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# **Factoring the Greatest Common Factor Examples**



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## Example 1

Factor  $27m^3n^2 + 9mn$

**Step 1:** Find the GCF of the two monomials.

$$27m^3n^2 = (3)(3)(3)(m)(m)(m)(n)(n)$$

$$9mn = (3)(3)(m)(n)$$

$$\text{GCF: } (3)(3)(m)(n) = 9mn$$

**Step 2:** Now factor out  $9mn$  from each monomial. Determine what is left from each monomial in order to determine the parenthesis.

$$9mn(3m^2n + 1)$$



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## Example 2

Factor  $64x^3y - 32x^2y^3 + 8x^2y^2$



**Step 1:** Find the GCF of the three monomials.

$$64x^3y = (2)(2)(2)(2)(2)(2)(x)(x)(x)(y)$$

$$32x^2y^3 = (2)(2)(2)(2)(2)(x)(x)(y)(y)(y)$$

$$8x^2y^2 = (2)(2)(2)(x)(x)(y)(y)$$

$$\text{GCF: } (2)(2)(2)(x)(x)(y) = 8x^2y$$

**Step 2:** Now factor out  $8x^2y$  from each monomial. Determine what is left from each monomial in order to determine the parenthesis.

$$8x^2y(8x - 4y^2 + y)$$



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## Example 3

Factor  $3b^2 + 3b$





**Step 1:** Find the GCF of the three monomials.

$$3b^2 = (3)(b)(b)$$

$$3b = (3)(b)$$

$$\text{GCF: } (3)(b) = 3b$$

**Step 2:** Now factor out  $3b$  from each monomial. Determine what is left from each monomial in order to determine the parenthesis.

$$3b(b + 1)$$



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## Example 4

Factor  $2m^2(3m + 5) - m(3m + 5)$

**Step 1:** Find the Greatest Common Factor.

$$2m^2(3m + 5) = (2)(m)(m)(3m + 5)$$

$$m(3m + 5) = m(3m + 5)$$

$$\text{GCF: } m(3m + 5)$$

**Step 2:** Now factor out  $m(3m + 5)$  from each monomial. Determine what is left from each monomial in order to determine the parenthesis.

$$m(3m + 5)(2m - 1)$$



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# In Summary

In order to find the Greatest Common Factor, GCF, follow these steps. First, write out the prime factorization of the problem. Then, mark the prime factors that each monomial has in common. Finally, combine the factors they have in common to come up with the GCF.