

Conceptualizing Polynomials

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Agenda

- Finding Roots (not in the garden)
- What's in a degree (besides a pay raise)?
- Increasing & decreasing (on a roller coaster?)

Finding Roots

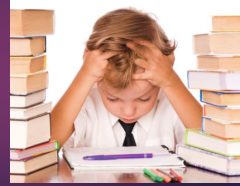
$$\text{Solve: } x^2 - x - 12 = 0$$

MATH TEACHERS



$$\text{Solve: } x^2 - x - 12 = 0$$

STUDENTS



$$\text{Solve: } x^2 - x - 12 = 0$$

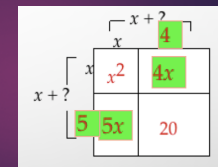
- Puzzle
- Guess & Check
- AC Method
- Tic Tac Toe Method
- And.....

math $\neq$ calculating
math $\gg$ calculating

CONRAD WOLFRAM

$$\text{Solve: } x^2 - x - 12 = 0$$

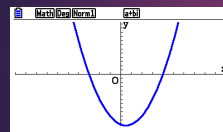
- Rectangular diagram



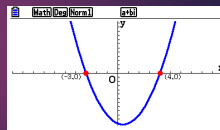
Solve: $x^2 - x - 12 = 0$

- Graphing!!!

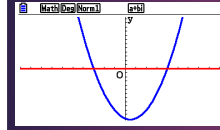
Graph $y = x^2 - x - 12$



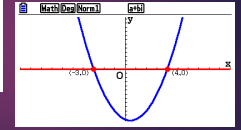
Find Roots



Graph $f(x) = x^2 - x - 12$ & $g(x) = 0$



Find Intersections



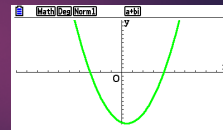
Solve: $x^2 - x - 12 = 0$

$(0, 4)$ and $(0, -3)$

How does that help us?!?!

$$x^2 - x - 12 = 0$$

$$(x - 4)(x + 3) = 0$$



Story of Marcos

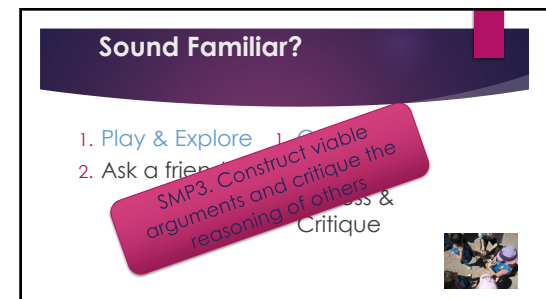
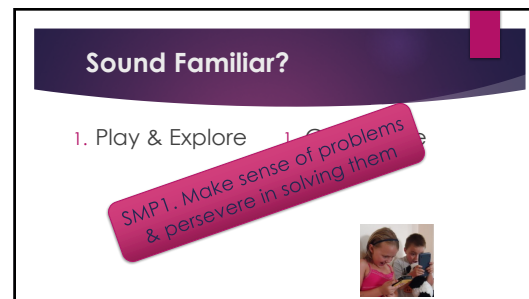
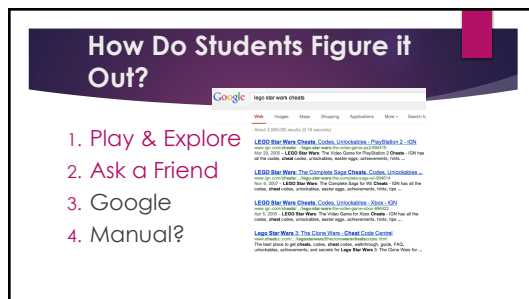
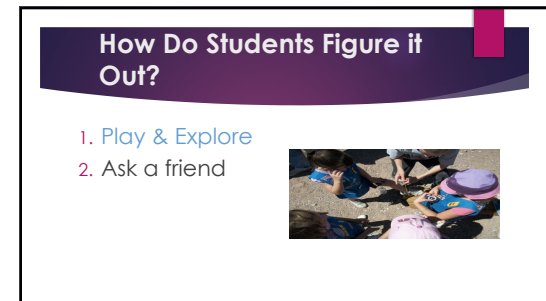
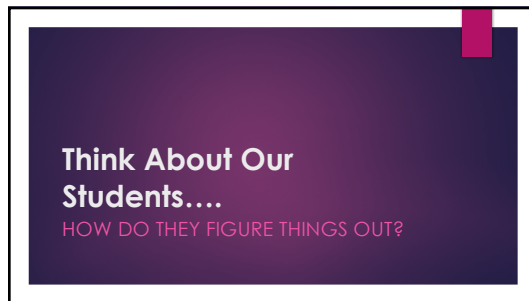
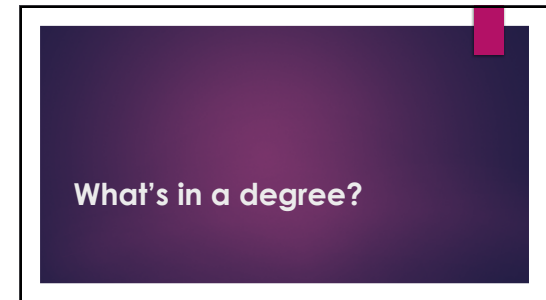
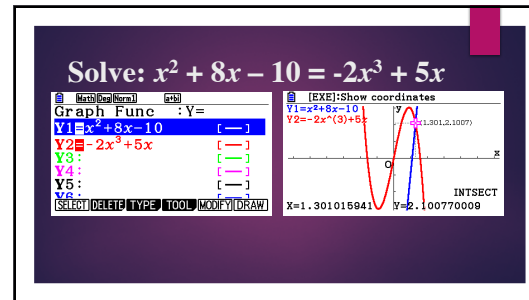
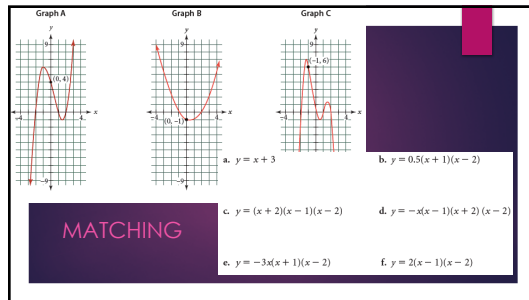
Turn & Talk

