Unit 2 Lesson 12: Polynomial Division (Part 1)

1 Notice and Wonder: A Different Use for Diagrams (Warm up)

Student Task Statement

What do you notice? What do you wonder?

A. $(x - 3)(x + 5) = x^2 + 2x - 15$

	x	5
x	x^2	$5x$
-3	$-3x$	-15

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

	x^2	$3x$	-4
x	x^3	$3x^2$	$-4x$
-1	$-x^2$	$-3x$	+4

C. $(x - 2)(?) = (x^3 - x^2 - 4x + 4)$

x	x^3		
-2			

2 Factoring with Diagrams

Student Task Statement

Priya wants to sketch a graph of the polynomial f defined by $f(x) = x^3 + 5x^2 + 2x - 8$. She knows $f(1) = 0$, so she suspects that $(x - 1)$ could be a factor of $x^3 + 5x^2 + 2x - 8$ and writes $(x^3 + 5x^2 + 2x - 8) = (x - 1)(?x^2 + ?x + ?)$ and draws a diagram.

x	x^3		
-1			

1. Finish Priya's diagram.

2. Write $f(x)$ as the product of $(x - 1)$ and another factor.

3. Write $f(x)$ as the product of three linear factors.

4. Make a sketch of $y = f(x)$.
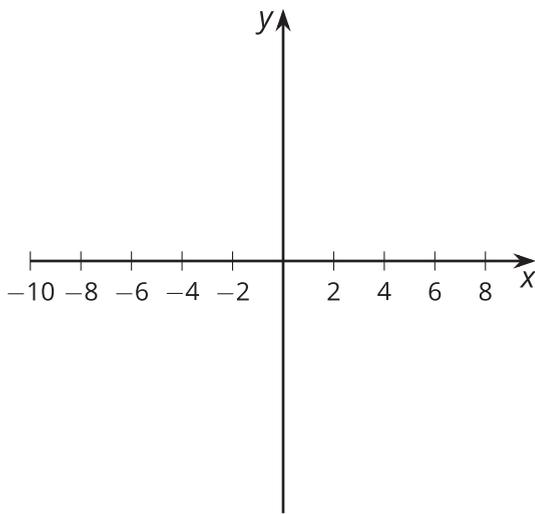
3 More Factoring with Diagrams

Student Task Statement

Here are some polynomial functions with known factors. Rewrite each polynomial as a product of linear factors. Note: you may not need to use all the columns in each diagram. For some problems, you may need to make another diagram.

1. $A(x) = x^3 - 7x^2 - 16x + 112, (x - 7)$

	x^2				
x	x^3	0			
-7	$-7x^2$				

2. $B(x) = 2x^3 - x^2 - 27x + 36, \left(x - \frac{3}{2}\right)$

	$2x^2$				
x	$2x^3$	$2x^2$			
$-\frac{3}{2}$	$-3x^2$				

3. $C(x) = x^3 - 3x^2 - 13x + 15, (x + 3)$

x					
3					

4. $D(x) = x^4 - 13x^2 + 36, (x - 2), (x + 2)$

   (Hint: $x^4 - 13x^2 + 36 = x^4 + 0x^3 - 13x^2 + 0x + 36$)

5. $F(x) = 4x^4 - 15x^3 - 48x^2 + 109x + 30, (x - 5), (x - 2), (x + 3)$