MCR3UI Unit 1/Ch. 2 Review

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1a) $(7x^2-2x+1)+(9x^2-4x+5)-(4x^2+6x-7)$
$=7x^2-2x+1+9x^2-4x+5-4x^2-6x+7$
$=12x^2-12x+13$

b) $(7a^2-4ab+9b^2)-(-a^2+2ab+6b^2)$
$=7a^2-4ab+9b^2+a^2-2ab-6b^2$
$=8a^2-6ab+3b^2$

4a) $-3(7x-5)(4x-7)$
$=-3(28x^2-49x-20x+35)$
$=-3(28x^2-69x+35)$
$=-84x^2+207x-105$

c) $2(a+b)^3$
$=2(a+b)(a+b)^2$
$=(2a+2b)(a^2+2ab+b^2)$
$=2a^3+4a^2b+2ab^2+2a^2b+4ab^2+2b^3$
$=2a^3+6a^2b+6ab^2+2b^3$

6c) $-7x(x^2+x-1)-3x(2x^2-5x+6)$
$=-7x^3-7x^2+7x-6x^3+15x^2-18x$
$=-13x^3+8x^2-11x$

f) $(x+2)^2(x-1)^2-(x-4)^2(x+4)^2$
$=(x^2+4x+4)(x^2-2x+1)-(x^2-8x+16)(x^2+8x+16)$
$=x^4-2x^3+x^2+4x^3-8x^2+4x+4x^2-8x+4-(x^4+8x^3+16x^2-8x^3-64x^2-128x+16x^2+128x+256)$
$=x^4+2x^3-3x^2-4x+4-(x^4+0x^3-32x^2+0x+256)$
$=2x^3+29x^2-4x-252$

6g) $(x^2+5x-3)^2$
$=(x^2+5x-3)(x^2+5x-3)$
$=x^4+5x^3-3x^2+5x^3+25x^2-15x-3x^2-15x+9$
$=x^4+10x^3+19x^2-30x+9$

7a) $12m^2n^3+18m^3n^2$
$=6m^2n^2(2n+3m)$

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

c) $3x^2+24x+45$
$=3(x^2+8x+15)$
$=3(x+3)(x+5)$

d) $50x^2-72$
$=2(25x^2-36)$
$=2(5x-6)(5x+6)$

e) $9x^2-6x+1$
$=(3x-1)(3x-1)$
$=(3x-1)^2$

f) $10a^2+a-3$
$=(5a+3)(2a-1)$

8a) $2x^2y^4-6x^5y^3+8x^3y$
$=2x^2y(y^3-3x^3y^2+4x)$

b) $2x(x+4)+3(x+4)$
$=(x+4)(2x+3)$

c) $x^2-3x-10$
$=(x-5)(x+2)$

d) $15x^2-53x+42$
$=(5x-6)(3x-7)$

5·6 = 30
3·7 = 21
−53

e) a^4-16
$=(a^2-4)(a^2+4)$
$=(a-2)(a+2)(a^2+4)$

f) $(m-n)^2-(2m+3n)^2$ → let $x=m-n$, $y=2m+3n$
$=x^2-y^2$
$=(x-y)(x+y)$
$=(m-n-(2m+3n))(m-n+(2m+3n))$
$=(m-n-2m-3n)(m-n+2m+3n)$
$=(-m-4n)(3m+2n)$
$=-(m+4n)(3m+2n)$

Review (cont'd)

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9a) $\frac{10a^2b+15bc^2}{-5b}$

$= \frac{5b(2a^2+3c^2)}{-5b}$

$= -(2a^2+3c^2)$

Rest: $b \neq 0$

b) $\frac{30x^2y^3-20x^2z^2+10x^2}{10x^2}$

$= \frac{10x^2(3y^3-2z^2+5)}{10x^2}$

$= 3y^3-2z^2+5$

Rest: $x \neq 0$

10b) $\frac{7a-14b}{2(a-2b)}$

$= \frac{7(a-2b)}{2(a-2b)}$

$= \frac{7}{2}$

Rest: $a \neq 2b$ [or $b \neq \frac{1}{2}a$]

10d) $\frac{4x^2-4x-3}{4x^2-9}$

$= \frac{(2x-3)(2x+1)}{(2x-3)(2x+3)}$

$= \frac{2x+1}{2x+3}$ Rest: $x \neq \pm\frac{3}{2}$

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10e) $\frac{3x^2-21x}{7x^2-28x+21}$

$= \frac{3x(x-7)}{7(x^2-4x+3)}$

$= \frac{3x(x-7)}{7(x-3)(x-1)}$

Rest: $x \neq 3, 1$

12a) $\frac{6x}{8y} \times \frac{2y^2}{3x}$

$= \frac{2y}{4}$

$= \frac{1}{2}y$

R: $x \neq 0$, $y \neq 0$

c) $\frac{2ab}{5bc} \div \frac{6ac}{10b}$

$= \frac{2ab}{5bc} \times \frac{10b}{6ac}$ (3)

$= \frac{2b}{3c^2}$

R: $b \neq 0$, $c \neq 0$, $a \neq 0$

13b) $\frac{x^2-5x+6}{x^2-1} \times \frac{x^2-4x-5}{x^2-4} \div \frac{x-5}{x^2+3x+2}$

$= \frac{(x-3)(x-2)}{(x-1)(x+1)} \times \frac{(x-5)(x+1)}{(x-2)(x+2)} \times \frac{(x+2)(x+1)}{(x-5)}$ $x \neq R$

$= \frac{(x-3)(x+1)}{(x-1)}$ Rest: $x \neq \pm 1, \pm 2, 5$

13c) $\frac{1-x^2}{1+y} \times \frac{1-y^2}{x+x^2} \div \frac{y^3-y}{x^2}$

$= \frac{(1-x)(1+x)}{1+y} \times \frac{-1(y-1)(1+y)}{x(1+x)} \times \frac{x^2}{y(y-1)(y+1)}$

$= \frac{-1(1-x)x}{y(y+1)}$ Rest: $y \neq -1, 0, 1$; $x \neq 0, -1$

$= \frac{x(x-1)}{y(y+1)}$

14c) $\frac{1}{x^2+3x-4} + \frac{1}{x^2+x-12}$

$= \frac{1}{(x+4)(x-1)} + \frac{1}{(x+4)(x-3)}$ LCD: $(x+4)(x-1)(x-3)$

$= \frac{1(x-3)+1(x-1)}{(x+4)(x-1)(x-3)}$

$= \frac{x-3+x-1}{(x+4)(x-1)(x-3)}$

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

$= \frac{2(x-2)}{(x+4)(x-1)(x-3)}$ Rest: $x \neq -4, 1, 3$

14d) $\frac{1}{x^2-5x+6} - \frac{1}{y^2-9}$

$= \frac{1}{(x-3)(x-2)} - \frac{1}{(x-3)(x+3)}$

$= \frac{(x+3)-(x-2)}{(x-3)(x-2)(x+3)}$

$= \frac{x+3-x+2}{(x-3)(x-2)(x+3)}$

$= \frac{5}{(x-3)(x-2)(x+3)}$

Rest: $x \neq \pm 3, 2$

15c) $\frac{6x}{x^2-5x+6} - \frac{3x}{x^2+x-12}$

$= \frac{6x}{(x-3)(x-2)} - \frac{3x}{(x-3)(x+4)}$

$= \frac{6x(x+4)-3x(x-2)}{(x-3)(x-2)(x+4)}$

$= \frac{6x^2+24x-3x^2+6x}{(x-3)(x-2)(x+4)}$

$= \frac{3x^2+30x}{(x-3)(x-2)(x+4)}$ or $\frac{3x(x+10)}{(x-3)(x-2)(x+4)}$

Rest: $x \neq 3, 2, -4$

15e) $\frac{(x-2y)^2}{x^2-y^2} \div \frac{(x-2y)(x+3y)}{(x+y)^2}$

$= \frac{(x-2y)(x-2y)}{(x-y)(x+y)} \times \frac{(x+y)(x+y)}{(x-2y)(x+3y)}$

$= \frac{(x-2y)(x+y)}{(x-y)(x+3y)}$

Rest: $x \neq \pm y, 2y, -3y$

Time: 50 min.