Secret Codes: Project **Name:**

Part 1: Creating Codes

You have been hired by a new tech startup company to develop some CIPHERS they can use to encrypt email messages. They will offer three different packages of security: BASIC, MODERATE and SUPER. You will be offering Ciphers for each level of security and demonstrating how to code and decode a message with each cipher.

- Decide on a message to demonstrate how to code and decode messages. **The message must have at least 10 letters**.

Original Message	

Develop THREE different Combination Ciphers (using at least 2 different operations like ADDITION/SUBTRACTION, MULTIPLICATION/DIVISION or EXPONENTS).

To give your supervisors a full view of your ciphers (they aren't as good at this as you are), please provide them with the:

- Graph for BASIC
- Coding Rule for the MODERATE
- Arrow Diagram for SUPER

Make sure all of your keys (Rule, Arrow Diagram and Graph) are useful for encrypting and decrypting messages.

BASIC: this should be a simple cipher that is relatively easy to BREAK. Represent this process with a GRAPH (include at least 3 points on your graph).

- Write this on the handout "Secret Codes: Project Graph" (on my desk).

MODERATE: this is a more complex cipher that is harder to BREAK. Represent this process with a RULE.

- Write the coding rule here:

SUPER: this is a very complex cipher that would be difficult to BREAK. Represent this process with an ARROW DIAGRAM

- Write the arrow diagram here:

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Now use each of your ciphers to ENCRYPT your ORIGINAL MESSAGE.

	CODED Message (in numbers)
BASIC	
MODERATE	
SUPER	

Demonstrate or explain how you would DECRYPT a message for each rule (you can use examples or arrow diagrams if that helps).

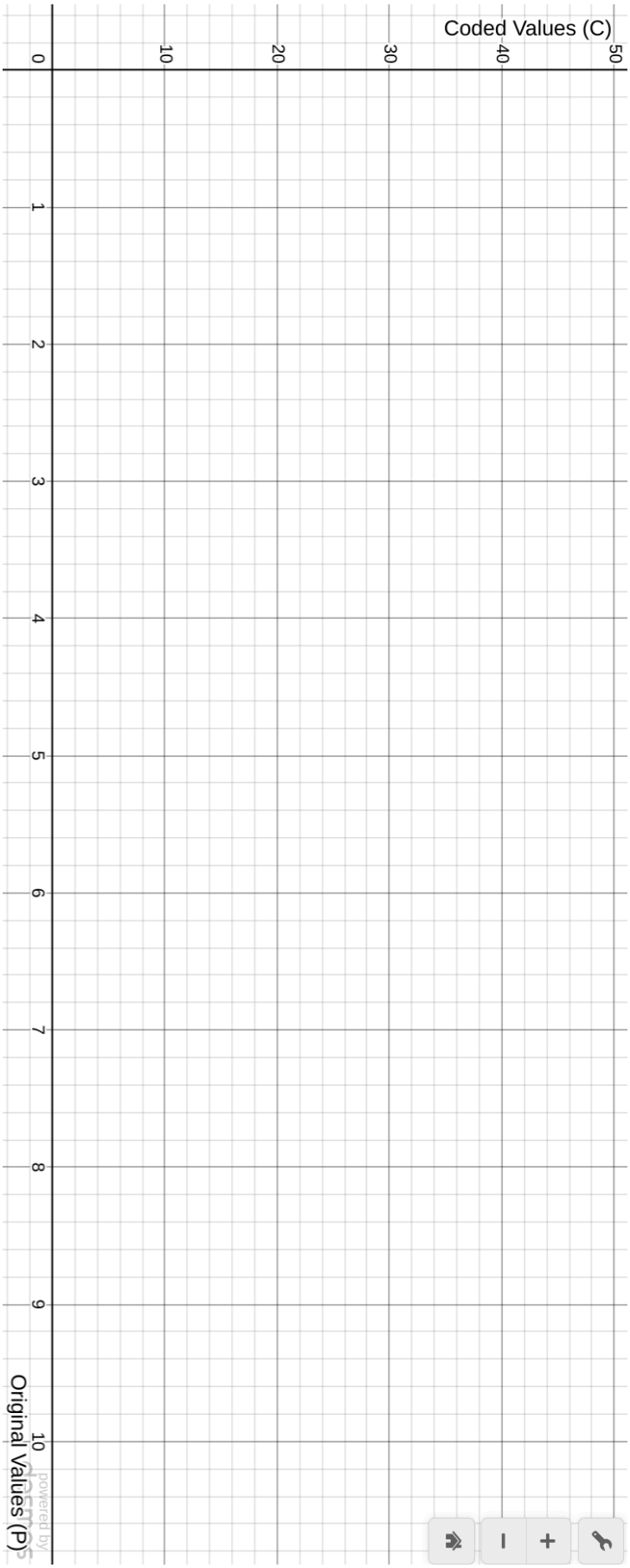
	Explain or show how to DECRYPT a message.
BASIC	
MODERATE	
SUPER	

1) Which type of KEY (GRAPH, RULE or ARROW DIAGRAM) is easiest for you to use to DECRYPT messages? Why?

2) Encryption plays a critical role in securing data. Describe some specific examples of how encryption is used for security at the personal level as well as at the national level. Also, discuss how advances in technology will change how encryption is currently done. This will take some research. These two resources are provided in Canvas under “Secret Codes: Project (Resources)”:
   - Podcast: “How China Hacked America’s Phone Network” - we listened from 3:45 - 8:00 at the start of class.
   - Article: “Google Unveils a Quantum Chip”

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Secret Codes Project Part 2: Code Breaking **Name** _____

*Bring out "**Secret Codes: Lesson 9 (Part 1) — Code Breaking**". This will be a key resource for Part 2 of the project. Make sure you've finished this lesson. Extra copies are available on my desk.*

Your supervisor also wants you to test other Ciphers. You will be given ENCRYPTED Messages to try and break.

- Choose whether you want a *BASIC, MODERATE, or SUPER* level cipher. Choosing more complex ciphers will allow you to demonstrate higher levels of learning.
- After you choose, your encrypted message will be provided to you.

Basic **Moderate** **Super**

For your coded message:

- Use some of the CODE BREAKING FACTS we have found: ("the" is the most common word used in English, "A" and "I" are the ONLY one-letter words in English, …) to identify any possible patterns in the encrypted message.
- Determine the CODING RULE used -- please **EXPLAIN** how you tried to figure the rule out in detail.
- Use the CODING RULE to DECODE the message.
- Explain your process.
- If you are stuck, you can get some additional information from me.

Decrypted Message:

Explanation:

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REFLECTION QUESTIONS

1) What is the difference between DECRYPTING and CODE BREAKING?.
   Response:

2) A student last year wanted to use the cipher y = 1000x + 100 as their SUPER cipher. Do you think that would be a hard cipher to BREAK? Explain why or why not.
   Response:

3) A student this year wanted to use the cipher $y = 2x + \pi$ as their SUPER cipher. Do you think that would be a hard cipher to BREAK? Explain why or why not.
   Response:

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