SECTION 4.3 - MULTIPLYING POLYNOMIALS

MAYO (F2017)

REVIEW:

(1) SIMPLIFY $(2x^2-7)+(8-5x^2) = 2x^2-5x^2-7+8 = \boxed{-3x^2+1}$

(2) GIVE THE FORMULA FOR THE nTH TERM OF: $2, 4, 8, 16, \ldots$ ($\times 2$ $\times 2$ $\times 2$)

$a_n = 2(2)^{n-1}$ $\quad r = 2$

(3) GIVE THE FORMULA FOR THE nTH TERM OF: $2, 4, 6, 8, \ldots$ ($+2$ $+2$ $+2$)

$a_n = 2+(n-1)2$ $\quad d = 2$

(3) GIVEN THE DATA BELOW, PREDICT A TEST SCORE FOR A PERSON WHO STUDIES FOR 44 MINUTES

TIME STUDIED (MIN)	10	15	23	25	30	48
TEST GRADE	48	62	70	77	80	92

✱ MULTIPLYING BINOMIALS ✱

EXAMPLE 1. DISTRIBUTIVE PROPERTY

(A) $(2x+3)(x+5) = 2x(x+5)+3(x+5)$

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

$= \boxed{2x^2+13x+15}$

(B) $(x-2)(3x+4) =$

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

$= \boxed{3x^2-2x-8}$

APPLICATION 1.

(1) $(3m+4)(m+5) = 3m(m+5)+4(m+5)$

$= 3m^2+15m+4m+20$

$= \boxed{3m^2+19m+20}$

(2) $(5y-2)(y+8) =$

$5y(y+8)-2(y+8) = 5y^2+40y-2y-16$

$= \boxed{5y^2+38y-16}$

EXAMPLE 2. "FOIL" METHOD

F = FIRST
O = OUTER
I = INNER
L = LAST

(A) $(2y-7)(3y+5) = 6y^2+10y-21y-35$
$= \boxed{6y^2-11y-35}$

(B) $(4a-5)(2a-9) = 8a^2-36a-10a+45$
$= \boxed{8a^2-46a+45}$

APPLICATION 2.

(1) $(x+3)(x-4)$
$x^2-4x+3x-12$
$\boxed{x^2-x-12}$

(2) $(4b-5)(3b+2)$
$12b^2+8b-15b-10$
$\boxed{12b^2-7b-10}$

(3) $(2y-5)(y-6)$
$2y^2-12y-5y+30$
$\boxed{2y^2-17y+30}$

(4) $(5a+2)(3a-4)$
$15a^2-20a+6a-8$
$\boxed{15a^2-14a-8}$

EXAMPLE 3. "BOX" METHOD.

(A) $(3x+2)(2x-3)$

	$2x$	-3
$3x$	$6x^2$	$-9x$
2	$4x$	-6

$\boxed{6x^2-5x-6}$

(B) $(-2a+5)(-3a-2)$

	$-3a$	-2
$-2a$	$6a^2$	$4a$
5	$-15a$	-10

$\boxed{6a^2-11a-10}$

APPLICATION 3.

(1) $(7x-2)(2x+2)$

	$2x$	2
$7x$	$14x^2$	$14x$
-2	$-4x$	-4

$\boxed{14x^2+10x-4}$
$= (2(7x^2+5x-2))$

(2) $(4b-6)(3b+2)$

	$4b$	-6
$3b$	$12b^2$	$-18b$
2	$8b$	-12

$\boxed{12b^2-10b-12}$

MULTIPLYING POLYNOMIALS *

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

"FOIL"

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

$12x^3-18x^2-30x+10x^2-15x-25$

$12x^3-8x^2-45x-25$

"BOX"

	$2x^2$	$-3x$	-5
$6x$	$12x^3$	$-18x^2$	$-30x$
5	$10x^2$	$-15x$	-25

$12x^3-8x^2-45x-25$

EXAMPLE 5. $(2y^2+3y-1)(3y^2-5y+2)$

	$3y^2$	$-5y$	2
$2y^2$	$6y^4$	$-10y^3$	$4y^2$
$3y$	$9y^3$	$-15y^2$	$6y$
-1	$-3y^2$	$+5y$	-2

$6y^4-y^3-14y^2+11y-2$

APPLICATION 4

① $(3x-5)(2x^2+7x-8)$ $6x^3+21x^2-24x-10x^2-35x+40$

$6x^3+11x^2-59x+40$

② $(m^2+2m-3)(4m^2-7m+5)$

	$4m^2$	$-7m$	5
m^2	$4m^4$	$-7m^3$	$5m^2$
$2m$	$8m^3$	$-14m^2$	$10m$
-3	$-12m^2$	$21m$	-15

$4m^4+m^3-21m^2+31m-15$

PRACTICE. FIND EACH PRODUCT. (ANY METHOD.)

