Lesson 6: Putting It All Together

Opening Exercise

Exercises 1–15: Polynomial Pass

Perform the indicated operation to write each polynomial in standard form.

1. $(x^2 - 3)(x^2 + 3x - 1)$

2. $(5x^2 - 3x - 7) - (x^2 + 2x - 5)$

3. $\dfrac{x^3 - 8}{x - 2}$

4. $(x + 1)(x - 2)(x + 3)$

5. $(x + 1) - (x - 2) - (x + 3)$

6. $(x + 2)(2x^2 - 5x + 7)$

7. $\dfrac{x^3 - 2x^2 - 65x + 18}{x - 9}$

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

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

10. $\dfrac{x^3 - x^2 - 5x - 3}{x - 3}$

11. $(x^2 + 7x - 12)(x^2 - 9x + 1)$

12. $(2x^3 - 6x^2 - 7x - 2) + (x^3 + x^2 + 6x - 12)$

13. $(x^3 - 8)(x^2 - 4x + 4)$

14. $\dfrac{x^3 - 2x^2 - 5x + 6}{x + 2}$

15. $(x^3 + 2x^2 - 3x - 1) + (4 - x - x^3)$

Sorting Activity

16. A. Review Exercises 1–15 and then sort them using the categories below. Explain how you know they belong to that category.

Addition Exercises: _____ Justification:	**Multiplication Exercise:** _____ Justification:
Subtraction Exercises: _____ Justification:	**Division Exercises:** _____ Justification:

B. What was similar in most of the 15 problems?

For Exercises 17–20, rewrite each polynomial in standard form by applying the operations in the appropriate order.

17. $\dfrac{(x^2+5x+20)+(x^2+6x-6)}{x+2}$

18. $(x^2 - 4)(x + 3) - (x^2 + 2x - 5)$

19. $\dfrac{(x-3)^3}{x^2-6x+9}$

20. $(x + 7)(2x - 3) - (x^3 - 2x^2 + x - 2) \div (x - 2)$

Lesson Summary

Anatomy of an nth-degree polynomial function

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \ldots + a_3 x^3 + a_2 x^2 + a_1 x + a_o$$

leading term   "term"

leading coefficient

coefficient

cubic term   quadratic term   linear term   constant term

[source: http://www.drcruzan.com/MathPolynomial.html]

The standard form of a polynomial expression means:

1. Write the term with the _____ exponent first.

2. Write the terms with lower exponents in _____ order.

3. A constant term always goes _____.

4. Always _____ like terms.

Homework Problem Set

For Problems 1–9, rewrite each expression as a polynomial in standard form.

1. $(3x - 4)^3$

2. $(2x^2 - x^3 - 9x + 1) - (x^3 + 7x - 3x^2 + 1)$

3. $(x^2 - 5x + 2)(x - 3)$

4. $\dfrac{x^4 - x^3 - 6x^2 - 9x + 27}{x - 3}$

5. $(x + 3)(x - 3) - (x + 4)(x - 4)$

6. $(x + 3)^2 - (x + 4)^2$

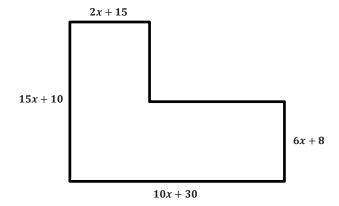7. $\dfrac{x^2 - 5x + 6}{x - 3} + \dfrac{x^3 - 1}{x - 1}$

8. $2(x^2 - 5x + 4) - (x + 3)(x + 2)$

9. $\dfrac{(x-2)^5}{x-2}$

10. Explain why these two quotients are different. Compute each one. What do they have in common? Why?

$$\frac{(x-2)^4}{x-2} \text{ and } \frac{x^4-16}{x-2}$$

11. What are the area and perimeter of the figure? Assume there is a right angle at each vertex.

$2x + 15$

$15x + 10$

$6x + 8$

$10x + 30$