

COLLEGE ALGEBRA

GPS # 35

4.3

SOLUTION OF POLYNOMIAL EQUATIONS

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no pro
Good
nb.

Useful Guidelines:

Greatest Common Factor: The largest common term that can be factor out from the polynomial.

For example: $3xy^2 + 6x = 3x(y^2 + 2)$, where $3x$ is the Greatest Common Factor.

Factoring by grouping:

Step 1: Group the terms so that each group has a common factor.

For example: $6x - 6y + 2x - 2y = (6x - 6y) + (2x - 2y)$

Step 2: Factor out the common factor in each group.

For example: $(6x - 6y) + (2x - 2y) = 6(x - y) + 2(x - y)$

Step 3: Factor out the common factor from the groups, if possible. Otherwise, try a different grouping.

For example: $6(x - y) + 2(x - y) = (x - y)(6 + 2) = 8(x - y)$

1. Factor out the greatest common factor. Simplify the factors, if possible.

a) $x^2y - 3xy = xy(x - 3)$

b) $6p^2q^3 - 12pq = 6pq(pq^2 - 2)$

c) $(p-2)(p+2) - (p+4)(p+2) = p+2[(p-2) - (p+4)] = (p+2)(p-2-p-4) = -6(p+2) = 6p-12$

d) $(x-3)(y+2) - (x+4)(y+2) = y+2[(x-3) - (x+4)] = (y+2)(x-3-x-4) = -7(y+2) = -7y-14$

2. Factor by grouping and simplify the factors, if possible.

a) $(3x+3y) + (7x+7y) = 3(x+y) + 7(x+y) = x+y(3+7) = 10(x+y) = 10x+10y$

b) $(15a+3b) + (5ab+nb) = 3(5a+b) + b(5a+b) = (5a+b)(3+b)$

c) $(30+5x) + (18y+3x) = 5(6+x) + 3y(6+x) = (6+x)(5+3y)$

d) $(2ab-2b) + (1-a) = 2b(a-1) + (-1)(a-1) = (a-1)(2b-1)$

3. Solve the polynomial equation by factoring and give the solution set.

a) $3x^3 - 12x = 0$

$3x(x^2 - 4) = 0$

$3x = 0$ or $x^2 - 4 = 0$

$x = 0$ $(x-2)(x+2)$

$x = \pm 2$

$\{-2, 0, 2\}$

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$\{x|x=0 \text{ or } x=\pm 2\}$

b) $(4m^3 + m^2) - (16m + 4) = 0$

$m^2(4m+1) - 4(4m+1) = 0$

$(4m+1)(m^2-4) = 0$

$4m+1 = 0$ or $m^2-4 = 0$

$4m = -1$ $(m-2)(m+2)$

$m = -1/4$ $m = \pm 2$

$\{-2, -1/4, 2\}$

$\{x|x=-1/4 \text{ or } x=\pm 2\}$