# Infix to Postfix Sums

## Example ①

A + B * C

| Step | Input | Stack | Output |
|---|---|---|---|
| 1 | A+B*C | | A |
| 2. | +B*C | + | A |
| 3. | B*C | + | AB |
| 4. | *C | + | AB |
| 5 | C | +* | AB |
| 6. | | +* | ABC |
| 7. | | + | ABC* |
| 8 | | | ABC*+ |

final postfix expression : ABC*+

2. (A+B) * (C - D)

| Step | Input | Stack | Output |
|---|---|---|---|
| 1 | (A+B) * (C-D) | - | - |
| 2. | A+B) * (C-D) | ( | |
| 3. | +B) * (C-D) | ( | A |
| 4. | *B) * (C-D) | (+ | A |
| 5. | ) * (C-D) | (+ | AB |
| 6. | * (C-D) | | AB+ |
| 7. | (C - D) | * | AB+ |
| 8. | C - D) | *( | AB+ |
| 9. | - D) | *(- | AB+C |
| 10. | D) | *(- | AB+C |
| 11. | ) | * | AB+CD- |
| 12. | | | AB+CD-* |

Final Postfix Expression: AB+CD-*

# Postfix to Infix

① AB+C *

| Step | Postfix | Stack |
|---|---|---|
| 1 | AB+C * | [] |
| 2. | B+C * | [A] |
| 3. | +C * | [A, B] |
| 4. | C * | [(A+B)] |
| 5 | * | [(A+B), C] |
| 6 | | [(A+B)*C] |

Infix Expression : [(A+B)*C]

② ABC *+D-

| Step | Postfix | Stack |
|---|---|---|
| 1 | ABC*+D- | [] |
| 2. | BC*+D- | A |
| 3. | C*+D- | A, B |
| 4. | *+D- | A, B, C |
| 5. | +D- | A, (B*C) |
| 6. | D- | [(A+(B*C))] |
| 7. | - | [(A+(B*C)), D] |
| 8. | | [(A+(B*C))-D] |

Infix expression:

→ (A+(B*C))-D

# Balancing Parenthesis

1. (A+B) * (C-D)

| Step | Read Character | Stack |
|---|---|---|
| 1 | ( | [(] |
| 2. | A | [(] |
| 3 | + | [(] |
| 4. | B | [(] |
| 5. | ) | [] |
| 6 | * | [] |
| 7. | ( | [(] |
| 8. | C | [(] |
| 9. | - | [(] |
| 10. | D | [(] |
| 11. | ) | [] |

↓

Stack is empty.

So, (A+B) * (C-D) is balanced.

2. {A + (B*C) - D})

| Step | Read character | Stack |
|---|---|---|
| 1 | { | [{] |
| 2. | A | [{] |
| 3. | + | [{] |
| 4. | ( | [{, (] |
| 5. | B | [{, (] |
| 6. | * | [{, (] |
| 7. | C | [{, (] |
| 8. | ) | [{] |
| 9 | - | [{] |
| 10. | D | [{] |
| 11. | } | [] |
| 12. | ) | [)] |

↓

Stack Not Empty.

So, the equation {A + (B*C) - D}) is Not Balanced.