Feb 2 Lesson 1 : Factoring Review

(e)

MPM 2D1
Revisit Factoring Skills

Common Factor

1a) $2a^2 - 6a = 2a(a-3)$

b) $15xy - 10xy^2 = 5xy(3-2y)$

c) $64x^6y^2 - 32x^4y^4 = 32x^4y^2(2x^2 - y^2)$

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

Go over

e) $45a^2b - 15ab^2 - 60ab = 5ab(9a - 3b - 12)$
$= 15ab(3a - b - 4)$

f) $x(a+b) + y(a+b)$
$(a+b)(x+y)$

g) $2ax - 3bx - 2ay + 3by$
$x(2a-3b) - y(2a-3b)$
$(2a-3b)(x-y)$

h) $x^2 + y - xy - x$
$x(x-1) - y(x-1)$
$(x-y)(x-1)$

Factoring Trinomials

2a) $x^2 - 9x + 20$ $(x-5)(x-4)$

b) $m^2 - 13m + 42$ $(m-6)(m-7)$

c) $a^2 + 6a + 9$ $(a+3)^2$

d) $25 - 10x + x^2$ $(x-5)^2$

e) $a^2 - 3ab - 10b^2$ sum $= -3b$, product $= -10b^2$
$-5b \times 2b$
$a^2 - 5b + 2b - 10b^2$
$a^2 - 5ab + 2ab - 10b^2$
$a(a-5b) + 2b(a-5b)$
$(a+2b)(a-5b)$

f) $3x^2 + 3x - 6$

g) $x^2 + 8xy + 15y^2$

h) $3y^2 + 12y - 15$

3a) $4x^2 + 8x + 3$

b) $9x^2 + 15x + 4$

c) $2y^2 + 3y + 1$

d) $3x^2 - 5x - 2$

e) $5x^2 - 11x + 2$ $(5x-1)(x-2)$

f) $6m^2 - 11m - 10$ $(3m+2)(2m-5)$

g) $10b^2 + b - 3$ $(5b+3)(2b-1)$

h) $3x^2 + 13m + 4$ $(3x+1)(x+4)$

Factoring Special Products

4a) $y^2 + 8y + 16$ $(y+4)^2$

b) $m^2 - 6m + 9$ $(m-3)^2$

c) $x^2 - 25$ $(x+5)(x-5)$

d) $9x^2 - 49$ $(3x+7)(3x-7)$

e) $4a^2 + 4a + 1$ $(2a+1)^2$

f) $x^2 - 4y^2$ $(x+2y)(x-2y)$

g) $25a^2 - 40ab + 16b^2$

h) $(a+b)^2 - c^2$

i) $c^2 - (2a-b)^2$

You decide

5a) $a^2 - ab - 56b^2$

b) $6a^2 + 5a + 1$

c) $m^4 - 5m^2 - 36$

d) $2x^2 - 8$

e) $4x^2 - 11x + 6$

f) $x^3 - xy$

g) $2x^2 - 16x + 32$

(f) $3x^2 + 3x - 6$ product $= 3x - 6 = -18$ ✓

$= 3x^2 + 6x - 3x - 6$ sum $= 3$ ✓

$= 3x(x-1) + 6(x-1)$ $6x - 3 = -18$ ✓

$6 - 3 = 3$ ✓

$= (x-1)(3x+6)$

(g) $x^2 + 8xy + 15y^2$ product $= 15y^2$ $5y \times 3y$

$= x^2 + 5xy + 3xy + 15y^2$ sum $= 8y$ $5y + 3y$

$= x(x+3y) + 5y(x+3y)$

$= (x+3y)(x+5y)$

(h) $3y^2 + 12y - 15$

$= 3(y^2 + 4y - 5)$ (add, mult) $(5) \times (-1) = -5$

$5 - 1 = 4$

$= 3(y^2 + 5y - y - 5)$

$= 3\{y(y+5) - (y+5)\}$

$= 3(y+5)(y-1)$

(3a) $4x^2 + 8x + 3$ product $= 12 \rightarrow 6 \times 2$

$= 4x^2 + 6x + 2x + 3$ add $= 8 \rightarrow 6 + 2$

$= 2x(2x+1) + 3(2x+1)$

$= (2x+1)(2x+3)$

3b) $9x^2 + 15x + 4$ product = $4 \times 9 = 36 \rightarrow 12 \times 3$

$= (9x^2) + 12x + (3x) + 4$ add = $15 \rightarrow 12 + 3$

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

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

3c) $2y^2 + 3y + 1$ product = $2 \times 1 = 2 \rightarrow 2 \times 1$

add = $3 \rightarrow 2 + 1$

$= 2y^2 + 2y + y + 1$

$= 2y(y+1) + (y+1)$

$= (2y+1)(y+1)$

3d) $3x^2 - 5x - 2$ product = $3 \times (-2) = -6$ ↳ $(-6) \times (1)$

add = -5 ↳ $(-6) + (1)$

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

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

$= (3x+1)(x-2)$

Factoring Special Products

4a) $y^2 + 8y + 16$

$= y^2 + 2 \cdot 4y + 4^2$

$= (y+4)^2$

4b) $m^2 - 6m + 9$

$= m^2 - 2 \cdot 3m + 3^2$

$= (m-3)^2$

4c) $x^2 - 25$

$= (x)^2 - (5)^2$ $a = x$, $b = 5$

$= (x+5)(x-5)$

4d) $9x^2 - 49$

$= (3x)^2 - (7)^2$ $a = 3x$, $b = 7$

$= (3x+7)(3x-7)$

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4e) $4a^2 + 4a + 1$

$= (2a)^2 + (2 \cdot 1 \cdot 2a) + 1^2$

$= (2a+1)^2$

4f) $x^2 - 4y^2$

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

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

4g) $25a^2 - 40ab + 16b^2$ $\quad a = 5a$, $b = 4b$

$= (5a)^2 - (2 \times 4b \times 5a) + (4b)^2$

$= (5a+4b)(5a-4b)$

4h) $(a+b)^2 - c^2$ $\quad a = a+b$, $b = c$

$= (a+b+c)(a+b-c)$

4i) $c^2 - (2a-b)^2$ $\quad a = c$, $b = 2a-b$

$= (c+2a-b)(c-(2a-b))$

$= (c+2a-b)(c-2a+b)$

You decide

5a) $a^2 - ab - 56b^2$

$= a^2 - 8ab + 7ab - 56b^2$

$= a(a-8b) + 7b(a-8b)$

$= (a-8b)(a+7b)$

product $= 1 \times -56 = -56$

add $= -1$

Two integers $= (-8) \times 7 = -56$