Mr. Ward Answer Key

Factoring Polynomials

To factor polynomials we have to find the GMF, or the greatest monomial factor. Once we find it, we factor it out of the polynomial to simplify it.

Example #1 Factor $5x^2 - 3x$

Step 1: Find the Greatest Monomial Factor.

$5x^2 = 5 \cdot x \cdot x$
$3x = 3 \cdot x$

What do these two monomials have in common? X

Step 2: Take the GMF out by *undoing* the Distributive Property.

Since both terms had an x in common, we will take "x" out of both terms. Then we write what we have left on the inside of the parenthesis.

$x(5x - 3)$

Step 3: Check your answer by multiplying the polynomial back out.

Take the x that we took out and re-multiply it to both the 5x and the -3. If we've done our factoring correctly, we should get back to what the original problem was.

Multiply the polynomial out below. Show your work and steps.

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

Practice Problem #1 Factor $10y^3 + 20y^2 - 5y$

Step 1: Find the greatest monomial factor

$10y^3 = 2 \cdot 5 \cdot y \cdot y \cdot y$
$20y^2 = 2 \cdot 2 \cdot 5 \cdot y \cdot y$
$5y = 5 \cdot y$

What do these three monomials have in common? 5y

Step 2: Take the GMF out

$5y(2y^2 + 4y - 1)$

Step 3: Check your answer

$5y(2y^2 + 4y - 1)$ $\quad 10y^3 + 20y^2 - 5y$

When you are done come show me your work to all three steps so I know you're on the right track and understanding the material!

You should now be able to say:

- I can factor polynomials by finding the greatest monomial factor

Assignment: **pg 535 #1-10, 27-35**

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Pg 535

1. $15a = 3 \cdot 5 \cdot a$
$5a^2 = 5 \cdot a \cdot a$
$5a(3 - a)$

2. $10g^3 = 2 \cdot 5 \cdot g \cdot g \cdot g$
$3g = 3 \cdot g$
$g(10g^2 - 3)$

3. $-35x = -5 \cdot 7 \cdot x$
$42 = 2 \cdot 3 \cdot 7$
$7(-5x + 6)$

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

5. $12h^4 = 2 \cdot 2 \cdot 3 \cdot h \, h \cdot h \cdot h$
$8h^2 = 2 \cdot 2 \cdot 2 \cdot h \cdot h$
$-6h = -2 \cdot 3 \cdot h$
$2h(6h^3 + 4h - 3)$

6. $3x^2 = 3 \cdot x \cdot x$
$-9x = -3 \cdot 3 \cdot x$
$3 = 3$
$3(x^2 - 3x + 1)$

7. $9m^2 = 3 \cdot 3 \cdot m \cdot m$
$m = m$
$m(9m + 1)$

8. $14n^3 = 2 \cdot 7 \cdot n \cdot n \cdot n$
$7n = 7 \cdot n$
$7n^2 = 7 \cdot n \cdot n$
$7n(2n^2 + 1 + n)$

9. $36f = 2 \cdot 2 \cdot 3 \cdot 3 \cdot f$
$18f^2 = 2 \cdot 3 \cdot 3 \cdot f \cdot f$
$3 = 3$
$3(12f + 6f^2 + 1)$

10. $-15b^2 = -3 \cdot 5 \cdot b \cdot b$
$7b = 7 \cdot b$
$b(-15b + 7)$

27. $9y^2 = 3 \cdot 3 \cdot y \cdot y$
$45y = 3 \cdot 3 \cdot 5 \cdot y$
$9y(y + 5)$

28. $36d^3 = 2 \cdot 2 \cdot 3 \cdot 3 \cdot d \cdot d \cdot d$
$24 = 2 \cdot 2 \cdot 2 \cdot 3$
$12(3d^3 + 2)$

29. $-14x^4 = -2 \cdot 7 \cdot x \cdot x \cdot x \cdot x$
$5x^2 = 5 \cdot x \cdot x$
$x^2(-14x^2 + 5)$

30. $-15f = -3 \cdot 5 \cdot f$
$-10f^2 = -2 \cdot 5 \cdot f \cdot f$
$-5f(3 + 2f)$

→

31. $-4d^4 = -2 \cdot 2 \cdot d \cdot d \cdot d \cdot d$

$d^3 = d \cdot d \cdot d$

$-3d^2 = -3 \cdot d \cdot d$

$d^2(-4d^2 + d - 3)$

32. $14x^3 = 2 \cdot 7 \cdot x \cdot x \cdot x$

$63x^2 = 3 \cdot 3 \cdot 7 \cdot x \cdot x$

$-7x = -7 \cdot x$

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

33. $21c^2 = 3 \cdot 7 \cdot c \cdot c$

$14c = 2 \cdot 7 \cdot c$

$7c(3c + 2)$

34. $33d^3 = 3 \cdot 11 \cdot d \cdot d \cdot d$

$22d = 2 \cdot 11 \cdot d$

$11 = 11$

$11(3d^3 + 2d + 1)$

35. $-5g^3 = -5 \cdot g \cdot g \cdot g$

$-15g^2 = -3 \cdot 5 \cdot g \cdot g$

$-5g^2(g + 3)$