Lesson 3

**AN4** Demonstrate an understanding of the multiplication of polynomial expressions (limited to monomials, binomials and trinomials), concretely, pictorially and symbolically

Expanding and simplifying polynomials

When simplifying polynomial expressions we follow order of operations as we do with rational number expressions. Multiplication will be done before adding and subtracting.

Ex 1:

Expand and simpliy:

(x -7)(2x-4) + ( 2x + 1) (x -8)

Do the multiplication of the first two binomials using the distributive property

(x-7)(2x-4) = x (2x-4) -7(2x -4)

= 2x2 – 4x-14x + 28

= 2x2 -18x + 28

Then multiply the second two binomials

(2x + 1) (x -8) = 2x(x -8)+ 1(x -8)

= 2x2 -16x + x -8

= 2x2 -15x -8

Then add the results together

(2x2 -18x + 28) + (2x2  - 15x -8)

= 4x2 -33x+ 20

Ex 2: (2x -5)(x-4) – (x +3)2

Multiply the first two binomials

(2x -5)(x -4) = 2x(x-4) -5(x-4)

= 2x2 -8x -5x + 20

= 2x2 – 13x + 20

Now square the second binomial

\*\*\*Remember squaring anything including polynomials means multiply them by themselves\*\*\*

(x + 3)2 = (x + 3) (x+3)

= x(x+3) + 3 ( x+3)

= x2 +3x +3x + 9

= x2 + 6x + 9

Now to subtract

(2x2 – 13x +20) – (x2 + 6x +9)

2x2 – 13x + 20 – x2 -6x -9 (Be careful of the signs when subtracting!!)

2x2 -x2 – 13x – 6x + 20 -9

X2 – 19x + 11

Ex 3:

-5( x + 6y) (2x +5y) + (2x +y)(x2 +2xy – y2)

Do the multiplication first

-5( x + 6y)(2x + 5y) = (-5x -30y)(2x +5y)

= -5x(2x + 5y) -30y(2x + 5y)

= -10x2 -25xy -60xy -150y2

= -10x2 -85xy -150y2

Then

(2x + y)(x2 + 2xy-y2) = 2x(x2 + 2xy-y2) + y (x2 + 2xy-y2)

= 2x3 + 4x2 y – 2xy2 + x2y + 2xy2 – y3

= 2x3 + 5x2y – y3

Putting these together gives :

(-10x2 -85xy -150y3) + (2x3 +5x2y – y3)

= -10x2 -85xy– 150y2 + 2x3 +5x2y– y3 ( there are no like terms )

Practice questions from textbook

p. 186-187 #15,17 & p. 200 #29 & 30