Polynomial Quiz Review -

Remember!

$(x^a)^b = x^{a \cdot b}$

$(x^a)(x^b) = x^{a+b}$

1) $(3x^2yz^3)^2 (-4xyz^5)^3$

$= [(3)^2(x^2)^2(y)^2(z^3)^2][(-4)^3(x)^3(y^3)(z^5)^3]$

$= [9\ (x^4)(y^2)(z^6)][(-64)(x^3)(y^3)(z^{15})]$

$= (9)\cdot(-64) \cdot (x^4)(x^3) \cdot (y^2)(y^3) \cdot (z^6)(z^{15})$

$= -576 \cdot x^7 \cdot y^5 \cdot z^{21}$

2) a) $(x+3)^2 = (x+3)(x+3)$

$= x^2 + 6x + 9$

	x	+3
x	x^2	3x
+3	3x	9

So... $(x+3)^2 \neq x^2 + 9$

and it is NOT an identity.

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

$x^2 - 9 = x^2 - 9$ ✓

	x	+3
x	x^2	3x
-3	-3x	-9

So it is an identity

c) $2(x-3) = 2x + 6$

$2x - 6 \neq 2x + 6$

and it is NOT an identity.

Remember: identity - if an equation is always true.
or the equations are equal.

3) $f(x)=5x^4-3x^3+5x-3$ $g(x)=2x^4+6x^2-7x-3$

$f(x)+g(x)$

$(5x^4-3x^3+5x-3)+(2x^4+6x^2-7x-3)$

$5x^4+2x^4 \quad -3x^3 \quad +6x^2 \quad +5x-7x-3-3$

$7x^4 \quad -3x^3 \quad +6x^2 \quad -2x \quad -6$

$f(x)-g(x)$

$(5x^4-3x^3+5x-3)-(2x^4+6x^2-7x-3)$

$5x^4 \quad -3x^3 \quad +5x \quad -3 \quad -2x^4 \quad -6x^2 \quad +7x \quad +3$

$5x^4-2x^4 \quad -3x^3 \quad -6x^2 \quad +5x+7x \quad -3+3$

$3x^4 \quad -3x^3 \quad -6x^2 \quad +12x \quad +0$

4) $f(x)=3x+4$ $g(x)=x^2-3x-7$

$f(x)\cdot g(x)$

$=(3x+4)(x^2-3x-7)$

$=3x^3-5x^2-33x-28$

	x^2	$-3x$	-7
$3x$	$3x^3$	$-9x^2$	$-21x$
4	$4x^2$	$-12x$	-28

Polynomial Test Review (cont.)

5) $3x^2yz^3 - 12xy^4z^3$

$3x^2yz^3 = 3 \cdot x \cdot x \cdot y \cdot z \cdot z \cdot z$

$12xy^4z^3 = -2 \cdot 2 \cdot 3 \cdot x \cdot y \cdot y \cdot y \cdot y \cdot z \cdot z \cdot z$

$= 3xyz^3(x - 4y^3)$

6) $(4x^3 - 12x^2) - (5x - 15)$ ← once put Parentheses around change sign of 15!

$= 2 \cdot 2 \cdot x \cdot x \cdot x \quad 2 \cdot 2 \cdot 3 \cdot x \cdot x \quad 5 \cdot x \quad -5 \cdot 3$

$= 4x^2(x-3) - 5(x-3)$

$= (4x^2 - 5)(x-3)$

7) a) $x^2 - 3x - 88$

$(x-11)(x+8)$

$a = 1$

$b = -3$

$c = -88$

* Remember: $ax^2 + bx + c$

factors of $c = -88$	Sum of factors (must equal $b = -3$)
$-44 \cdot 2$	$-44 + 2 = -42$
$44 \cdot -2$	$44 + (-2) = 42$
$-22 \cdot 4$	$-22 + 4 = -18$
$22 \cdot -4$	$22 + (-4) = 18$
$-11 \cdot 8$	$-11 + 8 = -3$
$11 \cdot -8$	$11 + (-8) = 3$
$-88 \cdot 1$	$-88 + 1 = -87$
$88 \cdot -1$	$88 + (-1) = 87$

b) $3x^2 + 16x + 5$

$a = 3$, $b = 16$, $c = 5$ } $ac = (3)(5) = 15$

factors of $ac = (3)(5) = 15$	Sum of factors (must equal $b = 16$)
$1 \cdot 15$	$1 + 15 = 16$
$-1 \cdot -15$	$-1 + -15 = -16$
$3 \cdot 5$	$3 + 5 = 8$
$-3 \cdot -5$	$-3 + -5 = -8$

rewrite!

$(3x^2 + 1x) + (15x + 5)$

$x(3x+1) + 5(3x+1)$

$(x+5)(3x+1)$

c) $8x^2 - 2x - 3$

$a=8$, $b=-2$, $c=-3$ $\Rightarrow ac=(8)(-3)=-24$

factors of $ac=(8)(-3)=-24$	sum of factors (must equal $b=-2$)
$-24 \cdot 1$	$-24+1=-23$
$24 \cdot -1$	$24+(-1)=23$
$-12 \cdot 2$	$-12+2=-10$
$12 \cdot -2$	$12+(-2)=10$
$-8 \cdot 3$	$-8+3=-5$
$8 \cdot -3$	$8+(-3)=5$
$-6 \cdot 4$	$-6+4=-2$
$6 \cdot -4$	$6+(-4)=2$

Rewrite

$(8x^2+4x)-(6x+3)$

$4x(x+1)-3(x+1)$

$(4x-3)(x+1)$

8) $9x^4 - 64y^2$

$=(3x^2 \cdot 3x^2)-(8y \cdot 8y)$

$=(3x^2)^2-(8y)^2$

$=(3x^2-8y)(3x^2+8y)$

difference of squares:

$x^2-y^2=(x+y)(x-y)$

$\rightarrow x=3x^2,\ y=8y$

a) $64x^3+1$

$=(4x)^3+(1)^3$

$=(4x+1)((4x)^2-(4x)(1)+(1)^2)$

$=(4x+1)(16x^2-4x+1)$

sum of cubes:

$x^3+y^3=(x+y)(x^2-xy+y^2)$

$\rightarrow x=4x,\ y=1$

10) $3x^2+13x=10$
$-10\ -10$

$3x^2+13x-10=0$

$a=3$
$b=13$
$c=-10$
$a\cdot c=-30$

$15\cdot -2=-30$ ✓
$15+(-2)=13$

$3x^2+15x-2x-10=0$

$(3x^2+15x)-(2x+10)=0$

$3x(x+5)-2(x+5)=0$

$(3x-2)(x+5)=0$

$3x-2=0$
$+2\ \ +2$

$\frac{3x}{3}=\frac{2}{3}$

$x=\frac{2}{3}$

$x+5=0$
$-5\ -5$

$x=-5$