

② Rational Functions:

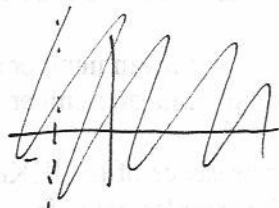
A rational function is a fn of the form

$$r(x) = \frac{\text{polynomial}_1(x)}{\text{polynomial}_2(x)} = \frac{P(x)}{Q(x)}$$

Ex:

~~$\frac{x+1}{3x}$~~

$$\frac{3x-2}{x+1}$$



$$\text{Domain} = \mathbb{R} \setminus \{-1\}$$

$$\frac{x^2-9}{x-3}$$

$$= \begin{cases} x+3 & x \neq 3 \\ \text{undefined} & x=3 \end{cases}$$

$$\text{Domain} = \mathbb{R} \setminus \{3\}$$

$$\frac{1}{1-x^2}$$

$$\text{Domain} = \mathbb{R} \setminus \{1, -1\}$$

① Polynomials:

A polynomial is a fn of the form

$$p(x) = a_0 + a_1x + a_2x^2 + \dots + a_nx^n$$

for some nonneg integer n .

Degree = n = highest exponent

The Roots are the of p are the solutions to $p(x)=0$.

* IF b is a root of p then $(x-b)$ is a factor:

$$p(x) = (x-b)q(x)$$

for some polynomial $q(x)$.

$$5x^8 - 3x^3 + 4x^2 - 6$$

{ You should review:

- ~~long~~ polynomial division (long division)
- completing the square

* Ex: Find a factor of $5x^8 - 3x^3 + 4x^2 - 6$. $(x-1)$

which are poly?

Ex: ~~x^3-1~~
 $x + x^{3/2}$
 $\sqrt{x^2}$
 $\frac{x}{1+x^5}$
 π