① $(3c-5)(c+3)$

$3c^2+9c-5c-15$

$3c^2+4c-15$

② $(g+10)(2g-5)$

$2g^2-5g+20g-50$

$2g^2+15g-50$

③ $(x-1)(x+1)$

$x^2+x-x-1$

x^2-1

④ $(6a+5)(5a+3)$

$30a^2+18a+25a+15$

$30a^2+43a+15$

(5) $(4x+1)(6x+3)$

$24x^2 + 12x + 6x + 3$

$24x^2 + 18x + 3$

(6) $(5y-4)(3y-1)$

$15y^2 - 5y - 12y + 4$

$15y^2 - 17y + 4$

(7) $(11z - 5y)(3z + 2y)$

$33z^2 + 22yz - 15yz - 10y^2$

$33z^2 + 7yz - 10y^2$

(8) $(8w + 4x)(5w - 6x)$

$40w^2 - 48wx + 20wx - 24x^2$

$40w^2 - 28wx - 24x^2$

(9) $(2y - 11)(y^2 - 3y + 2)$

$2y^3 - 6y^2 + 2y - 11y^2 + 33y - 22$

$2y^3 - 17y^2 + 35y - 22$

(10) $(4a + 7)(9a^2 + 2a - 7)$

$36a^3 + 8a^2 - 14a + 63a^2 + 14a - 49$

$36a^3 + 71a^2 - 49$

(11) $(m^2 - 5m + 4)(m^2 + 7m - 3)$

	m^2	$7m$	-3
m^2	m^4	$7m^3$	$-3m^2$
$-5m$	$-5m^3$	$-35m^2$	$15m$
4	$4m^2$	$28m$	-12

$m^4 + 2m^3 - 34m^2 + 43m - 12$

(12) $(x^2 + 5x - 1)(5x^2 - 6x + 1)$

	$5x^2$	$-6x$	1
x^2	$5x^4$	$-6x^3$	x^2
$5x$	$25x^3$	$-30x^2$	$5x$
-1	$-5x^2$	$6x$	-1

$5x^4 + 19x^3 - 34x^2 + 10x - 1$

(13) $(3b^2 - 4b - 7)(2b^2 - b - 9)$

$6b^4 - 11b^3 - 37b^2 + 43b + 63$

(14) $(6z^2 - 5z - 2)(3z^3 - 2z - 4)$

$18z^5 - 15z^4 - 18z^3 - 14z^2 + 24z + 8$

(BOX)

SIMPLIFY:

(15) $(3x^2 + 2) + (5x^2 + x - 3) = 8x^2 + x - 1$

(16) $3(2x^3 + 5) + 2x(3x + 1)$

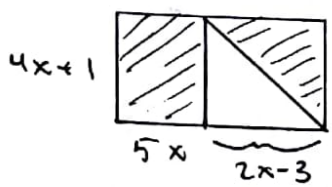
$6x^3 + 15 + 6x^2 + 2x = 6x^3 + 6x^2 + 2x + 15$

(17) $(x-4)\left[(x^2 + 3x + 8) - (x^2 - 2x + 6)\right]$

$(x-4)(5x + 2) = 5x^2 + 2x - 20x - 8$

$= 5x^2 - 18x - 8$

(18) FIND THE SHADED AREA.



$(4x+1)(5x) = 20x^2 + 5x$

$\frac{1}{2}(2x-3)(4x+1) = \frac{1}{2}(8x^2 + 2x - 12x - 3)$

$= \frac{1}{2}(8x^2 - 10x - 3)$

$= 4x^2 - 5x - \frac{3}{2}$

TOTAL $= 20x^2 + 5x + 4x^2 - 5x - \frac{3}{2}$

$= (24x^2 - 3/2)$