Name: _____ Date: _____

7.3 Factoring by GCF (Greatest Commmon Factor) Algebra 1CC

"I can factor polynomial expressions using the Greatest Common Factor."

What is factoring? The process of splitting a polynomial into the product of its factors.

GCF on calc: MATH NUM 9:gcd

There will be several ways to factor; the approach we will take depends on the polynomial. Today, we will start by using the *greatest common factor* (GCF) of the polynomial.

Steps for finding a GCF:	Example: $3x+12$	ANSWER
1. Look at **coefficients** first. Find GCF.	3, 12 GCF = 3	
2. A **variable must be common to all terms** to be a GCF. If it is, take the one with the **smallest exponent**	No variable in common.	
3. **Divide** all terms by the GCF to get the remainder in parentheses.	$\frac{3x}{3}+\frac{12}{3}$	GCF(remainder) $3(x+4)$
4. Check answer by re-distributing.	$3(x+4)=3x+12$ ✓	

Steps for finding a GCF:	Example: $21cd-3d$	ANSWER
1. Look at **coefficients** first. Find GCF. number	21, 3 ~~GCF = 3~~	
2. A **variable must be common to all terms** to be a GCF. If it is, take the one with the **smallest exponent**	'd' is in all terms GCF = 3d	
3. **Divide** all terms by the GCF to get the remainder in parentheses.	$\frac{21cd}{3d}-\frac{3d}{3d}$	$3d(7c-1)$
4. Check answer by re-distributing.	$3d(7c-1)=21cd-3d$ ✓	

Steps for finding a GCF:	Example: $4y^2-24y$	ANSWER
1. Look at **coefficients** first. Find GCF. numbers	4, 24 ~~GCF = 4~~	
2. A **variable must be common to all terms** to be a GCF. If it is, take the one with the **smallest exponent**	y is common to all terms GCF = 4y	
3. **Divide** all terms by the GCF to get the remainder in parentheses.	$\frac{4y^2}{4y}-\frac{24y}{4y}$	$4y(y-6)$
4. Check answer by re-distributing.		

$\frac{y(y)}{y}$

PRACTICE Factor the polynomials by finding the GCF (Greatest common factor). Check by redistributing.

MILD	1. $2x + 4$	2. $5x + 30$	3. $6z + 12$
	Re-distribute:	Re-distribute:	Re-distribute:
	4. $7y - 7$	5. $8t + 24$	6. $9x - 81$
	Re-distribute:	Re-distribute:	Re-distribute:
MEDIUM	7. $24xy - 4y$	8. $18xy - 9x$	9. $36ab + 18b$
	Re-distribute:	Re-distribute:	Re-distribute:
	10. $5x + 30y$	11. $6a^2 + 18$	12. $8m + 36n$
	Re-distribute:	Re-distribute:	Re-distribute:
HOT	13. $15a^2 - 30a$	14. $10y^2 - 5y$	15. $16bc^2 + 24bc$ GCF = 8bc $8bc(2c+3)$
	Re-distribute:	Re-distribute:	Re-distribute:

Answers Scrambled:

$5(x+6)$	$9(x-9)$	$5y(2y-1)$	$7(y-1)$	$5(x+6y)$
$8(t+3)$	$15a(a-2)$	$4(2m+9n)$	$18b(2a+1)$	$9x(2y-1)$
$6(z+2)$	$6(a^2+3)$	$2(x+2)$	$4y(6x-1)$	$8bc(2c+3)$

Why Are Handcuffs Like Souvenirs?

Use the distributive property to complete each statement below. Find your answer in the corresponding answer column. Write the letter of that exercise in the box that contains the number of the answer.

