Pre-Calculus 11 Quadratic Equations

Lesson 2 Factoring Polynomials…again

Example 1

Factor:

a) $6a^4 + 7a^2 - 10$

P -60
S 7
F $\frac{12}{6}, \frac{-5}{1}$
divide 2 -5

$(6a^2 - 5)(a^2 + 2)$

b) $x^2 - \frac{17}{3}x - 2$

$\frac{1}{3}(3x^2 - 17x - 6)$

GCF $\frac{1}{3}(3x + 1)(x - 6)$

P -18
S -17
F $\frac{-18}{3}, \frac{1}{1}$
divide -6 1

Example 2: Using Patterns to Factor

Factor each polynomial expression:

a) $(x + 3)^2 - 6(x + 3) - 16$

$y^2 - 6y - 16$

Let $y = x + 3$
define variable

P -16
S -6
F $-8, 2$

$(y - 8)(y + 2)$

$(x + 3 - 8)(x + 3 + 2)$

substitute $x + 3$ back in

$(x - 5)(x + 5)$

simplify each factor

1

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b) $2(x-6)^2 + 10(x-6) - 48$

$2y^2 + 10y - 48$

Let $y = x - 6$

GCF
first!

$2(y^2 + 5y - 24)$

$2(y-3)(y+8)$

P -24
S 5
F $-3, 8$

$2(x-6-3)(x-6+8)$

$2(x-9)(x+2)$

c) $3(2x+5)^2 + 10(2x+5) - 8$

$3y^2 + 10y - 8$

Let $y = 2x + 5$

P -24
S 10
F $\dfrac{12}{3}, \dfrac{-2}{1}$

divide 4 -2

$(3y-2)(y+4)$

$(3(2x+5)-2)(2x+5+4)$

$(6x+15-2)(2x+9)$

$(6x+13)(2x+9)$

Example 3: Factor, using patterns (difference of squares)
$\hookrightarrow a^2 - b^2$

factors as $(a-b)(a+b)$

a) $(3x+4)^2 - (2y-1)^2$

$(3x+4 - (2y-1))(3x+4 + 2y-1)$

$(3x+4 - 2y+1)(3x+4+2y-1)$

$(3x-2y+5)(3x+2y+3)$

watch
brackets
subtract
the whole
binomial

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b) $27(2x - 3)^2 - 75(y - 4)^2$

GCF 3

$3[9(2x-3)^2 - 25(y-4)^2]$

$3[(3(2x-3) - 5(y-4))(3(2x-3) + 5(y-4))]$ ← difference of squares

$3[(6x - 9 - 5y + 20)(6x - 9 + 5y - 20)]$

$3(6x + 5y + 11)(6x - 5y - 29)$

c) $32(x + 2)^2 - 18(2y - 3)^2$

GCF

$2[16(x+2)^2 - 9(2y-3)^2]$

$2[(4(x+2) + 3(2y-3))(4(x+2) - 3(2y-3))]$ diff of squares

$2[(4x+8 + 6y-9)(4x+8 - 6y+9)]$

$2(4x + 6y - 1)(4x - 6y + 17)$

Worksheet
and pg 178
10c, d
11b, d
13a
16c

3

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Exercise 2 Factoring Polynomials…again

1.) Factor: (follow example 1a)

    a.) $2x^4 - x^2 - 6$

      $(2x^2 + 3)(x^2 - 2)$

    b.) $3x^4 - 13x^2 + 12$

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

2.) Factor: (follow example 1b)

    a.) $\frac{1}{4}x^2 - x - 3$

      $\frac{1}{4}(x - 6)(x + 2)$

    b.) $\frac{1}{2}x^2 - x - 4$

      $\frac{1}{2}(x - 4)(x + 2)$

3.) Factor, using patterns (follow example 2)

    a.) $4(x + 2)^2 + 8(x + 2) + 3$ $(2x + 5)(2x + 7)$

    b.) $6(2x + 1)^2 + (2x + 1) - 1$ $(6x + 2)(4x + 3)$

                                            or $2(3x + 1)(4x + 3)$

4.) Factor, using patterns (follow example 3)

    a.) $(4a - 2)^2 - (2 + 4b)^2$ $(4a - 4b - 4)(4a + 4b)$

    b.) $9(2x + 1)^2 - 4(y - 2)^2$ $(6x - 2y + 7)(6x + 2y - 1)$

5.) Factor completely (L1, ex 1 and L2, ex 2, 3)

    a.) $-2(x + 3)^2 + 12(x + 3) + 14$ $-2(x - 4)(x + 4)$

    b.) $16(x^2 + 1)^2 - 4(2x)^2$ $16(x^2 - x + 1)(x^2 + x + 1)$

                 or $4(2x^2 - 2x + 2)(2x^2 + 2x + 2)$

Extra Practice: Pg. 178 #9, 10c, d, 11-13, 15-17