

Section 5.2 notes

Objective: Greatest Common Factor and factor by grouping Factoring Unit (F.IF.8)

Factoring: The reverse of multiplying. It means figuring out what you would multiply together to get a polynomial, and writing the polynomial as the product of several factors (writing it as a multiplication problem).

Greatest Common Factor (GCF): The monomial with the largest possible coefficient and the variables with the largest possible exponents that divides evenly into every term of the polynomial.

Prime Polynomial: A polynomial that cannot be factored.

Factoring Out a Common Factor:

1. Find the GCF.
2. Use the distributive property in reverse to “factor out” the GCF:
Write the GCF outside a set of parentheses.

Inside the parentheses, write what is left when you *divide* the original terms by the GCF. **Note:** If the GCF is the same as one of the terms of the polynomial, there will be a 1 left inside the parentheses.

3. If leading coefficient is negative, factor out a common factor with a negative coefficient.

Examples: Factor the following expressions.

a) $x^2 + 3x$

~~$x \cdot x$~~ ~~$3 \cdot x$~~
 $x(x + 3)$

check my work
 $x(x + 3)$
 $x^2 + 3x$

$-2y + 6$
 ~~$-1 \cdot 2y$~~ ~~$2 \cdot 3$~~
 $2(-1y + 3)$
 ~~$-2(y - 3)$~~

b) $-2y + 6$

$-1(2y - 6)$
 ~~$2y$~~ ~~$2 \cdot 3$~~
 $-1 \cdot 2(y - 3)$
 $-2(y - 3)$

c) $4n^2 - 20$

~~$1 \cdot 4n \cdot n$~~ ~~$4 \cdot 5$~~
 $4(n^2 - 5)$

d) $15d^2 + 20d^4$

~~$5 \cdot 3d^2$~~ ~~$5 \cdot 4d^4$~~
 $5d^2(3 + 4d^2)$

e) $2z^3 + 2z$
~~2~~z~~z~~z~~z~~ ~~2~~z~~z~~0

$2z(z^2 + 1)$

f) $-6h^2 + 3h$

~~1~~0~~2~~0~~3~~h~~h~~ ~~3~~h

$3h(-2h + 1)$

$-3h(2h - 1)$

g) $-20m^3 + 24m^2 - 32m$

~~1~~0~~4~~0~~5~~mm ~~4~~0~~6~~mm ~~4~~0~~8~~m

$4m(-5m^2 + 6m - 8)$

$-4m(5m^2 - 6m + 8)$

h) $2a^2b^3c^4 + 8a^4b^8c^7 - 6a^3bc^5$

~~2~~aa~~b~~³⁻¹ ~~2~~4aaaa~~b~~⁸⁻¹~~c~~⁷⁻⁴ ~~2~~3aaa~~b~~⁵⁻⁴~~c~~

$2a^2bc^4(b^2 + 4a^2b^7c^3 - 3a^1c^1)$

i) $p(q-6) + 2(q-6)$

GCF $(q-6)$

$(q-6)(p+2)$

b) $mp + mq + np + nq$

	P	q	
M	MP	mq	←
N	NP	Nq	

$(M+N)(P+q)$

c) $4y^3 + 2y^2 - 6y - 3$

	$2y$	1	
$2y^2$	$4y^3$	$2y^2$	←
-3	$-6y$	-3	

$(2y^2 - 3)(2y + 1)$

d) $20h^3 - 16h^2 - 5h + 4$

	$5h$	-4	
$4h^2$	$20h^3$	$-16h^2$	←
-1	$-5h$	4	

$(4h^2 - 1)(5h - 4)$

e) $4v^3 - 14v^2 + 12v - 42$

$2\sqrt{}$	$4v^3$	$-14v^2$	$(2v-7)(2v^2+6)$
6	$12v$	-42	$(2v-7)2(v^2+3)$

f) $4a - 7ab - 12 + 21b$

$1a$	$4a$	$-7ab$	$(1a-3)(4-7b)$
-3	-12	$21b$	

g) $6q^3 + 2q^2r - 36q - 12r$

$2q^2$	$6q^3$	$2q^2r$	$(3q+r)(2q^2-12)$
-12	$-36q$	$-12r$	$(3q+r)(2)(q^2-6)$

h) $15w^3z^2 - 20w^2z - 60wz + 80$

$5w^2z$	$15w^3z^2$	$-20w^2z$	$(3wz-4)(5w^2z-20)$
-20	$-60wz$	$+80$	

$(3wz-4)(5)(w^2z-4)$