

Use formulas to expand:

1. (4pts) $(3x - 4y)(3x - 4y) = (3x - 4y)^2 = (3x)^2 - 2 \cdot 3x \cdot 4y + (4y)^2$
 meant to be
 $(3x - 4y)(3x + 4y) = 9x^2 - 16y^2$
 $= (3x)^2 - (4y)^2 = 9x^2 - 16y^2$

2. (4pts) $(a + 3b)^2 = a^2 + 2 \cdot a \cdot 3b + (3b)^2 = a^2 + 6ab + 9b^2$

3. (5pts) $(x^4 + y^4)^2 = (x^4)^2 + 2 \cdot x^4 \cdot y^4 + (y^4)^2 = x^8 + 2x^4y^4 + y^8$

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

4. (5pts) $2x^2 + x - 10 = 2x^2 + 5x - 4x - 10 = x(2x + 5) - 2(2x + 5)$
 $= (x - 2)(2x + 5)$
 prod = -20 5, -4
 sum = 1

5. (6pts) $8x^2 + 10x - 3 = 8x^2 + 12x - 2x - 3 = 4x(2x + 3) - (2x + 3)$
 $= (4x - 1)(2x + 3)$
 ac = -24 prod = -24
 sum = 10
 12, -2

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

$\frac{3}{2} \cdot \frac{14}{9} = \frac{7}{3}$

$\frac{7}{10} \div \frac{28}{15} = \frac{7}{10} \cdot \frac{15}{28} = \frac{3}{8}$

$\frac{7}{6} + \frac{2}{9} = \frac{7 \cdot 3}{6 \cdot 3} + \frac{2 \cdot 2}{9 \cdot 2} = \frac{21 + 4}{18} = \frac{25}{18}$

LCD = 18

$\frac{19}{24} - \frac{13}{20} = \frac{19 \cdot 5}{24 \cdot 5} - \frac{13 \cdot 6}{20 \cdot 6} = \frac{95 - 78}{120} = \frac{17}{120}$
 $24 = 2 \cdot 2 \cdot 2 \cdot 3$
 $20 = 2 \cdot 2 \cdot 5$
 LCD is $2 \cdot 2 \cdot 2 \cdot 3 \cdot 5 = 120$

Multiply or divide the rational expressions.

$$7. (7\text{pts}) \frac{\frac{3(x+4)}{3x+12} \cdot \frac{(x-3)(x+3)}{x^2-9}}{(x+3)(x+4) \cdot 4(x-3)} = \frac{3(x+4)}{(x+3)(x+4)} \cdot \frac{(x-3)(x+3)}{4(x-3)} = \frac{3}{4}$$

$$8. (7\text{pts}) \frac{(x-6)(x+4)}{9x+3} \div \frac{(x-6)(x-2)}{3x^2-14x-5} = \frac{(x-6)(x+4)}{3(3x+1)} \cdot \frac{(3x+1)(x-5)}{(x-6)(x-2)} = \frac{(x+4)(x-5)}{3(x-2)}$$

stays

$\text{prod} = -15$
 $\text{sum} = -14$
 $-15, 1$

$$3x^2 - 15x + x - 5$$

$$3x(x-5) + x-5$$

$$(3x+1)(x-5)$$

Add or subtract the rational expressions.

$$9. (6\text{pts}) \frac{x+1}{x-5} - \frac{x^2+3}{x^2-2x-15} = \frac{x+1}{x-5} \cdot \frac{x+3}{x+3} - \frac{x^2+3}{(x-5)(x+3)}$$

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

$$10. (8\text{pts}) \frac{x+2}{x^2-2x-35} + \frac{x-2}{2x^2-11x-21} = \frac{x+2}{(x+5)(x-7)} \cdot \frac{2x+3}{2x+3} + \frac{x-2}{(2x+3)(x-7)} \cdot \frac{x+5}{x+5}$$

$$= \frac{(x+2)(2x+3) + (x-2)(x+5)}{(x+5)(x-7)(2x+3)}$$

$\text{LCD} = (x+5)(x-7)(2x+3)$
 $a = -42 = \text{prod}$
 $-11 = \text{sum}$
 $2x^2 - 14x + 3x - 21$
 $= 2x(x-7) + 3(x-7)$
 $(2x+3)(x-7)$

$$= \frac{2x^2 + 7x + 6 + x^2 + 3x - 10}{(x+5)(x-7)(2x+3)}$$

$$= \frac{3x^2 + 10x - 4}{(x+5)(x-7)(2x+3)}$$

prod = -12	-1, 12	-2, 6	-3, 4
sum = 10	11	4	1
	x	x	x

does not factor