College Algebra — Joysheet 7
MAT 140, Fall 2020 — D. Ivanšić

Name: Saul Ocean

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

Use formulas to expand:

1. (4pts) $(u+7)^2 =$ $u^2+2\cdot u\cdot 7+7^2 = u^2+14u+49$

2. (5pts) $(x^2+3y)^2 =$ $(x^2)^2+2\cdot x^2\cdot 3y+(3y)^2 = x^4+6x^2y+9y^2$

3. (4pts) $(5x+7y)(5x-7y) =$ $(5x)^2-(7y)^2 = 25x^2-49y^2$

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

4. (5pts) $7x^2-19x-6 =$ $7x^2-21x+2x-6 = 7x(x-3)+2(x-3)$

prod $= -42$ $-21, 2$
sum $= -19$
$= (7x+2)(x-3)$

5. (6pts) $12x^2+x-6 =$ $12x^2+9x-8x-6 = 3x(4x+3)-2(4x+3)$

prod $= -72$ $9, -8$
sum $= 1$
$= (3x-2)(4x+3)$

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

$\frac{3}{7}\cdot\frac{4}{9} = \frac{4}{21}$ (1, 3)

$\frac{15}{4}\div\frac{9}{10} = \frac{15}{4}\cdot\frac{10}{9} = \frac{25}{6}$ (5, 5, 2, 3)

$\frac{7}{6}+\frac{3}{10}$ (5, 3) $\quad \frac{5\cdot 7+3\cdot 3}{30} = \frac{44}{30} = \frac{22}{15}$

LCD $= 30$

$\frac{5}{12}-\frac{11}{42}$ (7, 2) $\quad \frac{7\cdot 5-11\cdot 2}{84} = \frac{13}{84}$

$2\cdot 2\cdot 3$ $\quad 2\cdot 3\cdot 7$
LCD $= 2\cdot 2\cdot 3\cdot 7$
$= 84$

Multiply or divide the rational expressions.

7. (7pts) $\dfrac{6x+3}{2x^2-9x-5} \cdot \dfrac{x^2-25}{3x+12} = \dfrac{3(2x+1)(x-5)(x+5)}{(2x+1)(x-5)\,3(x+4)} = \dfrac{x+5}{x+4}$

prod = −10, sum = −9: $-10, 1$

$2x^2 - 10x + x - 5$

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

$(2x+1)(x-5)$

8. (7pts) $\dfrac{x^2-16}{3x^2+5x-12} \div \dfrac{x^2+7x+12}{6x^2-8x} = \dfrac{(x-4)(x+4)}{(3x-4)(x+3)} \cdot \dfrac{2x(3x-4)}{(x+3)(x+4)} = \dfrac{2x(x-4)}{(x+3)^2}$

$(3x+9)(x+3)$ $\quad 2x(3x-4)$

prod = −36, sum = 5: $9, -4$

$3x^2 + 9x - 4x - 12$

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

Add or subtract the rational expressions.

9. (6pts) $\dfrac{x+2}{x^2-2x-3} - \dfrac{5x}{x+1} = \dfrac{x+2-5x(x-3)}{(x-3)(x+1)} = \dfrac{-5x^2+16x+2}{(x-3)(x+1)}$ ← doesn't factor

$(x-3)(x+1)$ $\quad \cdot(x-3)$ $\quad -5x^2+15x$

prod = −10	±10, ±1	±5, ∓2
sum = 16	∓9	±3

no sol.

10. (8pts) $\dfrac{x}{2x^2-3x-35} + \dfrac{x-2}{x^2-6x+5} = \dfrac{x\cdot(x-1) + (x-2)(2x+7)}{(2x+7)(x-5)(x-1)}$

$(2x+7)(x-5)$ $\quad (x-5)(x-1)$

prod = −70, sum = −3: $-10, 7$

$2x^2 - 10x + 7x - 35$

$2x(x-5) + 7(x-5)$

$= \dfrac{x^2 - x + 2x^2 - 4x + 7x - 14}{(2x+7)(x-5)(x-1)}$

$= \dfrac{3x^2 + 2x - 14}{(2x+7)(x-5)(x-1)}$ ← doesn't factor

prod = −42	±1, ∓42	±2, ∓21	±3, ∓14	±6, ∓7
sum = 2	∓41	∓19	∓11	∓1

no sol.