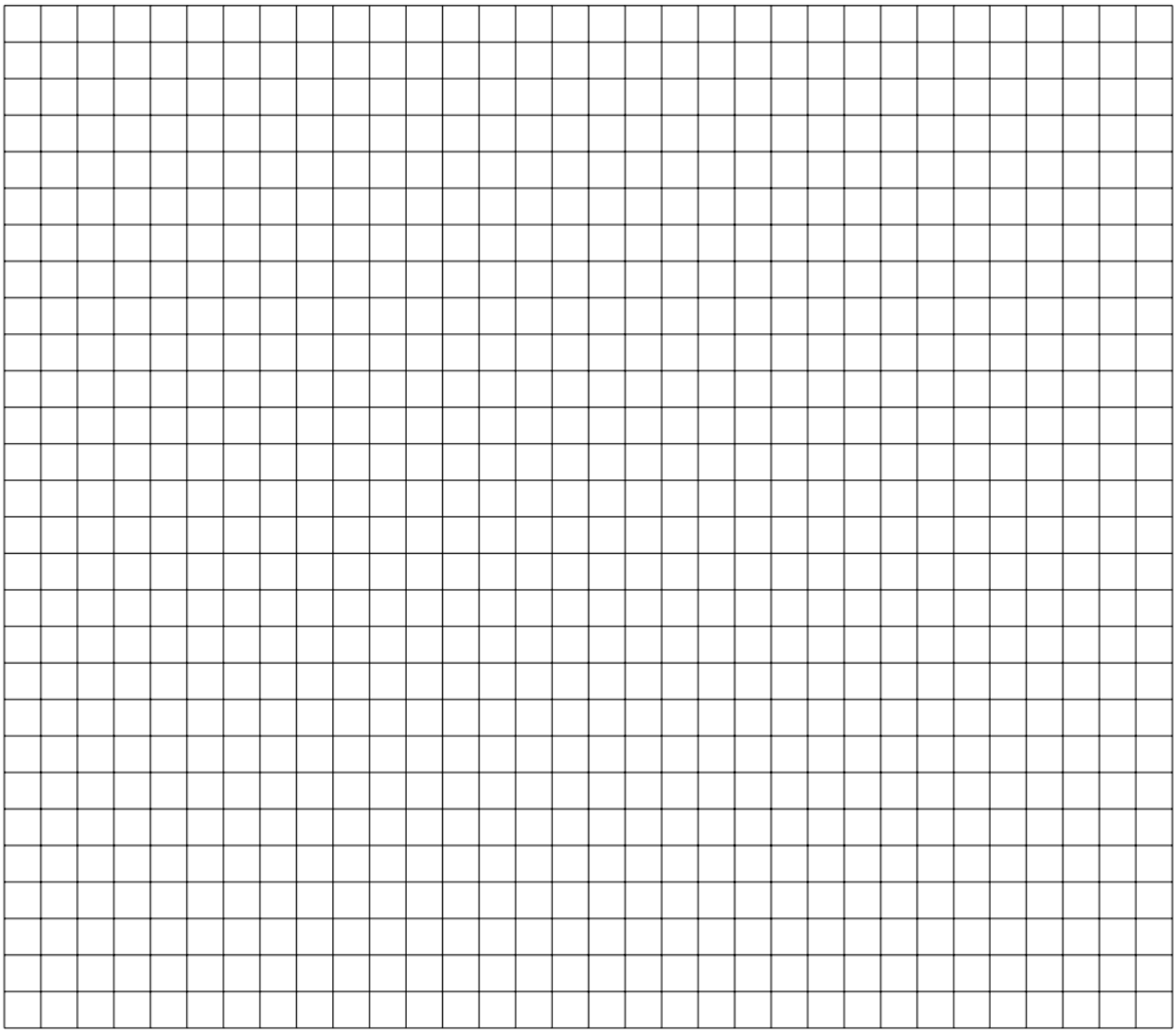
Time (Minutes)	Battery Life (Percentage)
0	
10	
20	
30	
40	
50	
60	

Camera 3

Time (Minutes)	Battery Life (Percentage)
0	
10	
20	
30	
40	
50	
60	

Graph on the next page

Extend Your Thinking 2: “The Camera” continued



Extend Your Thinking 2: "The Camera" continue

If it were to take 40 minutes to get the spy camera in and out of the warehouse, which camera would be the best choice to send in and take the photos? Explain.

_____
_____
_____
_____
_____
_____
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_____
_____
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_____

THE PHOTOGRAPH

Utilizing the information provided, calculate the length of the actual weapon. Describe how you could utilize the photograph to determine the size of the weapon.

Extend 4 Your Thinking

HIGHER ORDER THINKING QUESTIONS

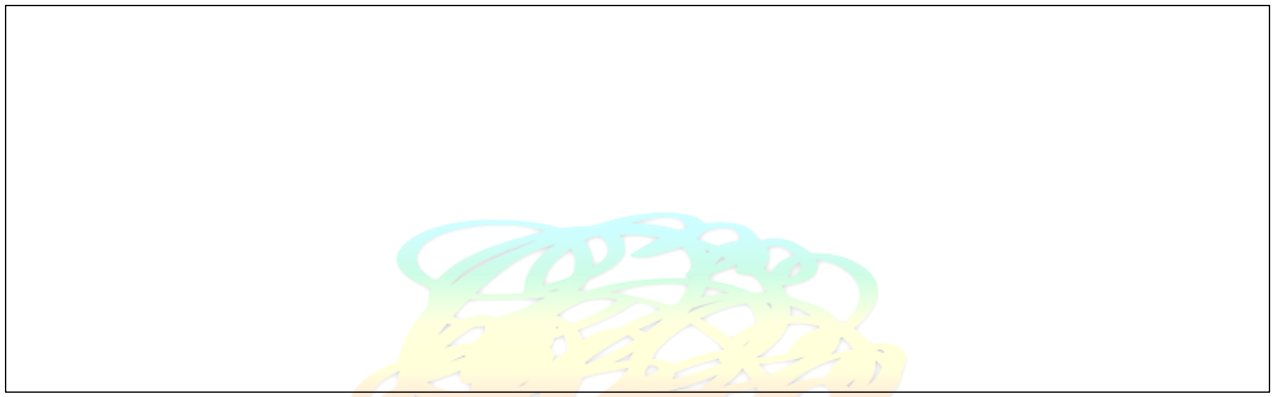
Level ONE

What questions (minimum of three) would you ask yourself if you were trying to determine if figures are similar?

Extend Your Thinking 4: "Higher Order THINKING" continue

Level TWO

What criteria would you use to determine if a relationship is proportional?



Extend Your Thinking 4: “Higher Order THINKING” continue

Level THREE

Construct a non-rectangular polygon and identify the dimensions. Construct a similar polygon and apply a scale factor of 3. Calculate the area of both figures. Does the rule you wrote in ""The Warehouse"" work for all polygons or just rectangles. Explain.

Extend Your Thinking 4: "Higher Order THINKING" continue

After examining the collection of photographs captured by the spy camera, the Silk Shadow deemed the warehouse safe for entry. He utilized his superpower of shadow manipulation as he entered the warehouse…..

Write the ending to the story. Be creative!