Factoring Special Binomials

Consider a 2-term expression such as $x^2 - 9$
This could be written as $x^2 + 0x - 9$

So, we would need 2 numbers that multiply to -9 but add to 0
The only numbers that add to zero are the number and the negative of itself 3, -3 6, -6 etc

$x^2 - 9 \rightarrow \quad (x-3)(x+3)$ *This is called a "difference of squares"*

If you encounter a 2 term expressions, they could be:

1) *GCF* 2) *Difference of Squares* 3) *both of these*

Factor the following:

a) $x^2 - 25$

$\sqrt{25} = 5 \rightarrow (x-5)(x+5)$

b) $x^2 - 1296$

$\sqrt{1296} = 36 \rightarrow (x-36)(x+36)$

c) $16x^2 - 1$

$\sqrt{16} = 4, \sqrt{1} = 1 \rightarrow (4x-1)(4x+1)$

d) $9x^2 - 169y^4$

$\sqrt{9} = 3, \sqrt{169} = 13 \rightarrow (3x - 13y^2)(3x + 13y^2)$

e) $x^2 + 49$

Not possible $7 + -7 = 0, \ 7 \times -7 = -49 \quad (7 + 7 = 14)$ *No #'s exist*

f) $144x - 16$

No squares … just a GCF of 16 $\rightarrow 16(9x - 1)$

g) $x^6 - 9b^{14}$

$\sqrt{9} = 3 \rightarrow (x^3 - 3b^7)(x^3 + 3b^7)$

h) $x^4 - 16$

$\sqrt{16} = 4$ $\quad (x^2 - 4)(x^2 + 4)$ 

$\rightarrow (x-2)(x+2)(x^2+4)$

Wait a minute

Get funky …

i) $(x-6)^2 - (x+5)^2$

$[(x-6) - (x-5)]\,[(x-6) + (x-5)] \rightarrow (-1)(2x - 11)$

Assignment = worksheet

Difference of Squares Worksheet

Why didn't Klutz do ant homework on Saturday?

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

E	$n^2 - 49$	***A***	$n^2 - 1$	***N***	$81 - n^2$
H	$4n^2 - 9$	***I***	$49n^2 - 16$	***E***	$144 - 25n^2$
S	$x^2 - y^2$	***I***	$4x^2 - 49y^2$	***W***	$81x^2 - 100y^2$
E	$36x^2 - 121y^2$	***O***	$9x^2 - 64y^2$	***N***	$x^4 - 400$
T	$a^6 - b^4$	***C***	$25a^8 - 9b^4$	***W***	$a^2b^2 - 36$
D	$16 - a^4b^6$	***K***	$a^2b^4 - c^8$	***N***	$4a^{16} - 225$
15	$4 - 9a^2$	***12***	$4a^4 - 36$	***24***	$a^4 - 36$
4	$16a^2 - b^2$	***13***	$49a^2 - 1$	***6***	$a^2 - 25$

Answers

1 $(2n+3)(2n-3)$
10 $(12+5n)(12-5n)$
8 $(n+1)(n-1)$
5 $(7n+3)(7n-3)$
2 $(n+7)(n-7)$
18 $(9+n)(9-n)$
20 $(7n+4)(7n-4)$

3 $(9x+10y)(9x-10y)$
5 $(x+y)(x-y)$
7 $(x^2+20)(x^2-20)$
11 $(6x+11y)(6x-11y)$
16 $(3x+7y)(3x-7y)$
22 $(2x+7y)(2x-7y)$
23 $(3x+8y)(3x-8y)$

19 $(4+a^2b^3)(4-a^2b^3)$
14 $(2a^8+15)(2a^8-15)$
21 $(a^3+b^2)(a^3-b^2)$
12 $(ab^2+c^4)(ab^2-c^4)$
9 $(ab+6)(ab-6)$
10 $(4+ab^4)(4-ab^4)$

I $(a+5)(a-5)$
D $(2+3a)(2-3a)$
E $(7a-1)(7a+1)$
N $(a^2-6)(a^2+6)$
A $(4a+b)(4a-b)$
O $(2a^2-5b)(2a^2+5b)$

16 $(5a^4 + 3b^2)\ (5a^4 - 3b^2)$

Now try Page 194 #6, 10, 20