

Calculating *First* for the grammar:

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Expr   -> Term Expr'
Expr'  -> + Term Expr' | - Term Expr' | ε
Term   -> Factor Term'
Term'  -> * Factor Term' | / Factor Term' | ε
Factor -> (Expr) | num | id

```

	num	id	+	-	*	/	(	)	ε
	num	id	+	-	*	/	(	)	ε

Rule	Expr	Expr'	Term	Term'	Factor

1. If  $X$  is a terminal, then  $\text{First}(X)$  is  $\{X\}$
2. If  $X \rightarrow \epsilon$  is a production, then add  $\epsilon$  to  $\text{First}(X)$
3. Let  $X \rightarrow Y_1 Y_2 \dots Y_k$  be a production:
  - a. If  $a$  is in  $\text{First}(Y_1)$ , then place  $a$  in  $\text{First}(X)$ .
  - b. If  $\epsilon$  is in all of  $\text{First}(Y_1), \dots, \text{First}(Y_{i-1})$ , that is  $Y_1 \dots Y_{i-1} \Rightarrow^* \epsilon$ , then place all  $a$  in  $\text{First}(Y_i)$  into  $\text{First}(X)$ .
  - c. If  $\epsilon$  is in  $\text{First}(Y_j)$  for all  $j = 1, 2, \dots, k$ , then add  $\epsilon$  to  $\text{First}(X)$ .