The quotient of two polynomials P and Q, with $Q \neq 0$ is a **rational expression**

Denominator of a fraction cannot be 0, the domain consists of all real numbers except those that make the denominator 0.

1. Find the domain of the rational expression
   a. $\frac{2x-4}{x+7}$
   c. $\frac{3}{x^2-5x-6}$
   b. $\frac{9x+12}{(2x+3)(x-5)}$
   d. $\frac{x^2-25}{x-5}$

⋆ To determine the domain, find values of x that make the **original denominator** equal to 0 and exclude those.

2. Write each rational expression in lowest terms
   a. $\frac{36y^2+72y}{9y^2}$
   c. $\frac{r^2-r-6}{r^2+r-12}$
   b. $\frac{-8(4-y)}{(y+2)(y-4)}$
   d. $\frac{y^3-27}{y-3}$

Multiplying and Dividing

For fractions $\frac{a}{b}$ and $\frac{c}{d}$ $(b \neq 0,\ d \neq 0)$, the following hold.

$$\frac{a}{b} \bullet \frac{c}{d} = \frac{ac}{bd} \text{ and } \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \bullet \frac{d}{c} \quad (c \neq 0)$$

3. Multiply or divide, as indicated.

a. $\frac{2y^2}{9} \bullet \frac{27}{8y^5}$

b. $\frac{8r^3}{6r} \div \frac{5r^2}{9r^3}$

c. $\frac{y^3+y^2}{7} \bullet \frac{49}{y^4+y^3}$

d. $\frac{6r-8}{9r^2+6r-24} \div \frac{4r-12}{12r-16}$

e. $\frac{x^2+2x-15}{x^2+11x+30} \bullet \frac{x^2+2x-24}{x^2-8x+15}$

Addition and Subtraction

For fractions $\frac{a}{b}$ and $\frac{c}{d}$ $(b \neq 0,\ d \neq 0)$, the following hold

$$\frac{a}{b} + \frac{c}{d} = \frac{ad+cb}{bd} \text{ and } \frac{a}{b} - \frac{c}{d} = \frac{ad-bc}{bd}$$

4. Add or subtract, as indicated:

a. $\frac{8}{5p} + \frac{3}{4p}$

b. $\frac{3}{z} - \frac{x}{z^2}$

c. $\frac{7}{18a^3b^2} - \frac{2}{9ab}$

d. $\frac{p}{2p^2-9p-5} - \frac{2p}{6p^2-p-2}$

e. $\frac{3}{(x-1)(x+3)} + \frac{1}{(x+3)(x-4)}$

5. Simplify each complex fraction

a. $\frac{2-\frac{2}{y}}{2+\frac{2}{y}}$

b. $\frac{\frac{1}{y+3}-\frac{1}{y}}{\frac{1}{y}}$

c. $\frac{\frac{6}{x^2-25}+x}{\frac{1}{x-5}}$

Homework:

Pg. 53
11, 15, 21, 27, 31, 33, 35, 37, 41, 47, 51, 57, 59, 69, 73, 75, 81

Most Difficult First:

Pg. 53
29, 45, 67, 86