How would you use graphing to solve

1. $0 = x^2 - x - 2$
2. $1 = x^2 - x - 2$
3. $0 = x^4 + 3x^3 - 15x^2 - 19x + 30$

Kahoot.it

Implications?



Sound Familiar?

1. Play & Explore
 2. Ask a friend
 3. Go on a quest
- SMP5. Use appropriate tools strategically

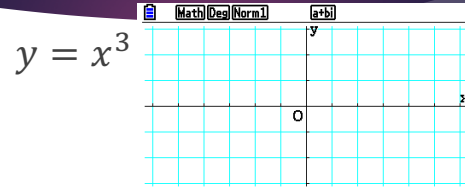
Let's Play!!

- Transformations
 - Polynomial degrees
- $$y = 2x^4$$

Polynomial Degree Aerobics

$$y = x^2$$

Polynomial Degree Aerobics



Polynomial Degree Aerobics

$$y = -x^2$$

Polynomial Degree Aerobics

$$y = x^4$$

Polynomial Degree Aerobics

$$y = x^5$$

Polynomial Degree Aerobics

$$y = -x^4$$

Polynomial Degree Aerobics

$$y = x^{-1}$$

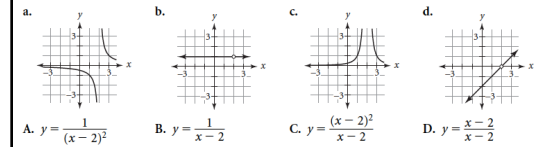
Turn & Talk

- ▶ What did we discover?
- ▶ How would you use this?

More Play!!

$$y = \frac{(x - A)^B}{(x - A)}$$

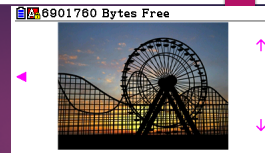
Where are we going?



Where are we going?

How can you use an equation to predict where holes and asymptotes are?

Increasing & Decreasing



Increasing & Decreasing

Recap

- ▶ Finding Roots (not in the garden)
- ▶ What's in a degree (besides a pay raise)?
- ▶ Increasing & decreasing (on a roller coaster?)

Conceptualize

- ▶ Make connections with graphs
- ▶ Use technology
- ▶ Engage students through exploration

Thank you to my inspiration

CASIO



Kahoot It!!

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