

Marathon Math Problems - Week 8

This week we'll be talking about coded messages. You'll break codes, write your own coded messages, and come up with your own coding system.

You should write all answers on a *separate sheet of paper*.

Problem 1

Sarah got a message from her brother Brian. It reads

PHHW PH LQ WKH KDOOZDB.

The previous night, Sarah and Brian had agreed to use a coded message system. To decode the message, Sarah must shift each letter back by 3. What does the message say?

Problem 2

Sarah needs to tell Brian: "IN TEN MINUTES" using the same code. What should she write? (Hint: check your answer by decoding it!)

Problem 3

Describe a different coding system Brian and Sarah could use, in case this one gets broken. Include an example message that is both coded and decoded.

Marathon Math Problems - Week 9

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

A Vigenere code uses a secret keyword known only by the sender and receiver of the message. Say we use the keyword “cat” and we want to send the message “Go Bills!”

Our keyword tells us how far forward to shift each letter. Since *c* is the *third* letter of the alphabet, we shift the first letter of our message *forward by three places*. So *G* becomes *J*.

Next, since *a* is the *first* letter of the alphabet, we shift the second letter of our message *forward by one place*. So *o* becomes *p*. And since *t* is the *twentieth* letter of the alphabet, we shift *B* forward *twenty* places to get *V*.

Now we have reached the end of our keyword, and we start back at the beginning with *c*. So we shift *i* forward 3 places to get *l*. We shift *l* forward 1 place to get *m*. We shift the next *l* forward 20 places to get *f*. And finally, we shift the *s* forward 3 places to get *v*. So the coded message reads ”Jp Vlmfv!”

Problem 1

Write me a coded message using the keyword *dog*.

Problem 2

Using the keyword *dog*, decode the message “Lpwtn Oeasslic!”