Factor Completely. $12m^8n + 9m^5n^2 - 3m^2n^3$

$3m^2n \left(4m^6 + 3m^3n - n^2\right)$

$$\frac{-4}{+4 \times -1}$$
$$3$$

	m^3	$+n$
$4m^3$	$4m^6$	$4m^3n$
$-n$	$-m^3n$	$-n^2$

$= \boxed{3m^2n \left(m^3+n\right)\left(4m^3-n\right)}$

Factor completely.

$= 2x^9 - 20x^5 + 18x$

$= 2x \left(x^8 - 10x^4 + 9\right)$

$$\frac{9}{-1 \times -9}$$
$$-10$$

$\rightarrow 2x \left(x^4 - 1\right)\left(x^4 - 9\right)$

$= 2x \left(x^2-1\right)\left(x^2+1\right)\left(x^2-3\right)\left(x^2+3\right)$

$= \boxed{2x \left(x+1\right)\left(x-1\right)\left(x^2+1\right)\left(x^2-3\right)\left(x^2+3\right)}$

Expand each.

1. $(K + 5)^2$

$= K^2 + 10K + 25$

2. $(c - 8)^2$

$= c^2 - 16c + 64$

The square of a binomial formula:

$$(a+b)^2 = a^2 + 2ab + b^2$$

$(K + 5)^2 = (K)^2 + 2(k)(5) + (5)^2$

$= \boxed{K^2 + 10K + 25}$

Factor completely.

$$2 \cdot 12$$

$$h^2 + 24h + 144 \longrightarrow \sqrt{144} = 12$$

$$(h)^2 + 2(12)h + (12)^2$$

$$= (h + 12)^2$$

A **perfect square trinomial** is the product you obtain when you square a binomial. An example is $x^2 + 10x + 25$, which can be written as $(x + 5)^2$. The first term and the third term of the trinomial are always positive, as they represent the squares of the two terms of the binomial. The middle term of the trinomial is two times the product of the terms of the binomial.

Property	Factoring Perfect Square Trinomials	
$a^2 + 2ab + b^2 = (a + b)^2$		$a^2 - 2ab + b^2 = (a - b)^2$

Factor each completely.

$$2 \cdot 3 \qquad \sqrt{9} = 3$$

1. $h^2 + 6h + 9$

$$= (h)^2 + 2(3)h + (3)^2$$

$$= \boxed{(h + 3)^2}$$

$$2 \cdot 7 \qquad \sqrt{49} = 7$$

2. $P^2 - 14P + 49$

$$= (P)^2 - 2(7)P + (7)^2$$

$$= \boxed{(P - 7)^2}$$