Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_

Class/Home worksheet: Alg2H

Factoring (book chapter 5, page 519 and beyond)

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| --- |
| Factoring is the reverse of multiplying.Factoring an expression means to write it as an equivalent expression that is a product.  |
| Common factor:$$3x^{2}+12=$$ | Common factor:$$7x^{3}+14x^{2}=$$ |
| Common factor:$$5x^{3}-20x^{3}=$$ | Common factor:$$12x^{2}y-20x^{3}y=$$ |
| Common factor:$$10a^{4}+15a^{2}-25a=$$ | Common factor:$$9x^{3}y^{2}-6x^{2}y^{3}+3x^{3}y^{3}=$$ |
| Take a common factor if possible. It will simplify things! |

|  |
| --- |
| Difference of Squares (P. 221)$$A^{2}-B^{2}= \left(A+B\right)⋅(A-B)$$ |
| Factor:$$x^{2}-25=$$ | Factor:$$9x^{2}-16y^{2}=$$ |
| Factor:$$\frac{1}{25}-x^{2}=$$ | Factor (challenge):$$x^{16}-1=$$ |
| Perfect Squares (P. 220)$$A^{2}+2AB+B^{2}= \left(A+B\right)^{2}$$$$A^{2}-2AB+B^{2}= \left(A-B\right)^{2}$$ |
| Factor:$$x^{2}+10x+25=$$ | Factor:$$x^{2}-14x+49=$$ |
| Factor (hint: rearrange) :$$16y^{2}+49+56y=$$ | Factor:$$72xy+16x^{2}+81y^{2}=$$ |

Factoring trinomials MATH style

(The common method in Kehillah school!)

Assume a trinomial of the form

$$aX^{2}+bX+c$$

Create the following table following the directions below it:

|  |  |  |  |
| --- | --- | --- | --- |
| M | A | T | H |
| $$a⋅c⋅X^{2}$$ | $$b⋅X$$ | Try the various factors of $a⋅c$that sum up to b | ☺ |

1. Put under M (Multiply) the product $a⋅c⋅X^{2}$
2. Put under A (Add) the value of $b⋅X$
3. Under T (Tries), put the various factor-pairs of the result in M, and try to see if their sum adds up to A.
4. When you find an appropriate pair, mark a smiley face in H (Happy) !
5. Rewrite the trinomial, by writing the middle term as the sum of two terms, and factor by grouping appropriate terms.

Examples:

1. $3x^{2}+8x+4$

|  |  |  |  |
| --- | --- | --- | --- |
| M | A | T | H |
|  |  |  |  |

1. $2x^{2}+x-15$

|  |  |  |  |
| --- | --- | --- | --- |
| M | A | T | H |
|  |  |  |  |

1. $x^{2}-2x-24$

|  |  |  |  |
| --- | --- | --- | --- |
| M | A | T | H |
|  |  |  |  |

Let's try in the case of binomial (though we know the answer already!)

1. $4x^{2}-9=4x^{2}+0x-9$

|  |  |  |  |
| --- | --- | --- | --- |
| M | A | T | H |
|  |  |  |  |

1. $-2x^{2}-x+6$

|  |  |  |  |
| --- | --- | --- | --- |
| M | A | T | H |
|  |  |  |  |

From the book, Page 223

|  |  |
| --- | --- |
| (30) $12a^{2}+36a+27=$  | (38) $9x^{2}-25=$ |
| (46) (tricky: Don't stop in the middle) $4xy^{4}-4xz^{4}=$ | Factor:$$x^{2}+9x+20=$$ |
| Factor:$$4x^{2}-3+4x=$$ | Factor:$$6x^{2}+17x+7=$$ |

Two more items for factoring: Grouping and Cubes