A polynomial of degree n has exactly n Solutions.

Some of these solutions may be Complex Solutions and wouldn't appear on a graph.

And some of the Real Solutions might repeat which means there might not be n different solutions.

Four prime numbers multiply to 4641. Two of the factors are 7 and 17. Find the other two factors.

$4641 \div 7 = 663$

$663 \div 17 = 39$

$39 = 3 \cdot 13$

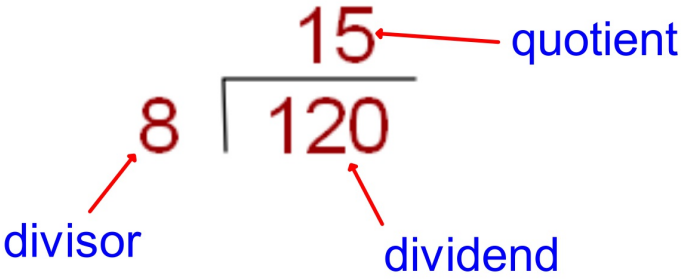
the other two prime factors are 3 & 13

The solutions to a polynomial equation are -6, 1 and 4.

What are the factors of this polynomial?

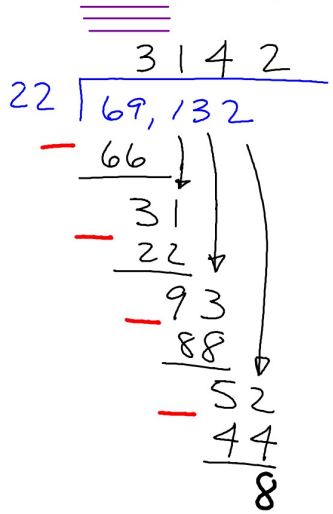
$(x+6)(x-1)(x-4)$

Vocabulary of division.



Do the following using long division without a calculator.

$$\frac{69,132}{22} = 3142 \text{ R}=8$$



Polynomial Long Division

Topic 6: Polynomial Equations

Agilemind website: Exploring "Other Polynomial Equations"

Page 3

SAS4 - question 2 a

This animation shows how to perform polynomial long division and how it is related to long division with integers.

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SAS4 - question 2 b,c

$(x-2)(x^2+1) = 0$

To find the solutions set each factor equal to zero and solve for x.

$x-2=0$

$+2 \quad +2$

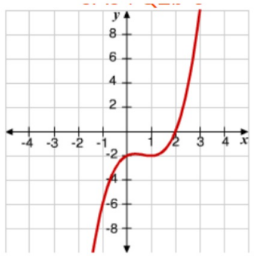
$x=2$

$x^2+1=0$

$-1 \quad -1$

$\sqrt{x^2}=\sqrt{-1}$

$x=\pm i$



Find this quotient:

$$x+3 \overline{)\, x^3 - 5x^2 - 23x + 5}$$

$x^2 - 8x + 1$

$-(x^2 + 3x^2)$

$-8x^2 - 23x$

$-(-8x^2 - 24x)$

$x + 5$

$-(x + 3)$

2 ← Remainder

Quotient: $x^2 - 8x + 1$ R = 2

What must be true for a number to be considered a factor of another number?

There must be NO remainder when they are divided.

Is $x+3$ a factor of $x^3 - 5x^2 - 23x + 5$?

NO, because when $x^3 - 5x^2 - 23x + 5$ was divided by $x+3$ the remainder ISN'T ZERO.

Topic 6: Polynomial Equations

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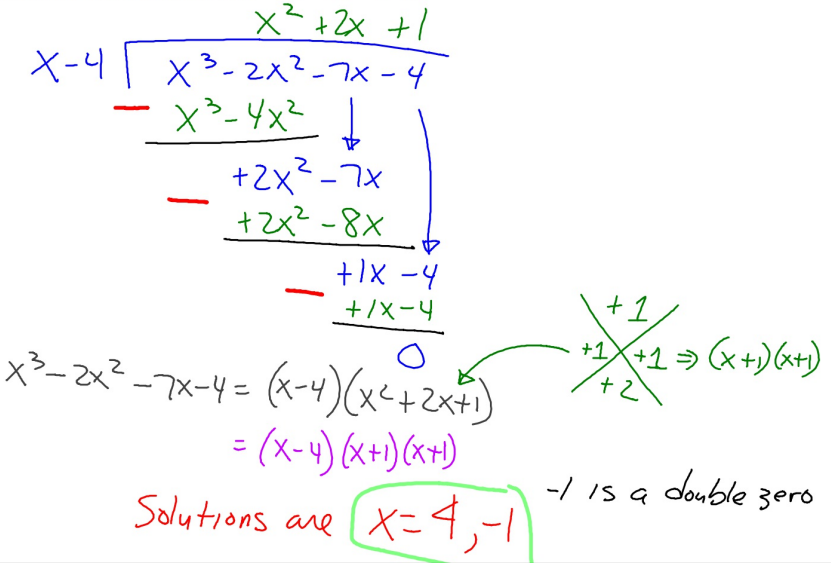
SAS4 - question 3

Topic 6: Polynomial Equations

Answer to SAS4 - question 3

3. Use long division to show that $x - 4$ is a factor of $x^3 - 2x^2 - 7x - 4$. Then use the result to help you solve the equation $x^3 - 2x^2 - 7x - 4 = 0$.



$x^3 - 2x^2 - 7x - 4 = (x-4)(x^2 + 2x + 1)$

$= (x-4)(x+1)(x+1)$

-1 is a double zero

Solutions are $x = 4, -1$