

2 people work together to finish a job in 2 hrs.

The first person takes 5 hrs alone, find the time it takes the 2<sup>nd</sup> person alone =  $t$

	rate	time = together	part job done
①	$\frac{1 \text{ job}}{5 \text{ hrs}}$	2	$\frac{2}{5}$
②	$\frac{1}{t}$	2	$\frac{2}{t}$

|

$$\frac{2^{\text{st}}}{5} + \frac{2^{\text{st}}}{t} = 1^{\text{st}}$$

$$2t + 10 = 5t$$

$$10 = 3t$$

$$\frac{10}{3} = t$$

or  $3\frac{1}{3}$

- motion
- work
- Average Cost
- Solving a formula

ditions, how long will it take to fill the pool?

26. A motorboat averages 20 miles per hour in still water. It takes the boat the same amount of time to travel 3 miles with the current as it does to travel 2 miles against the current. What is the current's rate?

$v = \text{rate of current}$

	rate	time	distance
with	$20 + v$	$\frac{3}{20+v}$	3
against	$20 - v$	$\frac{2}{20-v}$	2

$(20-v) \left( \frac{3}{20+v} \right) = \frac{2}{20-v} (20+v)$

$60 - 3v = 40 + 2v$

$20 = 5v \quad v = 4 \text{ mph}$

$t = \frac{d}{v}$

# Rationals

- ① Simplify
- ② mult/div
- ③ add/sub
- ④ Complex
- ⑤ Solve
- ⑥ applications

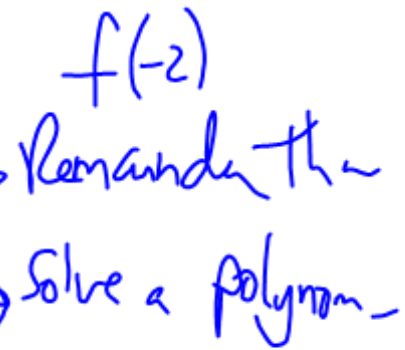
# graphing

- 1) domain & Range
- 2) Vertical asymptotes (Domain)
- 3) Horizontal asymptote (end beh)



# Polynomials

- ① long division
- ② synthetic div



9.  $\frac{5x}{x^2 - 4} - \frac{2}{x^2 + x - 2}$

add  
or subtract

$$\frac{\cancel{(x-1)}}{\cancel{(x-1)}(x+2)(x-2)} - \frac{2}{(x+2)\cancel{(x-1)}\cancel{(x-2)}} \quad \text{LCD} = (x+2)(x-2)(x-1)$$

$$\frac{5x^2 - 5x}{(x+2)(x-2)(x-1)} \oplus \frac{-2x + 4}{(x+2)(x-2)(x-1)} \rightarrow \frac{5x^2 - 7x + 4}{(x+2)(x-2)(x-1)}$$

$$\begin{matrix} (5x & 2)(x & 2) \\ (5x & 4)(x & 4) \end{matrix}$$

12.

$$\frac{\cancel{4x} \frac{x}{4} - \frac{1}{\cancel{x}} \frac{4x}{1}}{\frac{\cancel{4x} \frac{1}{1} + \frac{x+4}{\cancel{x}} \frac{4x}{1}}$$

$$LCD = 4x$$

$$\frac{x^2 - 4}{4x + 4x + 16}$$

$$8x + 16$$

→

$$\frac{(x-2)(x+2)}{8(x+2)}$$

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

In Exercises 20–21, solve each rati

$$20. \frac{x}{x+4} = \frac{11}{x^2-16} + 2$$

Solve

LCD

$$\frac{\cancel{(x+4)}\cancel{(x-4)}}{1} \frac{x}{\cancel{x+4}} = \frac{11 \cancel{(x+4)}\cancel{(x-4)}}{\cancel{(x+4)}\cancel{(x-4)}} + \frac{2 \cancel{(x+4)}\cancel{(x-4)}}{1}$$

$$x \neq -4, 4$$

$$x^2 - 4x = 11 + 2(x^2 - 16)$$

$$x^2 - 4x = 11 + 2x^2 - 32$$

$$0 = x^2 + 4x - 21$$

$$0 = (x + 7)(x - 3)$$

$$x = -7, x = 3$$

$$16. (3x^4 + 2x^3 - 8x + 6) \div (x^2 - 1)$$

$$\begin{array}{r}
 \phantom{3x^4 + 2x^3 - 8x + 6} \overline{3x^2 + 2x + 3} \oplus \frac{6x+9}{x^2-1} \\
 x^2 + 0x - 1 \overline{) 3x^4 + 2x^3 + 0x^2 - 8x + 6} \\
 \underline{-3x^4 + 0x^3 + 3x^2} \phantom{-8x + 6} \\
 2x^3 + 3x^2 - 8x \phantom{+ 6} \\
 \underline{-2x^3 + 0x^2 + 2x} \phantom{+ 6} \\
 3x^2 - 6x + 6 \\
 \underline{-3x^2 + 0x + 3} \\
 -6x + 9 \\
 \underline{-(6x - 9)} \\
 0
 \end{array}$$



18. Given that

$$f(x) = x^4 - 2x^3 - 11x^2 + 5x + 34,$$

use synthetic division and the Remainder Theorem to find  $f(-2)$ .

$$\begin{array}{r|rrrrr}
 -2 & 1 & -2 & -11 & 5 & 34 \\
 & & -2 & 8 & 6 & -22 \\
 \hline
 & 1 & -4 & -3 & 11 & 12
 \end{array}$$

$$f(-2) = 12$$

19. Use synthetic division to decide whether  $-2$  is a solution of  $2x^3 - 3x^2 - 11x + 6 = 0$ .

$$\begin{array}{r|rrrr}
 -2 & 2 & -3 & -11 & 6 \\
 & & -4 & 14 & -6 \\
 \hline
 & 2 & -7 & 3 & 0
 \end{array}$$

$(x+2)(2x^2 - 7x + 3) = 0$   
 $(x+2)(2x-1)(x-3) = 0$

$x = -2$   
 $x = 1/2$   
 $x = 3$

$$\begin{array}{r} \cancel{6.} \cancel{1} \\ \cancel{2} \\ \hline 3 \\ + \\ \cancel{6.} \cancel{1} \\ \cancel{3} \\ \hline 2 \\ \hline 5 \end{array}$$

$$\begin{array}{r} \text{A} \\ \hline 3 \\ 6 \end{array}$$

$$\begin{array}{r} \text{B} \\ \hline 2 \\ 6 \\ + \\ \hline 5 \\ \hline 4 \end{array}$$

