

# 7.5 Greatest Common Factor

Factor	A number when multiplied w/ another produces a given # or expres
GCF	Greatest Common Factor - Greatest Factor that divides two #'s
Prime	No positive dividers other than 1 or itself

Factoring is like dividing, or using the distributive property backwards.

To find the GCF or (Greatest Common Factor), we have to:

1. See what they ALL have in common (including numbers and variables)
2. Remove what is in common
3. Show what is left
4. Check by redistributing what you removed!

**Directions:** Find the GCF in each of the following.

1.  $\underline{2x^2} - \underline{10x}$       GCF:  $2x$

$$2x(x - 5)$$

2.  $\underline{8x^2y^5} + \underline{4x^5y^3} + \underline{12x^3y^3}$

$$\text{GCF: } 4x^2y^3$$

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

3.  $\underline{24x^5y^2} + \underline{16x^7y^3} + \underline{40x^3y^2}$

$$8x^3y^2(3x^2 + 2x^4y + 5)$$

4.  $4x^8y^4 + 2x^3y^3 + 12x^5y^6$

$$2x^3y^3(2x^5y + 1 + 6x^2y^3)$$

5.  $27x^6y^7 + 81x^2y^3 + 18x^3y^4$

$$9x^2y^3$$

$$9x^2y^3(3x^4y^4 + 9 + 2xy)$$

6.  $3x^3 + 12x^2 + 9x$

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

7.  $8x - 56x^3$



$$8x(1 - 7x^2)$$

8.  $4a^4b - 16a^2b^2 + 4ab^4$

$$4ab(a^3 - 4ab + b^3)$$

9.  $6a^3b^2 - 12a^2b^3 + 18ab$

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

	FACTORED FORMAT:	MULTIPLIED & SIMPLIFIED FORMAT:
1.	$4(x + 3)$	$4x + 12$ ✓
2.	$7(3x - 2)$	$21x - 14$
3.	$4x(x + 3)$	$4x^2 + 12x$
4.	$2xy(3x + 5y)$	$6x^2y + 10xy^2$ ✓
5.	$5x(2xy + 3)$	$10x^2y + 15x$
6.	$2a(5a - 7)$	$10a^2 - 14a$ ✓
7.	$-9(7x^2 + 2x - 5)$	$-63x^2 - 18x + 45$
8.	$3ab(17c^2 - 7c - 5)$	$51abc^2 - 21abc - 15ab$
9.	$-15(2x^3 + 5x^2 + 7x - 3)$	$-30x^3 - 75x^2 - 105x + 45$
10.	$-16(2x - y)$	$-32x + 16y$
11.	$-28x(2x - 7)$	$-56x^2 + 196x$ ✓
12.	$-5(3x - 1)$	$-15x + 5$
13.	$3abc(2ab - c)$	$6a^2b^2c - 3abc^2$ ✓
14.	$5ab$  $(4a - 3b)$	What is the Area? $20a^2b - 15ab^2$ ✓
15.	Length: $7y - 3$	Area is $\frac{7y^2 - 3y}{y}$ 

Answer

(10)

Calc  
Math → Num → gcd  
(#, #)

$$a) 5x^2 + 10x = \underline{5x(x + 2)}$$

$$b) 6x^3 - 18x^2 = \underline{6x^2(x - 3)}$$

$$c) 4x^3 - 8x^2 + 12x = \underline{4x(x^2 - 2x + 3)}$$

$$d) -6m^6 - 12m^3 - 24m^2 = \underline{-6m^2(m^4 + 2m + 4)}$$

$$e) 9c^3d^2 - 12c^2d^5 = \underline{3c^2d^2(3c - 4d^3)}$$

$$f) 10y^4 + 25y^3 - 15y^2 = \underline{5y^2(2y^2 + 5y - 3)}$$

$$g) 4x^4y - 8x^3y^2 + 5x^2y^3 = \underline{x^2y(4x^2 - 2xy + 5y^2)}$$

$$6a^3 + 15a =$$

$$3a(2a^2 + 5)$$

$$8. x^2y^4 - x^2y - 4x^2 =$$

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

$$32b^2 + 12b =$$

$$4b(8b + 3)$$

$$9. a^{5n} + a^{2n} =$$

$$a^{2n}(a^{3n} + 1)$$

$$12a^5b^2 + 16a^4b =$$

$$4a^4b(3ab + 4)$$

$$10. 3x^2y - 9xy + 12y =$$

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

**Homework on Factoring by Greatest Common Factor 9/10**

Factor the greatest common factor out of the polynomial. If the GCF is 1, write PRIME.

- |     |                               |                                 |     |                                  |                               |     |                   |                   |
|-----|-------------------------------|---------------------------------|-----|----------------------------------|-------------------------------|-----|-------------------|-------------------|
| 1.  | $8x^2 + 10x$                  | $2x(4x + 5)$                    | 2.  | $12y - 16$                       | $4(3y - 4)$                   | 3.  | $-15d^5 + 45d^3$  | $-15d^3(d^2 - 3)$ |
| 4.  | $13a + 20b$                   | PRIME                           | 5.  | $c^3 + c^2 - c$                  | $c(c^2 + c - 1)$              | 6.  | $6n^2 - 30n + 42$ | $6(n^2 - 5n + 7)$ |
| 7.  | $-7m^2 - 10m + 17$            | PRIME                           | 8.  | $18p^3 - 63p^2 - 9p$             | $9p(2p^2 - 7p - 1)$           | 9.  | $18x^2 - 50y^2$   | $2(9x^2 - 25y^2)$ |
| 10. | $100z^9 + 50z^6 - 75z^5$      | $25z^5(4z^4 + 2z - 3)$          | 11. | $36rs^2 - 108r^2s^3$             | $36rs^2(1 - 3rs)$             | 12. | $36k - 30$        | $6(6k - 5)$       |
| 13. | $a^7b - a^{10}$               | $a^7(b - a^3)$                  | 14. | $2c^5d^4 - 3c^4 + 4c^3$          | $c^3(2c^2d^4 - 3c + 4)$       | 15. | $3g^8 + 3g^7$     | $3g^7(g + 1)$     |
| 16. | $18x^5 - 48x^4 + 56x^3 - 86x$ | $2x(9x^4 - 24x^3 + 28x^2 - 43)$ | 17. | $23y^{10} - 46y^7 + 68y^2 + 10y$ | $y(23y^9 - 46y^6 + 68y + 10)$ |     |                   |                   |

Show work below: