College Algebra — Joysheet 7
MAT 140, Spring 2021 — D. Ivanšić

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Covers: JIT 13, 15, 21–23 *Show all your work!*

Use formulas to expand:

1. (4pts) $(u-2v)(u+2v) =$ $u^2-(2v)^2 = u^2-4v^2$

2. (4pts) $(x-5y)^2 =$ $x^2-2\cdot x\cdot 5y+(5y)^2 = x^2-10xy+25y^2$

3. (5pts) $(x^2+y^3)^2 =$ $(x^2)^2+2\cdot x^2\cdot y^3+(y^3)^2 = x^4+2x^2y^3+y^6$

Use the *ac*-method or another method to factor. Show how you got your answer.

4. (5pts) $3x^2-2x-8 =$ $3x^2-6x+4x-8 = 3x(x-2)+4(x-2)$

prod = -24 $-6, 4$ $= (3x+4)(x-2)$

sum = -2

5. (6pts) $20x^2+28x-3 =$ $20x^2+30x-2x-3 = 10x(2x+3)-(2x+3)$

prod = -60 $30, -2$ $= (10x-1)(2x+3)$

sum = 28

6. (8pts) Compute expressions with fractions by hand.

$\frac{2}{5}\cdot\frac{15}{4} = \frac{3}{2}$ (1 3 / 1 2)

$\frac{12}{25}\div\frac{3}{10} = \frac{12}{25}\cdot\frac{10}{3} = \frac{8}{5}$ (4 2 / 5 1)

$\frac{3}{8}+\frac{5}{6} = \frac{3\cdot 3}{8\cdot 3}+\frac{5\cdot 4}{6\cdot 4} = \frac{9+20}{24} = \frac{29}{24}$

LCD = 24

$\frac{35}{18}-\frac{14}{45} = \frac{35\cdot 5}{18\cdot 5}-\frac{14\cdot 2}{45\cdot 2} = \frac{175-28}{90} = \frac{147}{90}$

$2\cdot 3\cdot 3$ $5\cdot 3\cdot 3$

LCD is $2\cdot 5\cdot 3\cdot 3 = 90$ $= \frac{49}{30}$

Multiply or divide the rational expressions.

7. (7pts) $\dfrac{x^2-4}{x^2-5x-14}\cdot\dfrac{5x-35}{2x+4}=$ $\dfrac{(x-2)(x+2)}{(x-7)(x+2)}\cdot\dfrac{5(x-7)}{2(x+2)}=\dfrac{5(x-2)}{2(x+2}$

8. (7pts) $\dfrac{x^2-2x-35}{2x^2-11x-21}\div\dfrac{x^2+4x-5}{6x+9}=$ $\dfrac{(x-7)(x+5)}{(2x+3)(x-7)}\cdot\dfrac{3(2x+3)}{(x+5)(x-1)}$

prod = -42 -14, 3

sum = -11

$2x^2-14x+3x-21$

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

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

$=\dfrac{3}{x-1}$

Add or subtract the rational expressions.

9. (6pts) $\dfrac{2x-3}{4x^2-15x-4}-\dfrac{3}{x-4}=$ $\dfrac{2x-3-3(4x+1)}{(4x+1)(x-4)}=\dfrac{-10x-6}{(4x+1)(x-4)}$

prod = -16 $(4x+1)(x-4)$ -16, 1

sum = -15

$4x^2-16x+x-4$

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

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

$=-\dfrac{2(5x+3)}{(4x+1)(x-4)}$

10. (8pts) $\dfrac{x-3}{2x^2-7x-30}+\dfrac{x+1}{x^2-3x-18}=$ $\dfrac{(x-3)(x+3)+(x+1)(2x+5)}{(2x+5)(x-6)(x+3)}$

prod = -60 $(2x+5)(x-6)$ $(x-6)(x+3)$

sum = -7

-12, 5

$2x^2-12x+5x-30$

$=2x(x-6)+5(x-6)$

$=(2x+5)(x-6)$

$=\dfrac{x^2-9+2x^2+2x+5x+5}{(2x+5)(x-6)(x+3)}=\dfrac{3x^2+7x-4}{(2x+5)(x-6)(x+3)}$

prod = -12	-1, 12	-2, 6	-3, 4	does not factor
sum = 7	11	4	1	