IM 9–12 MATH v.1

Unit 2

Polynomials and Rational Functions

ALGEBRA 2

Lesson 14

What Do You Know About Polynomials?

Illustrative Mathematics®

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Learning Goal

Let's put together what we've learned about polynomials so far.

Algebra 2

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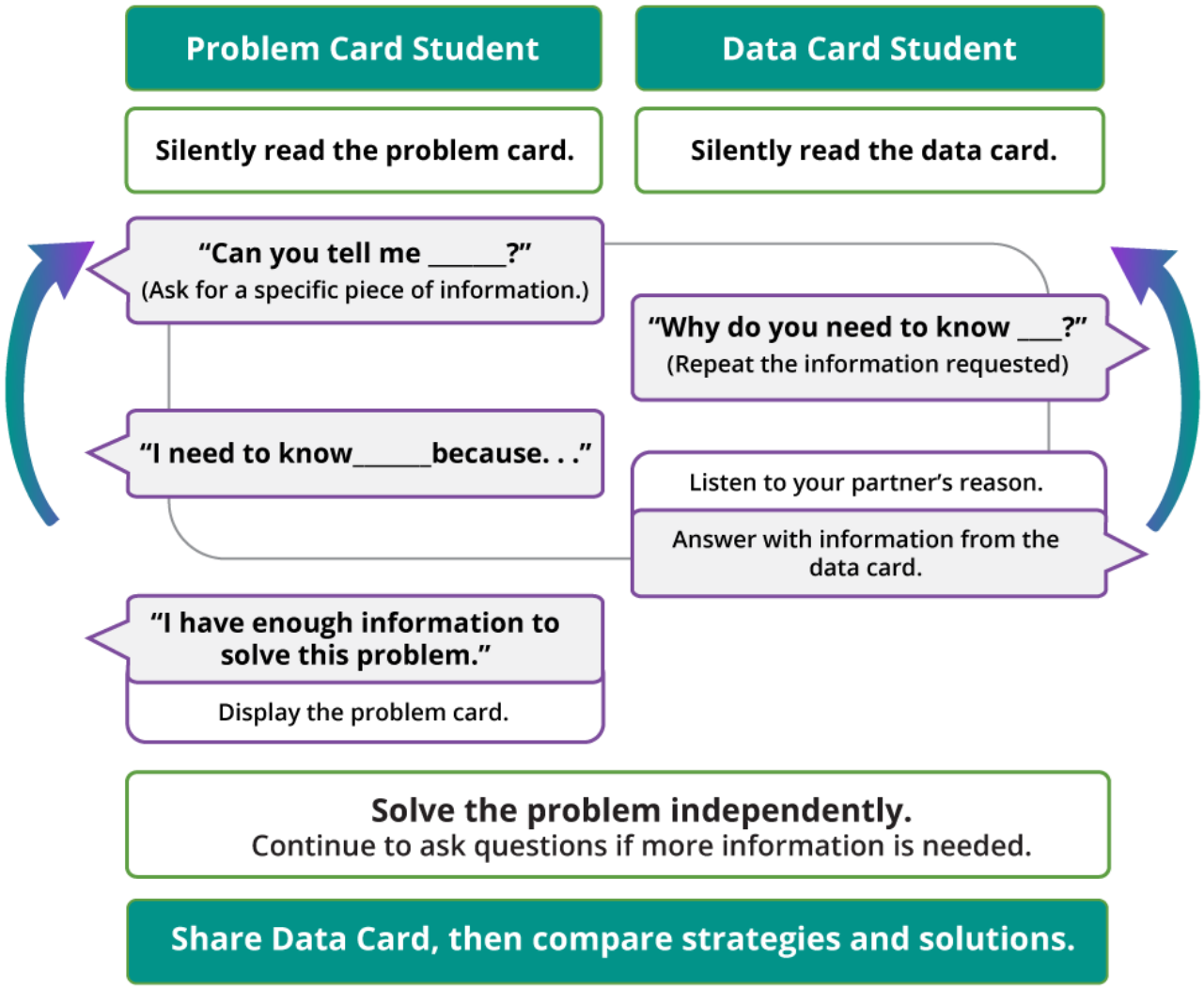
What Else is True?

Warm-up

$G(x)$ is a polynomial. Here are some things we know about it:

- It has degree 3.
- Both x and $(x + 4)$ are factors of G.
- It has 2 horizontal intercepts, but only 1 is negative.
- Its leading coefficient is negative.
- What else do we know is true about $G(x)$?

Info Gap: More Polynomials



Even More Polynomials

1. Without letting your partner see, do the following:
   a. write a polynomial of degree 3 or 4 in factored form
   b. sketch the graph of your polynomial
   c. rewrite its expression in standard form
2. On a separate slip of paper, write the standard form of your polynomial along with 1 of the factors (or 2 factors, if the polynomial has degree 4). Trade slips with your partner.
3. Use the information your partner gave you about their polynomial to:
   a. rewrite their polynomial in factored form
   b. sketch a graph of their polynomial showing all horizontal intercepts
4. Once you and your partner have finished graphing, check your factored form and graph with your partner and discuss any differences.

What Do You Know About Polynomials?

Lesson Synthesis

How would you explain to a student who isn't here today how to solve a problem like the one in the Information Gap? Include what questions you think they should ask and any other solution steps needed to graph the polynomial.

I can use division to rewrite a polynomial in factored form starting from a known factor and then sketch what it looks like.

Learning Targets

Algebra 2

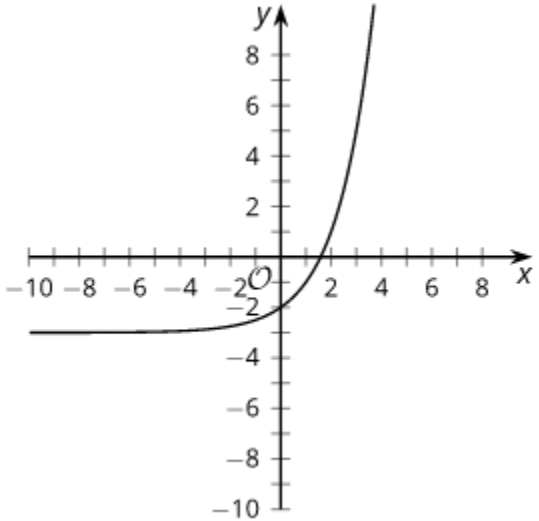
How Would You Factor?

Cool-down

A polynomial $D(x) = 3x^3 - 2x^2 - 15x + 14$ has known factors $(x - 2)$ and $(x - 1)$. Would you use a diagram, long division, or some other method to rewrite the expression for D in factored form? Explain your reasoning.

end behavior

How the outputs of a function change as we look at input values further and further from 0.



This function shows different end behavior in the positive and negative directions. In the positive direction the values get larger and larger. In the negative direction the values get closer and closer to -3.

multiplicity

The power to which a factor occurs in the factored form of a polynomial. For example, in the polynomial $(x - 1)^2(x + 3)$, the factor $x - 1$ has multiplicity 2 and the factor $x + 3$ has multiplicity 1.