

LECTURE 5: ALGEBRAIC FRACTIONS

Golden Rule: If you multiply or divide BOTH numerator and denominator by the same number the fraction's value stays the same.

1. Simplify:

1.1 $\frac{12x^6}{4x^2}$

1.2 $\frac{6+8}{2}$

1.3 $\frac{ax+bx}{a+b}$

1.4 $\frac{2x^2-x}{8x^2-2}$

1.5 $\frac{2x^2-9x+9}{4x^2-12x+9}$

1.6 $\frac{ax-b+x-ab}{ax^2-abx}$

1.7 $\frac{2\frac{1}{2}}{3\frac{3}{4}}$

1.8 $\frac{\frac{3}{4}+\frac{1}{2}}{\frac{1}{3}+\frac{1}{2}}$

BEWARE: ONLY CANCEL FACTORS, NOT INDIVIDUAL TERMS

MULTIPLICATION OF FRACTIONS

Simplify

2.1 $\frac{x^2+2x-15}{x^2-5x-14} \times \frac{x^2-49}{x^2+4x-21}$

2.2 $\frac{2x^2-7x+6}{2x^2+x-3} \times \frac{6x^2+7x-3}{2x^2-x-3} \div \frac{3x^2-5x-2}{x^2-1}$

2.3 $\frac{\frac{1}{2}x-\frac{3}{4}}{4x^2-9}$

2.4 $\frac{\frac{b}{a}-\frac{a}{b}}{\frac{1}{a}+\frac{1}{b}}$

TRUE OR FALSE? $\frac{5}{\frac{1}{2}+\frac{1}{3}} = 5 \times (2+3)$

ADDITION AND SUBTRACTION OF FRACTIONS

Simplify:

3.1 $\frac{x}{2} + \frac{2x}{5}$

3.2 $\frac{x-3}{3} + \frac{3x-1}{12}$

3.3 $\frac{5}{6}(x-1) - \frac{x-1}{2} + \frac{x-3}{3}$

3.4 $\frac{3}{x} - \frac{4}{3x} + \frac{5}{4x^2}$

3.5 $\frac{1}{x+1} + \frac{1}{x+5} - \frac{3x+7}{x^2+6x+5}$

3.6 $\frac{x+1}{2x^3-4x^2} + \frac{x-1}{2x^3+4x^2} - \frac{1}{x^2-4}$

3.7 $\frac{12a}{a^2-1} + \frac{4}{1-a} - \frac{6}{a+1}$

3.8 $\frac{a^2-2a}{a^2-a-2} + \frac{3a}{4-6a} + \frac{5a}{6a^2+2a-4}$

3.9 $\frac{x+\frac{1}{2}}{x-\frac{1}{2}} - \frac{x+\frac{1}{8}}{x-\frac{1}{8}}$

3.10 $\frac{2b}{a^2-b^2} - \frac{b}{ab-a^2} - \frac{a}{ab+b^2}$

MIXED EXAMPLES

Simplify

4.1 $\left(1 - \frac{1}{x}\right)\left(1 - \frac{1}{x-1}\right)\left(1 + \frac{2}{x-2}\right)\left(1 + \frac{2}{x-2}\right)$

4.2 $\left(\frac{1}{x} - \frac{1}{y}\right)\left(\frac{1}{x} + \frac{1}{y}\right) \div \left(\frac{x-y}{y} - \frac{y}{x}\right)$

4.3 $\left(2x-3 + \frac{7}{x+3}\right)\left(x+1 - \frac{3}{2x+1}\right)$

EVALUATION 2

Simplify

1. $\frac{ab+a}{b^2-1} \times \frac{a+3}{b-1} \div \frac{3a+9}{b^2-2b+1}$ (8)

2. $\frac{3x-4}{x^2+2x-8} - \frac{x}{x^2-4}$ (7)

3. $\frac{\frac{b}{a}-\frac{a}{b}}{\frac{1}{a}-\frac{1}{b}}$ (5)