Activity

7-4 Factoring Polynomials

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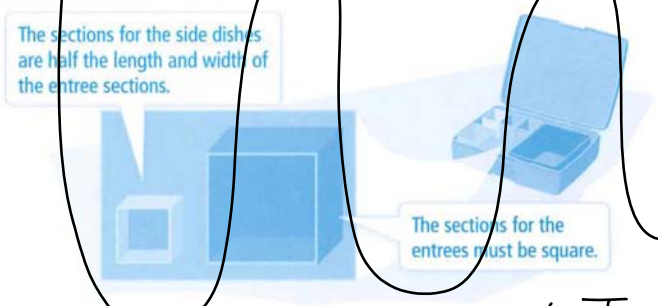
MODEL & DISCUSS

A catering company has been asked to design meal boxes for entrees and side dishes.



A. Design a meal box that meets each of these requirements:

a. Equal numbers of sections for entrees and side dishes

b. More sections for entrees than for side dishes

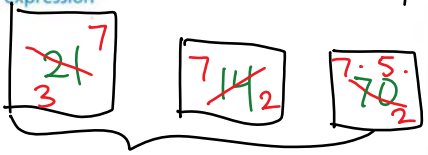
c. More sections for side dishes than for entrees

B. **Use Structure** For each meal box from Part A, write an algebraic expression to model the area of the meal boxes. MP.7

Toy Boxes
- allowed to play with a toy that's in all boxes....

"Common"

→ common toy → Algebra common factor / multiple...



7 greatest common factor

HABITS OF MIND

Construct Arguments Can you meet more than one of the three requirements with the same-sized meal box? Use a mathematical argument to support your answer. MP.3

Notes

Assess

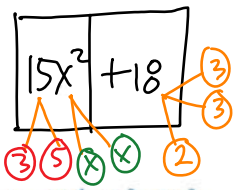
EXAMPLE 1 **Try It!** Find the Greatest Common Factor

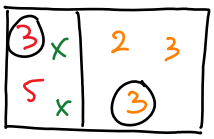
binomial

GCF
- largest # that divides into each term

1. Find the GCF of the terms of each polynomial.

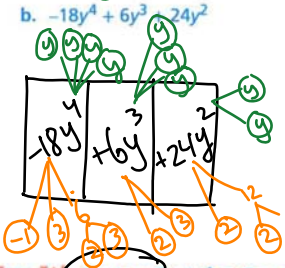
a. $15x^2 + 18$

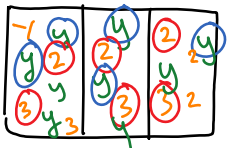




→ 3

b. $-18y^4 + 6y^3 - 24y^2$





→ $2 \cdot 3 \cdot y \cdot y \rightarrow 6y^2$

EXAMPLE 2 **Try It!** Factor Out the Greatest Common Factor

2. Factor out the GCF from each polynomial.

a. $x^3 + 5x^2 - 22x$

Factor: Divide

$x^2 + 5x - 22$

GCF: $1x$

x^3	$5x^2$	$-22x$

$\frac{x^3 + 5x^2 - 22x}{1x} \rightarrow \frac{x^3}{x} + \frac{5x^2}{x} - \frac{22x}{x}$

$x(x^2 + 5x - 22)$

GCF: x quotient: $x^2 + 5x - 22$

b. $-16y^6 + 28y^4 - 20y^3$

$-4y^3 + 7y - 5$

GCF: $4y^3$

$-16y^6$	$+28y^4$	$-20y^3$

$\frac{-16y^6}{4y^3} + \frac{28y^4}{4y^3} - \frac{20y^3}{4y^3}$

$-4y^3 + 7y - 5$

→ $4y^3(-4y^3 + 7y - 5)$

GCF: $4y^3$ quotient: $-4y^3 + 7y - 5$

HABITS OF MIND

Use Appropriate Tools If you model a trinomial $ax^2 + bx + c$ using algebra tiles, how can you tell if it has common factor? MP.5

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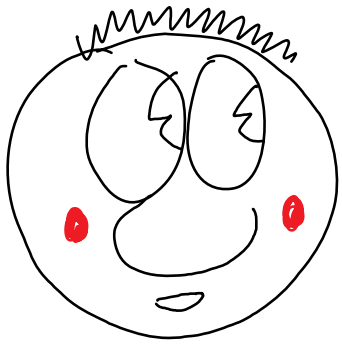
Notes

Assess

EXAMPLE 3 **Try It! Factor a Polynomial Model**

3. Suppose the dimensions of the narrower photos were increased to 2 in. by x in. What expression would represent the new arrangement based on the GCF?



HABITS OF MIND

Reason If none of the terms of a polynomial have the same variable, what will be true about the GCF? MP.2

Assess

Do You UNDERSTAND?

1. ESSENTIAL QUESTION How is factoring a polynomial similar to factoring integers?

2. Look for Relationships Why does the GCF of the variables of a polynomial have the *least* exponent of any variable term in the polynomial? MP.7

3. Reason What is the greatest common factor of two polynomials that do not appear to have any common factors? MP.2

4. Error Analysis Andrew factored $3x^2y - 6xy^2 + 3xy$ as $3xy(x - 2y)$. Describe and correct his error. MP.3

5. Error Analysis Wendell says that the greatest common factor of x^6 and x^8 is x^2, since the greatest common factor of 6 and 8 is 2. Is Wendell correct? Explain. MP.3

Do You KNOW HOW?

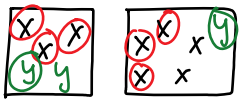
Find the GCF of each pair of monomials.

6. $10x$ and 25

5

7. x^3y^2 and x^5y

x^3y



8. $8a^2$ and $28a^5$

$4a^2$

9. $4x^3$ and $9y^5$

no GCF

10. $12a^5b$ and $16a^4b^2$

$4a^4b$

11. $14x^{10}y^8$ and $15x^6y^9$

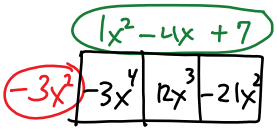
x^6y^8

Factor out the GCF from each polynomial.

12. $10a^2b + 12ab^2$

$2ab(5a + 6b)$

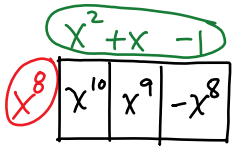
13. $-3x^4 + 12x^3 - 21x^2$



14. $15x^3y - 10x^2y^3$

$5x^2y(3x - 2y^2)$

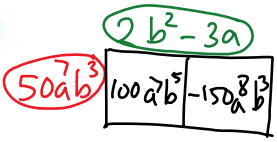
15. $x^{10} + x^9 - x^8$



16. $3x^3y^2 - 9xz^4 + 8y^2z$

done

17. $100a^7b^5 - 150a^8b^3$



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