12. $[g^3 - 2g^2] + [5g] + [6 - 6g^3 - 2g] =$

$= g^3 - 3g^2 + 3g + 6$

$6 \cdot 2 = 4 \ x?$

$g^3 - 2g^2 + 5g + 6g^2 - 2g$

$g^3 - 3g^2 + 3g + 6$

8-1   In 8-1, you're combining like terms by simply adding or subtracting. You can only combine terms with the same powers of all variables. (The terms in a polynomial are separated by + or - signs.) So, as you can see in the example above, g^3 can not be combined with $-3g^2$.

28.

$$2j\left(7j^3h^2+jh^2+5h\right)-9k\left(-2j^3h+2h^2+3j\right)$$

$$=14j^3h^2+10jh^2+\underline{10jk}+18j^3k-18h^3-\underline{27jk}$$

$$=14j^3h^2+10jh^2+18j^3k-18h^3-17jk$$

In 8-2, you're multiplying a polynomial by a monomial. #28 on p. 475 is above
Remember to distribute the monomial to each term in the polynomial. A trick here, is that the negative sign before the 9k has to travel with the the 9k to each term in the polynomial.

$$(A+10)(A+10)$$

$$(A^2 + 10A + 10A + 100)$$

$$(A^2 + 70A + 100) = (A+10)^2$$

$$(3c - 5)(c + 3)$$

F $3c \cdot c = 3c^2$
O $3c \cdot 3 \quad 9c$
I $-5 \cdot c \quad -5c$
L $-5 \cdot 3 \quad -15$

$= 3c^2 + 4c - 15$

In 8-3, you're multiplying polynomials by polynomials using the FOIL (first, outer, inner, last) method. Basically, you're multiplying both terms from the first binomial by both terms of the last binomial, and then combining like terms.

$$(x+3)(x-3) = x^2 + 3x - 3x - 9$$
$$= x^2 - 9$$

$$(x+3)^2 = (x+3)(x+3) = x^2 + 3x + 3x + 9$$
$$= x^2 + 6x + 9$$

In 8-4 you're finding special products. Problems such as (x+3)(x-3) will result in an answer without a "middle term"; whereas problems such as

$(x+3)^2$ will result in a "middle term", which isn't obvious until you remember to FOIL.

1.
$$21B - 15A \qquad GCF = 3$$

$$= 3(7B - 5A)$$

4. $12Jk^2 + 6J^3k + 2J^3k^2 \qquad GCF = 2Jk$

$$= 2Jk(6k + 3J + 1Jk)$$

In 8-5, you're starting to factor. These problems are usually considered more difficult that the multiplying of polynomials.

Basically, you'll find all the common factors of the terms and "pull them out".

8-5 is entitled "Using the Distributive Property"

$$3h(h+10)=0$$

So either $3h = 0$

or $h+10 = 0$

$\quad\quad\quad -10 \quad -10$

$h = -10 \quad\quad k = 0 \text{ or } -10$

$\quad\quad\quad\quad\quad\quad$ are the two
$\quad\quad\quad\quad\quad\quad\quad\quad$ solutions

8-5 Too:
Zero Product Property:
If the product of two
factors is zero, then at
least one of the factors
must be zero.

8-5 Too:
Factoring by Grouping:
A polynomial can be
factored by grouping if
all of these are true:
a. There are four or
more terms
b. Terms have common
factors
c. There are two
common factors that are
identical or additive
inverses of each other

Example 3p495
Factor 2mk-12m+42-7k
2mk-12m+42-7k

=(2mk-12m) + (42-7k)
= 2m(k-6) + 7(6-k)

= (7(6-k)(-1) = -7(k-6)
=2m(k-6) + -7(k-6)
= (2m-7)(k-6)

Check by FOIL
= 2mk - 12m -7k +42

8-5 #21

$FG - 5G + 4F - 20$

$G(F-5) + 4(F-5)$

$= (G+4)(F-5)$

#22 $A^2 - 4A - 24 + 6A$

$= A(A-4) + 6(-4+A)$

$= A(A-4) + 6(A-4)$

$= (A+6)(A-4)$

$$8.6$$
$$\text{Solving quadratic equations:}$$
$$Ax^2 + Bx + c = 0$$

As long as A=1, these problems are pretty easy. They are all set up as (x   )(x   ). You can always check your work by using FOIL. Find all the factor-pairs of C, with a common sum or difference of B. For #21 below, it's like this:

20 =   20x1, 10x2 and 4x5.
20x1 have a sum or difference of 19 and 21, -19, or -21,
10x2 give 12 and 8, -12 or -8
4x5 give 1 or 9, -1, or -9.
I need +1, so I need to use 4 and 5. Using common sense and FOIL to check, I can see that (y+5)(y-4) will give me a B of +1.

21. y2 + y = 20
= y2+y-20 = 0
(y +4)(y-5) = 0
There's an additional step for some of these problems, which is to actually solve them for y. The only trick is to realize that to get numbers to multiply to zero, one of the factors has to equal zero, so either (y+4) =0, or (y-5) = 0
So, y either = -4 or 5.

8-7

ax^2+bx+c

10. $5x^2 + 34x + 24$

1. So, since A is prime, you can start with $(5x\quad)(x\quad)$.
2. Multiply A and C.
3. Find all the factor-pairs of AC.
4. Find a sum or difference in a factor-pair that give B.
5. Figure out how to place factors of C into your solution to using the factor-pair from step B.

10. $5x^2+34x+24$

① $(5x\qquad)(x\qquad)$

② $5 \cdot 24 = 120$

③ $120 = 1 \cdot 120, 2 \cdot 60, 3 \cdot 40, \boxed{4 \cdot 30}, 5 \cdot 24,$
$6 \cdot 20, 8 \cdot 15, 10 \cdot 12.$

④ $30 + 4 = 34$

⑤ $5 \cdot 6 = 30, 1 \cdot 4 = 4, so (5x+4)(x+6)$

8-8

Difference of Squares

$81-c^2 = (9+c)(9-c)$

When you FOIL this problem to check your work, you get

$81 + -9c +9c -c^2$, and as you can see, the middle terms add to zero, so they get cancelled out.

#32 p.519:

$3xn^4 - 27x^3$

Step One, Factor out the GCF, 3x:
$= 3x(n^4 - 9x^2)$
Step Two, Use the difference of squares to factor the parentheses:
$=3x (n^2 -3x)(n^2 +3x)$

Again, notice that the middle terms $3n^2x$ get cancelled when you FOIL to check your work.

So basically, the *difference of squares shortcut* is that $(x^2-1) = (x+1)(x-1)$

8-9
Perfect Square Trinomials:

Check for perfect square trinomial by doing these three steps:

$4y^2 +12y +9$

1. Is the first term a perfect square?

(Yes, $(2y)^2$

2. Is the middle term twice the product of the square roots of the first and last terms? (Yes, 2y*3*2=12y)

3. Is the last term a perfect square?

(Yes, $(3)^2$

If so, use the *perfect square trinomial shortcut*; which is that you just take the square root of the first term and add the square root of the second term, like this:

$4y^2 +12y +9 =$

$(2y+3)^2$