

Use formulas to expand:

1. (4pts) $(6a - b)^2 = (6a)^2 - 2 \cdot 6a \cdot b + b^2$
 $= 36a^2 - 12ab + b^2$

2. (5pts) $(3u + v^3)^2 = (3u)^2 + 2 \cdot 3u \cdot v^3 + (v^3)^2$
 $= 9u^2 + 6uv^3 + v^6$

3. (4pts) $(4i - 3j)(4i + 3j) = (4i)^2 - (3j)^2 = 16i^2 - 9j^2$

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

4. (5pts) $4x^2 - 11x + 6 = 4x^2 - 8x - 3x + 6 = 4x(x-2) - 3(x-2)$
 $\text{prod} = 24 \quad -8, -3$
 $\text{sum} = -11$
 $= (4x-3)(x-2)$

5. (6pts) $18x^2 - 9x - 2 = 18x^2 - 12x + 3x - 2 = 6x(3x-2) + (3x-2)$
 $\text{prod} = -36 \quad -12, 3$
 $\text{sum} = -9$
 $= (6x+1)(3x-2)$

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

$\frac{2}{5} \cdot \frac{25}{8} = \frac{5}{4}$

$\frac{6}{7} \div \frac{9}{28} = \frac{6}{7} \cdot \frac{28}{9} = \frac{8}{3}$

$\frac{3}{2} - \frac{5}{6} = \frac{3 \cdot 3}{2 \cdot 3} - \frac{5}{6} = \frac{9-5}{6} = \frac{4}{6} = \frac{2}{3}$

$\frac{7}{12} + \frac{5}{42} = \frac{7 \cdot 7}{12 \cdot 7} + \frac{5 \cdot 2}{42 \cdot 2} = \frac{49+10}{84} = \frac{59}{84}$

LCD: $\left. \begin{array}{l} 2 \cdot 2 \cdot 3 \\ 7 \cdot 2 \cdot 3 \end{array} \right\} 2 \cdot 2 \cdot 3 \cdot 7 = 84$

Multiply or divide the rational expressions.

$$7. (7\text{pts}) \frac{x-3}{2x+10} \cdot \frac{x^2-25}{3x^2-3x-18} = \frac{\cancel{(x-3)}(x-5)\cancel{(x+5)}}{2\cancel{(x+5)} \cdot 3\cancel{(x-3)}(x+2)} = \frac{x-5}{6(x+2)}$$

$3(x^2-x-6)$

$$8. (7\text{pts}) \frac{4x+10}{3x^2+4x-15} \div \frac{x^2-3x-18}{4x-24} = \frac{4x+10}{3x^2+4x-15} \cdot \frac{4x-24}{x^2-3x-18}$$

prod = -45, -5
sum = 4

$$= \frac{2(2x+5) \cdot 4\cancel{(x-6)}}{(3x-5)(x+3)\cancel{(x-6)}(x+3)} = \frac{8(2x+5)}{(3x-5)(x+3)^2}$$

$3x^2+9x-5x-15$
 $= 3x(x+3)-5(x+3)$
 $(3x-5)(x+3)$

Add or subtract the rational expressions.

$$9. (6\text{pts}) \frac{x+5}{x-2} - \frac{15x+12}{x^2+2x-8} = \frac{(x+5)(x+4)}{(x-2)(x+4)} - \frac{15x+12}{(x-2)(x+4)}$$

$$= \frac{x^2+5x+4x+20-15x-12}{(x-2)(x+4)} = \frac{x^2-6x+8}{(x-2)(x+4)}$$

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

$$10. (8\text{pts}) \frac{2x+1}{3x^2-5x-12} + \frac{x-4}{x^2+4x-21} = \frac{2x+1}{(3x+4)(x-3)} + \frac{x-4}{(x+7)(x-3)}$$

prod = -36, -9, 4
sum = -5

$$= \frac{(2x+1)(x+7) + (x-4)(3x+4)}{(3x+4)(x-3)(x+7)}$$

$$= \frac{2x^2+15x+7+3x^2-8x-16}{(3x+4)(x-3)(x+7)} = \frac{5x^2+7x-9}{(3x+4)(x-3)(x+7)}$$

prod = -48
sum = -7

-1	45	15	-5
1	44	12	4

Does not factor