

Section 11.4 Math Link

This worksheet will help you with the Math Link on page 413.

Jim has decided to make a new code that is as complicated as he can make it. Jim's final message to his friend is:

43 19 21 41 / 21 41 / 29 53 / 7 13 41 43 / 9 33 11 13 / 53 13 43

Note: Spaces separate letters and the symbol " / " separates words.

1. The letter E is the most common letter in English. Predict what number represents E. _____
2. Jim started with this code.

1 = a	2 = b	3 = c	4 = d	5 = e	6 = f	7 = g
8 = h	9 = i	10 = j	11 = k	12 = l	13 = m	14 = n
15 = o	16 = p	17 = q	18 = r	19 = s	20 = t	21 = u
22 = v	23 = w	24 = x	25 = y	26 = z		

He used an equation in the form $ax + b = c$ to change the letters in the message. In this equation,

x = original number

a = what you will multiply or divide the original number by

b = what you will add

c = new number for each letter

Use the equation to check if the number you predicted represents E.

original number = 5

new number for letter = 13

$$ax + b = c$$

$$(\text{---})(5) + \text{---} = 13$$

Hint: Try easy numbers first.

$$(2)(5) + 3 = 13$$

$$\text{Code: } 2x + 3$$

Name: _____

Date: _____

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- 3.** If #2 is correct, the first word with an E is 7 13 41 43. Decode the other letters.

A letter is 7.

$$ax + b = c$$

$$2x + 3 = 7$$

What is x ? _____ Identify this letter: _____

A letter is 41.

$$ax + b = c$$

$$2x + 3 = 41$$

What is x ? _____ Identify this letter: _____

A letter is 43.

$$ax + b = c$$

$$2x + 3 = 41$$

What is x ? _____ Identify this letter: _____

What word does 7 13 41 43 represent? _____

- 4.** Now try to decode the first word: 43 19 21 41.

You have already decoded 43 and 41. $43 =$ _____ $41 =$ _____

A letter is 19.

$$ax + b = c$$

$$2x + 3 = 19$$

What is x ? _____ Identify this letter: _____

A letter is 21.

$$ax + b = c$$

$$2x + 3 = 19$$

What is x ? _____ Identify this letter: _____

What word does 43 19 21 41 represent? _____

- 5.** You have already decoded the letters in the second word (21 41).

21 is the letter _____.

41 is the letter _____.

21 41 represents _____

Name: _____

Date: _____

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6. Now try to decode the third word: 29 53.

A letter is 29.

$$ax + b = c$$

$$2x + 3 = 29$$

What is x ? _____ Identify this letter: _____

A letter is 53.

$$ax + b = c$$

$$2x + 3 = 53$$

What is x ? _____ Identify this letter: _____

What word does 29 53 represent? _____

7. You have already decoded the letters in the sixth word (53 13 43).

53 is the letter _____.

13 is the letter _____.

43 is the letter _____.

53 13 43 represents _____

8. Use the steps above to decode 9 33 11 13.

9. Write the entire message.