3/1 Algebra I - Downing

Bellwork: what numbers can you multiply to get "c" and add to get "b"

1) $b=-35$ $c=-200$
2) $b=-15$ $c=44$
3) $b=14$ $c=-51$
4) $b=0$ $c=-256$
5) $b=5$ $c=12$

-200	
1	200
2	100
4	50
(5)	(-40)
8	25
10	20

44	
1	44
2	22
(-4)	(-11)

-51	
1	51
(-3)	(17)

-256	
1	256
2	128
4	64
8	32
(16)	(16)

12	
1	12
2	6
3	4

Not Possible

Go over HW

★ Add to notes "Factor out GCF"

★ 4. If the leading coefficient is NEGATIVE, then factor out a Negative ★

Find the GCF

Ex) $45x^6y^3z^2$ $24x^4y^5z$ GCF = $3x^4y^3z$

45	
(3)	15
5	9

24	
1	24
2	12
(3)	8
4	6

(xxxx)xx ← (xxxx) ← they both have at least 4 x's

(yyy) ← (yyy)yy ← they both have at least 3 y's

(z) ← (z) ← they both have at least 1 z.

Ex) $48x^3y^3$ $24x^2y^5z$ GCF = $24x^2y^2$ ★ if they both have the same letter – pick the smallest exponent

Factor out the GCF

Ex) $\frac{-36x^2}{-6}+\frac{54x}{-6}-\frac{6}{-6}$ GCF = -6

$-6(-6x^2+9x-1)$

Ex) $\frac{-20x^7}{-4x^2}+\frac{4x^5}{-4x^2}-\frac{28x^4}{-4x^2}+\frac{40x^2}{-4x^2}$ GCF = $-4x^2$ ★ take out a negative GCF since the leading coefficient is a negative.

$-4x^2(5x^2-x^3+7x^2-10)$

7.5A GCF and Factoring by Grouping

Factoring by Grouping - Factoring a Polynomial w/ 4 terms

Steps

1. Factor the GCF out of ALL terms (if possible)
2. Group the first 2 terms and the last 2 terms using parenthesis. ★ Be sure to include negatives if necessary.
3. Factor out the GCF out of each pair.
4. Rewrite as 2 binomials being multiplied

Example

$\frac{120}{6}x^3 - \frac{150}{6}x^2 - \frac{48}{6}x + \frac{60}{6}$

GCF = 6

$6(20x^3 - 25x^2 - 8x + 10)$

$\left(\frac{20x^3}{5x^2} - \frac{25x^2}{5x^2}\right)\left(\frac{-8x}{-2} + \frac{10}{-2}\right)$

$5x^2(4x - 5) - 2(4x - 5)$

these should be the same

$6(5x^2 - 2)(4x - 5)$

Ex) $\left(\frac{48x^3}{6x^2} + \frac{30x^2}{6x^2}\right)\left(\frac{-8x}{-1} - \frac{5}{-1}\right)$

$6x^2(8x + 5) - 1(8x + 5)$

$\boxed{(6x^2 - 1)(8x + 5)}$

Ex) $24x^4 + 12x^3 + 32x^2 + 16x$

$4x\left(\frac{6x^3}{3x^2} + \frac{3x^2}{3x^2}\right)\left(+\frac{8x}{4} + \frac{4}{4}\right)$

$3x^2(2x + 1) + 4(2x + 1)$

$4x(3x^2 + 4)(2x + 1)$

Ex) The area of a rectangle is $x^3 + 3x^2 + x + 3$. What polynomials would represent the length and width?

Factor $\left(\frac{x^3}{x^2} + \frac{3x^2}{x^2}\right)\left(+\frac{x}{1} + \frac{3}{1}\right)$

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

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

length width

HW - 7.5A Worksheet