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Put both sides into
standard form by
multiplying!

Date _____
Algebra II

Proving Expressions are Equal

Prove the following expressions are equal

1. $4k^2 - 49 = (2k + 7)(2k - 7)$

$4k^2 - 49 = 4k^2 - 49$

	$2k$	$+7$
$2k$	$4k^2$	$+14k$
-7	$-14k$	-49
	$4k^2 - 49$	

2. $a^3 - 8b^3 = (a - 2b)(a^2 + 2ab + 4b^2)$

$a^3 - 8b^3 = a^3 - 8b^3$

	a^2	$+2ab$	$+4b^2$
a	a^3	$+2a^2b$	$+4ab^2$
$-2b$	$-2a^2b$	$-4ab^2$	$-8b^3$
	$a^3 - 8b^3$		

3. $(x + 2)^2 + 2(x + 2) - 8 = (x + 6)x$

$x^2 + 4x + 4 + 2x + 4 - 8 = x^2 + 6x$
 $x^2 + 6x = x^2 + 6x$

	x	$+2$
x	x^2	$+2x$
$+2$	$+2x$	$+4$
	$x^2 + 4x + 4$	

4. $m^5 + m^3 - 6m = m(m^2 + 3)(m^2 - 2)$

$m^5 + m^3 - 6m = m(m^4 + 3m^2 - 6)$
 $m^5 + m^3 - 6m = m^5 + m^3 - 6m$

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

$$5. t^3 + 5t^2 + 6t + 6 = (t+1)(t+2)(t+3)$$

$$t^3 + 6t^2 + 11t + 6 = t^3 + 6t^2 + 11t + 6$$

	t	$+1$
t	t^2	$+t$
$+2$	$+2t$	$+2$

$$(t^2 + 3t + 2)(t + 3)$$

$$t^3 + 3t^2 + 2t$$

t	t^3	$+3t^2$	$+2t$
$+3$	$+3t^2$	$+9t$	$+6$

$$t^3 + 6t^2 + 11t + 6$$

$$6. 2d(d+3)^2(d-3) = 2d^4 + 6d^3 - 18d^2 - 54d$$

$$2d(d^3 + 3d^2 - 9d - 27) = 2d^4 + 6d^3 - 18d^2 - 54d$$

$$2d^4 + 6d^3 - 18d^2 - 54d = 2d^4 + 6d^3 - 18d^2 - 54d$$

	d	$+3$
d	d^2	$+3d$
$+3$	$+3d$	$+9$

$$d^2 + 6d + 9$$

d	d^3	$+6d^2$	$+9d$
-3	$+3d^2$	$+18d$	-27

$$d^3 + 3d^2 - 9d - 27$$

7. Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x-4)(2x^2 + hx + 3) + k$$

$$2x^3 - 10x^2 + 11x - 7 = 2x^3 + (h-8)x^2 + (3-4h)x - 12 + k$$

$$\begin{array}{r} h-8 = -10 \\ +8 \quad +8 \\ \hline h = -2 \end{array}$$

$$\begin{array}{r} -12+k = -7 \\ +12 \quad +12 \\ \hline k = 5 \end{array}$$

	$2x^2$	$+hx$	$+3$
\times	$2x^3$	$+hx^2$	$+3x$
-4	$+8x^2$	$-4hx$	-12

$$2x^3 + (h-8)x^2 + (3-4h)x - 12$$

8. Algebraically determine the values of h and k to correctly complete the identity stated below.

$$x^3 - 8x^2 + 5x + 53 = (x-5)^2(x+h) + k$$

$$x^3 - 8x^2 + 5x + 53 = x^3 + (h-10)x^2 + (25-10h)x + 25h + k$$

$$\begin{array}{r} -8 = h - 10 \\ +10 \quad +10 \\ \hline 2 = h \end{array}$$

$$\begin{array}{r} 25h + k = 53 \\ 25(2) + k = 53 \\ 50 + k = 53 \\ -50 \quad -50 \\ \hline k = 3 \end{array}$$

	x	-5
\times	x^2	$-5x$
-5	$+5x$	$+25$

$$x^2 - 10x + 25$$

\times	x^3	$-10x^2$	$+25x$
$+h$	$+hx^2$	$+10hx$	$+25h$

$$x^3 + (h-10)x^2 + (25-10h)x + 25h$$