

Name:

Advanced Algebra

Unit 5: Polynomials: Assignment #11

Factoring higher level polynomials:

For the following problems factor out the Prompt: Greatest Common Factor

1) $14x^2 + 8x + 72$

2) $3x^4 - 12x^3$

3) $-35x^3 + 28x^2 + 7x$

4) $24x^4 - 6x$

5) $39x^5 + 13x^3 - 78x^2$

6) $145x^9 - 29$

7) $6x^6 - 3x^4 - 9x^2$

8) $72x^9 + 15x^6 + 9x^3$

I can recognize Special patterns :

Name of Pattern	Example
Sum and Difference: $(a+b)(a-b) = a^2 - b^2$	$(x+3)(x-3) = x^2 - 9$
Square of a Binomial: $(a+b)^2 = a^2 + 2ab + b^2$ $(a-b)^2 = a^2 - 2ab + b^2$	$(y+4)^2 = y^2 + 8y + 16$ $(3t^2-2)^2 = 9t^4 - 12t^2 + 4$
Cube of a binomial: $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ $(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$	$(x+1)^3 = x^3 + 3x^2 + 3x + 1$ $(p-2)^3 = p^3 - 6p^2 + 12p - 8$
Sum of two Cubes: $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$	$x^3 + 8 = (x+2)(x^2 - 2x + 4)$
Difference of two Cubes: $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$	$8x^3 - 1 = (2x-1)(4x^2 + 2x + 1)$

Classwork: Prompt: Use the Sum or Difference of Cubes to factor the polynomial:

Sum of two Cubes: $a^3 + b^3 = (a+b)(a^2-ab+b^2)$	$x^3+8 = (x+2)(x^2-2x+4)$
Difference of two Cubes: $a^3 - b^3 = (a-b)(a^2+ab+b^2)$	$8x^3 - 1 = (2x-1)(4x^2+2x+1)$

1) x^3-8	2) $x^3 + 64$
3) $216x^3+1$	4) $125x^3-8$
5) $1000x^3 + 27$	6) $27x^3+216$
7) $32x^3-4$	8) $2x^3+54$

Prompt: Grouping: Factor the following by grouping:

1) $x^3 + x^2 + x + 1$	2) $10x^3 + 20x^2 + x + 2$
3) $x^3 + 3x^2 + 10x + 30$	4) $x^3 - 2x^2 + 4x - 8$
5) $2x^3 - 5x^2 + 18x - 45$	6) $-2x^3 - 4x^2 - 3x - 6$
7) $3x^3 - 6x^2 + x - 2$	8) $2x^3 - x^2 + 2x - 1$
9) $3x^3 - 2x^2 - 9x + 6$	

Quadratic Form: Factor the polynomials: Prompt: Use special quadratic ideas to factor...

1) $16x^4 - 1$

2) $x^4 + 3x^2 + 2$

3) $x^4 - 81$

4) $81x^4 - 256$

5) $4x^4 - 5x^2 - 9$

6) $x^4 + 10x^2 + 16$

7) $81 - 16x^4$

8) $32x^6 - 2x^2$

9) $6x^5 - 51x^3 - 27x$

Prompt: Mixed Practice: For the following problems, factor the problem completely.

Ideas: Look to factor out the GCF
Is there a special pattern that you recognize?
Once you make it quadratic, can you factor that more?
Try to fit terms in the box

9) $3x^2 + 11x + 6$	10) $x^3 - 4x^2 + 4x - 16$
11) $125x^3 - 216$	12) $2x^7 - 32x^3$
13) $2x^5 + 4x^4 - 4x^3 - 8x^2$	14) $2x^3 - 32x$