

Find the GCF of:

- a) $6x - 3x^2 + 18$
- b) $2a^4 + 3a^3 + 4a^2 + a$
- c) $15b^2 - 30b^3 + 10b^5$
- d) $14c^7 + 21c^6 - 35c^3$
- e) $16d^8e^4 - 20e^5d^4 + 8de^6$
- f) $8x^2yz - 6xy^3 + 10x^3y^2z^4$

$$\begin{aligned} \text{GCF} &= 3 \\ \text{GCF} &= a \\ \text{GCF} &= 5b^2 \\ \text{GCF} &= 7c^3 \\ \text{GCF} &= 4de^4 \\ \text{GCF} &= 2xyz \end{aligned}$$

Common Factor

$$\begin{aligned} \text{a) } 12k - 36m & \\ = 12(k - 3m) & \\ \text{b) } 9x^2y - 3x^3y^2 - 6x^4y & \\ = 3x^2y(3 - xy - 2x^2) & \end{aligned}$$

$$\begin{aligned} \text{c) } 6x^2 - 9x - 12 & \\ = 3(2x^2 - 3x - 4) & \\ \text{d) } 8x^2y - 24xy + 12y & \\ = 4y(2x^2 - 6x + 3) & \end{aligned}$$

$$\begin{aligned} \text{e) } 4a^2 + 6ab + 12abc & \\ = 2a(2a + 3b + 6bc) & \\ \text{f) } 6x^2y - 4xy - 2y & \\ = 2y(3x^2 - 2x - 1) & \end{aligned}$$

Binomial Common Factors

binomial common factor

$$\begin{array}{ll}
 4(w+1) + 5y(w+1) & 4(\text{pumpkin}) + 5y(\text{pumpkin}) \\
 = (w+1)(4+5y) & = \text{pumpkin} (4+5y)
 \end{array}$$

Ex. 1: Factor

$$\begin{array}{ll}
 \text{a) } 2y(a-1) - 3x(a-1) & \text{b) } 4a(x-y) - 3b(-y+x) \\
 = (a-1)(2y-3x) & = 4a(x-y) - 3b(x-y) \\
 & = (x-y)(4a-3b)
 \end{array}$$

Factor by Grouping

★ group terms that have a common factor

★ factor each group to try and get a binomial common factor

$$\begin{aligned}
 & ac + bc + ad + bd \\
 & = c(a+b) + d(a+b) \\
 & = (a+b)(c+d)
 \end{aligned}
 \quad \left. \begin{aligned}
 & = ac + ad + bc + bd \\
 & = a(c+d) + b(c+d) \\
 & = (c+d)(a+b)
 \end{aligned} \right\}$$

Ex. 2 Factor by Grouping

$$\begin{array}{ll}
 \text{a) } xy + 12 + 4x + 3y & \text{b) } 5m^2t - 10m^2 + t^2 - 2t \\
 = xy + 4x + 3y + 12 & = 5m^2(t-2) + t(t-2) \\
 = x(y+4) + 3(y+4) & = (t-2)(5m^2 + t) \\
 = (y+4)(x+3) &
 \end{array}$$

Factoring Lesson

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