(A) $7(a+b)=7a+$ ____	(18) ax	(O) $5x+5y=5(x+$ ____ $)$	(16) 4
(R) $4(5+x)=20+$ ____	(17) $4a$	(T) $9a+9b=9($ ____ $+b)$	(5) u
(Y) $3(2x+9)=6x+$ ____	(9) $7b$	(W) $4m+4n=$ ____ $(m+n)$	(22) a
(S) $8(3x+1)=$ ____ $+8$	(1) 5	(H) $ab+3a=a(b+$ ____ $)$	(11) x
(O) $a(4+b)=$ ____ $+ab$	(14) $4x$	(E) $xy+15x=$ ____ $(y+15)$	(21) $2y$
(E) $x(y+10)=$ ____ $+10x$	(23) $24x$	(A) $bu+uv=$ ____ $(b+v)$	(13) y
(I) $2(7x+4y)=14x+$ ____	(10) $30x$	(F) $\frac{2}{5}m+\frac{2}{5}n=\frac{2}{5}($ ____ $+n)$	(19) $3a$
(D) $6(9+5x)=54+$ ____	(6) $6y$		(2) 3
(W) $x(a+3b)=$ ____ $+3bx$	(3) xy	(M) $\frac{3}{4}a+\frac{3}{4}b+\frac{3}{4}c=$ ____ $(a+b+c)$	(12) m
(E) $a(8x+2y)=8ax+$ ____	(4) 27	(S) $7ax+2ay=a(7x+$ ____ $)$	(15) k
(T) $\frac{1}{2}(4a+10)=2a+$ ____	(7) $2ay$	(T) $4kx+11ky=$ ____ $(4x+11y)$	(8) $\frac{3}{4}$
(R) $\frac{2}{3}(12+9y)=8+$ ____	(20) $8y$	(R) $3ay+8by=y($ ____ $+8b)$	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

Names in group _____

DOUBLE CROSS

1. What do you get when you cross a chicken with a centipede?

5	8	11	14	12	2	14	1	10	13	11	6	7	4	13

2. What do you get when you cross a mink with an octopus?

12	7	3	12	11	3	9	12	14	10	13

Factor each polynomial below as the product of its greatest monomial factor and another polynomial. Find your answer and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it. Keep working and you will find out what you get from these "double crosses."

(1) $6x^2 + 9x + 27$

(2) $5x^3 + 30x^2 - 15x$

(3) $14x^3 - 7x^2 - 35x$

(4) $25x^3 - 40x^2 + 10x$

(5) $4x^4 + 20x^3 + 12x^2$

(6) $3x^4 + 12x^2 - 33$

(7) $49x^4 - 14x^3 - 28x$

Answers:

(E) $4x^2(x^2 + 5x + 3)$

(L) $3(x^4 + 6x^2 + 11)$

(O) $7x(2x^2 - x - 5)$

(U) $3(2x^2 + 3x + 9)$

(C) $7x(7x^3 - 2x^2 - 4)$

(K) $5x(5x^2 - 8x + 2)$

(B) $7x(7x^3 + 2x^2 - 3)$

(D) $5x(x^2 + 6x - 3)$

(I) $3(x^4 + 4x^2 - 11)$

(8) $2a^2 + 12ab + 6b^2$

(9) $6a^3 - 18ab$

(10) $3a^2b^2 + 15ab^3$

(11) $8a^4b^4 - 28a^3b^3 + 4a^2b^2$

(12) $6a^4b - 10a^3b^2 - 6a^2b^3$

(13) $7ab^5 - 56ab$

(14) $24ab^4 + 12ab^3 - 18ab^2$

Answers:

(H) $6ab^2(4b^2 - 3b - 2)$

(X) $2(a^2 + 6ab + 3b^2)$

(S) $7ab(b^4 - 8)$

(M) $3ab^2(a + 5b)$

(R) $6ab^2(4b^2 + 2b - 3)$

(N) $4a^2b^2(2a^2b^2 - 9ab + 2)$

(A) $2a^2b(3a^2 - 5ab - 3b^2)$

(F) $6a(a^2 - 3b)$

(T) $4a^2b^2(2a^2b^2 - 7ab + 1)$