Your Name

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Factoring out GCF

Notes

Remember....

The distributive property

$4(x + 3)$

$4 \cdot x + 4 \cdot 3$

$4x + 12$

$3x(x + 2)$

Put GCF in front

$3x \cdot x + 3x \cdot 2$

Look for GCF

$3x^2 + 6x$

$4y^2(x + 3y)$

Factoring

is just undoing

the distributive property!

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Factoring a Polynomial

GCF

Always

Two or three terms: Factor out GCF FIRST. Write the GCF on the outside of the parenthesis, and the left over factors that are added or subtracted inside the parenthesis. As if you undid the distributive property

ex. $12a^2 + 3a$ what is GCF? $3a$

$3a \cdot 4a + 3a \cdot 1$

$3a(4a+1)$ completely factored

to check (distribute)

ex. $6m + 4m^2n + 8m^3n^2$ GCF? $2m$

$2m \cdot 3 + 2m \cdot 2mn + 2m \cdot 4m^2n^2$

$2m(3 + 2mn + 4m^2n^2)$

It is the simple things in life. . . .

The Zero Product Property

Anything times 0 equals 0

a(0)= 0 (0)b = 0

if ab = 0 then **either b was 0 or a was 0**

Solving Using GCF

lead exponent determines # of solutions

$6a^2 + 3a = 0$

$3a \cdot 2a + 3a \cdot 1 = 0$

$3a(2a+1) = 0$

$3a = 0$ $\quad 2a+1=0$

$a = 0$ $\quad 2a = -1$

$a = -\frac{1}{2}$

$45y^2 - 18y = 0$

$9y(5y-2) = 0$

$9y = 0$ $\quad 5y - 2 = 0$

$y = 0$ $\quad 5y = 2$

$y = \frac{2}{5}$

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Factor each polynomial if possible

$3m + 36$

$3(m+12)$

$5x^2 - 35x$

$5x(x-7)$

$4p^2q^2 - 16pq^2 + 56pq^3$

$4pq^2(p - 4 + 14q)$

$4a^3b + 28a^2b$

$4a^2b(a+7)$

$3x^2 = 21x$

Never divide by a variable

$\frac{3x}{3} = \frac{21}{3}$

$x = 7$

* Make equation = 0 move terms over

$3x^2 - 21x$

$-21x \quad -21x$

* $3x^2 - 21x = 0$

$3x(x-7) = 0$

Set each factor = 0 and solve

$\frac{3x}{3} = \frac{0}{3}$ $\quad x - 7 = 0$

$x = 0$ $\quad x = 7$

$-9a^2 + 63a = 0$

$-9a(a-7) = 0$

$\frac{-9a}{-9} = \frac{0}{-9}$ $\quad a - 7 = 0$

$a = 0$ $\quad a = 7$

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Assignment:

pg. 381 #25-38 all
odd
and 37 and 38

In Exercises 25–30, factor the polynomial. *(See Example 3.)*

25. $5z^2 + 45z$

26. $6d^2 - 21d$

27. $3y^3 - 9y^2$

28. $20x^3 + 30x^2$

29. $5n^6 + 2n^5$

30. $12a^4 + 8a$

In Exercises 31–36, solve the equation. *(See Example 4.)*

31. $4p^2 - p = 0$

32. $6m^2 + 12m = 0$

33. $25c + 10c^2 = 0$

34. $18q - 2q^2 = 0$

35. $3n^2 = 9n$

36. $-28r = 4r^2$

37. ERROR ANALYSIS Describe and correct the error in solving the equation.

✗
$6x(x + 5) = 0$
$x + 5 = 0$
$x = -5$
The root is $x = -5$.

38. ERROR ANALYSIS Describe and correct the error in solving the equation.

✗
$3y^2 = 21y$
$3y = 21$
$y = 7$
The root is $y = 7$.

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Assignment Key: pg. 381 #25-37 all

25. $5z(z + 9)$

26. $3d(2d - 7)$

27. $3y^2(y - 3)$

28. $10x^2(2x + 3)$

29. $n^5(5n + 2)$

30. $4a(3a^3 + 2)$

31. $p = 0, p = \frac{1}{4}$

32. $m = 0, m = -2$

33. $c = 0, c = -\frac{5}{2}$

34. $q = 0, q = 9$

35. $n = 0, n = 3$

36. $r = 0, r = -7$

37. also need to set $6x = 0$ and solve; $6x = 0$ or $x + 5 = 0$; $x = 0$ or $x = -5$; The roots are $x = 0$ and $x = -5$.

38. cannot divide both sides by y, because y could be 0 and division by 0 is undefined; $3y^2 - 21y = 0$; $3y(y - 7) = 0$; $3y = 0$ or $y - 7 = 0$; $y = 0$ or $y = 7$; The roots are $y = 0$ and $y = 7$.