Lesson Plan

Grade 10 Academic Math **Lesson: 4**

Unit: Polynomials **Topic: Common Factors**

- ***homework check:*** **FM 10 p. 65 # 1 - 5**

- ***note:*** **Common Factors**

Common factors are terms that divide evenly into all parts of the polynomial. A common factor may be a single monomial OR even a binomial. In order to common factor, you may be able to find something common to everything OR common to a smaller group of terms. For example,

$a)\ 3x^2 + 27x - 15 =$

$= 3\left(\dfrac{3x^2 + 27x - 15}{3}\right)$

$= 3\left(x^2 + 9x - 5\right)$

$b)\ 12a^2b + 6ab - 18ab^2 =$

$6ab\left(\dfrac{12a^2b + 6ab - 18ab^2}{6ab}\right)$

$= 6ab\left(2a + 1 - 3b\right)$

$c)\ 5a\left(x + y\right) - 2b\left(x + y\right) =$

$= \left(x + y\right)\left(\dfrac{5a\left(x + y\right) - 2b\left(x + y\right)}{x + y}\right)$

$= \left(x + y\right)\left(5a - 2b\right)$

$d)\ 2mn\left(3a - b\right) + 4n\left(3a - b\right) =$

$= 2n\left(3a - b\right)\left[\dfrac{2mn\left(3a - b\right) + 4n\left(3a - b\right)}{2n\left(3a - b\right)}\right]$

$= 2n\left(3a - b\right)\left(m + 2\right)$

$e)\ \ ax + by + bx + ay =$ reorder to group terms with the same factors

$= ax + ay + bx + by$

$= a\left(\dfrac{ax + ay}{a}\right) + b\left(\dfrac{bx + by}{b}\right)$

$= a(x + y) + b(x + y)$

$= (a + b)(x + y)$

$f)\ \ 4mx + 2ny - 8my - nx =$ reorder to group terms with same factors

$= 4mx - 8my - nx + 2ny$

$= 4m(x - 2y) - n(x - 2y)$

$= (4m - n)(x - 2y)$

Remember that when asked to factor, you must factor completely. Not everyone will group given arrangements in the same way, but the end product should be the same if the polynomial is factored completely.

- ***homework assignment:*** **<u>Principles of Mathematics 10</u> p. 203 # 7, 9 – 11 and <u>FM 10</u> p. 68 # 1 - 3**

$= (y + 5)(2x + 3w)$

EXERCISE 2.6

A 1. Factor completely, where possible.

(a) $2x + 6$ (b) $5y - 10$
(c) $3x + 6y$ (d) $7w - 7$
(e) $3x + 11$ (f) $2x^2 - 82$
(g) $2tw + 4tx - 6ty$ (h) $3abx - aby - 2abz$

B 2. Factor completely, where possible.

(a) $25x^3 + 10x^2 + 15x$
(b) $y^5 - y^4 + y^3 - y^2$
(c) $36x^5 - 9y^3$
(d) $12xy + 4wx - 8xz$
(e) $9m^3 - 6m^2t + 3mt^2$
(f) $7xyz - 14xy + 21txy$
(g) $7pqr - 5xy + 8t$
(h) $22xy - 11y^2 + 33wy$
(i) $36mn^2 - 24m^2n + 28mn$
(j) $7rst - 14r^2s^2t$
(k) $18r^2s^3 - 9rs^2 - 27r^3s^2$
(l) $20m^6n^4 - 30m^5n^5 + 40m^7n^3 - 10m^5n^3$
(m) $14rst + 17xy - 3w$
(n) $40x^5y^7 - 32x^7y^6 - 28x^6y^4 - 36x^7y^5$

3. Factor.

(a) $3m(x + y) + 2(x + y)$
(b) $3x(y - 1) + 2(y - 1)$
(c) $9x(m + 3) - 2(m + 3)$
(d) $5y(m + n) + t(m + n)$
(e) $5w(x - 2) - 3t(x - 2)$
(f) $2t(x + 5) + (x + 5)$
(g) $4mn(t - 4) - (t - 4)$

EXERCISE 2.6

1. (a) $2(x + 3)$ (b) $5(y - 2)$ (c) $3(x + 2)$ (d) $7(w - 1)$
(f) $2(x^2 - 41)$ (g) $2t(w + 2x - 3y)$ (h) $ab(3x - y - 2z)$
2. (a) $5x(5x^2 + 2x + 3)$ (b) $y^2(y^3 - y^2 + y - 1)$
(c) $9(4x^5 - y^3)$ (d) $4x(3y + w - 2z)$
(e) $3m(3m^2 - 2mt + t^2)$ (f) $7xy(z - 2 + 3t)$
(h) $11y(2x - y + 3w)$ (i) $4mn(9n - 6m + 7)$
(j) $7rst(1 - 2rs)$ (k) $9rs^2(2rs - 1 - 3r^2)$
(l) $10m^5n^3(2mn - 3n^2 + 4m^2 - 1)$ (n) $4x^5y^4(10y^3 - 8x^2y^2 - 7x^3 - 9x^2y)$

3. (a) $(x + y)(3m + 2)$ (b) $(y - 1)(3x + 2)$
(c) $(m + 3)(9x - 2)$ (d) $(m + n)(5y + t)$
(e) $(x - 2)(5w - 3t)$ (f) $(x + 5)(2t + 1)$
(g) $(t - 4)(4mn - 1)$