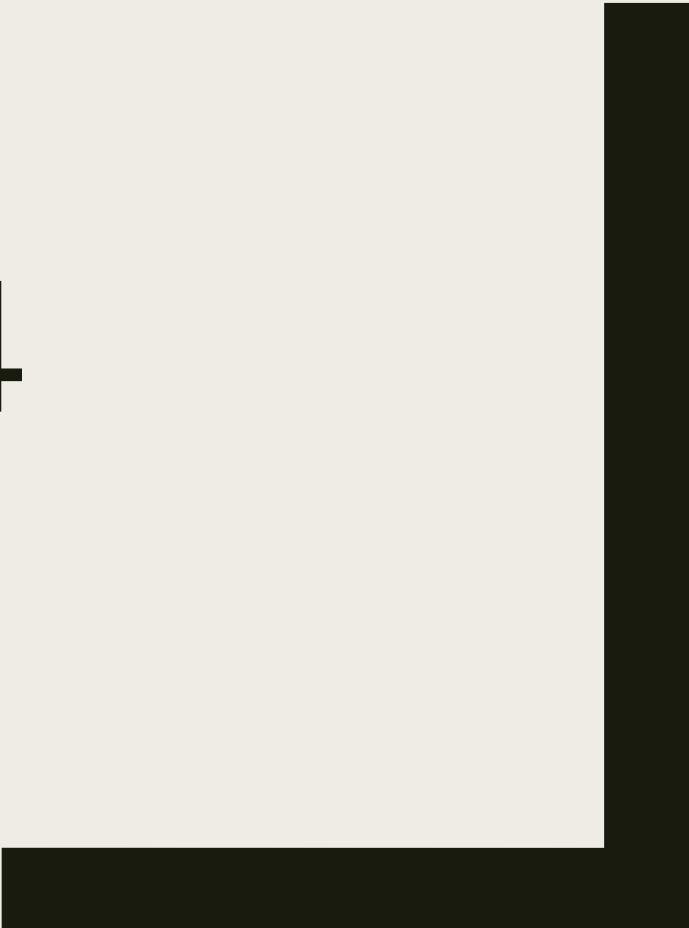




# ALGEBRA 4

Day 50



## Bell Work

4. Given  $f = cd^3$ ,  $f = 450$ , and  $d = 10$ , what is  $c$  ?

F. 0.45

G. 4.5

H. 15

J. 45

K. 150

# From Last Time

- page 322 #1-7, 9-19 (odd), 38-40, 44

# Catch Up Day

- What do we need to talk about from previous classes?
- Quiz on Solving towards end of class...

# Unit 5 Quiz 2

- You can use your notes (as always on a quiz)
- You'll want a calculator to help you find zeros.

## 5.6 The Fundamental Theorem of Algebra

**Objective(s):** To use the Fundamental Theorem of Algebra to solve polynomial equations with and without complex solutions.

# The Fundamental Theorem of Algebra

The degree of a polynomial function tells us how many zeros we'll have in the problem

Fantasy Math Talk...

If  $f(x)$  is a polynomial of degree  $n$  where  $n \geq 0$ , then the equation  $f(x) = 0$  has exactly  $n$  roots, including multiple and complex roots.

What are the roots for the following equation?

$$P(x) = x^5 - x^4 - 3x^3 + 3x^2 - 4x + 4 = 0$$

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Note: There are 5 zeros (solutions) because the degree is 5.

Lets graph... cross our fingers that it touches 5 times



$$P(x) = x^5 - x^4 - 3x^3 + 3x^2 - 4x + 4 = 0$$

$$x = 1 \quad x = 2 \quad x = -2 \quad x = \underline{\hspace{2cm}} \quad x = \underline{\hspace{2cm}}$$

So how can we find the imaginary?

(We need to get to  $x^2$  equation to use quadratic formula)

Divide!! We know there are 5 answers, we have 3...  
divide 3 times and it will leave us the last 2!

$$\begin{array}{r}
 x^5 - x^4 - 3x^3 + 3x^2 - 4x + 4 \\
 \underline{1 \quad 1 \quad 0 \quad -3 \quad 0 \quad -4} \\
 1 \quad 0 \quad -3 \quad 0 \quad -4 \quad 0 \rightarrow x^4 + 0x^3 - 3x^2 + 0x - 4
 \end{array}$$

$$\begin{array}{r}
 1 \quad 0 \quad -3 \quad 0 \quad -4 \\
 \underline{2 \quad 2 \quad 4 \quad 2 \quad 4} \\
 1 \quad 2 \quad 1 \quad 2 \quad 0 \rightarrow x^3 + 2x^2 + 1x + 2
 \end{array}$$

$$\begin{array}{r}
 1 \quad 2 \quad 1 \quad 2 \\
 \underline{-2 \quad -2 \quad 0 \quad -2} \\
 1 \quad 0 \quad 1 \quad 0 \rightarrow x^2 + 0x + 1 = 0
 \end{array}$$

$$P(x) = x^5 - x^4 - 3x^3 + 3x^2 - 4x + 4 = 0$$

*Use quadratic formula to find the last two zeros...*

$$x = 1 \quad x = 2 \quad x = -2 \quad x = i \quad x = -i$$

# More Examples

- $x^5 - x^4 - 7x^3 + 7x^2 - 18x + 18 = 0$

- $x^4 + 2x^3 - 4x^2 - 7x - 2 = 0$