

a) $1 - 2 + 3 - 2$

$$\begin{array}{c} \boxed{} \\ \text{op} \end{array} 1 \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 1 2 \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 1 2 - \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 1 2 - 3 \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 1 2 - 3 + \\ \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 1 2 - 3 + 2 -$$

b) $(2^3)^2$

$$\begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 \rightarrow \begin{array}{c} \boxed{\wedge} \\ \text{op} \end{array} 2 \rightarrow \begin{array}{c} \boxed{\wedge} \\ \text{op} \end{array} 2 3 \xrightarrow{\text{pop's with 3}} \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 3 \wedge \rightarrow \begin{array}{c} \boxed{\wedge} \\ \text{op} \end{array} 2 3 \wedge \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 3 \wedge 2 \wedge$$

c) $2^3 \wedge 2$

$$\begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 \rightarrow \begin{array}{c} \boxed{\wedge} \\ \text{op} \end{array} 2 \rightarrow \begin{array}{c} \boxed{\wedge} \\ \text{op} \end{array} 2 3 \rightarrow \begin{array}{c} \boxed{\wedge} \\ \text{op} \end{array} 2 3 \rightarrow \begin{array}{c} \boxed{\wedge} \\ \text{op} \end{array} 2 3 2 \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 3 2 \wedge \wedge$$

d) $(2+6) / 3 - (32+4*7)*2$

$$\begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 \rightarrow \begin{array}{c} \boxed{+} \\ \text{op} \end{array} 2 \rightarrow \begin{array}{c} \boxed{+} \\ \text{op} \end{array} 2 6 \xrightarrow{\text{pop's action}} \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 6 + \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 6 + \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 6 + 3 \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 6 + 3 /$$

$$\rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 6 + 3 / \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 6 + 3 / 3 2 \xrightarrow{\text{pop's action}} \begin{array}{c} \boxed{+} \\ \text{op} \end{array} 2 6 + 3 / 3 2 4 \rightarrow \begin{array}{c} \boxed{*} \\ \text{op} \end{array} 2 6 + 3 / 3 2 4$$

$$\rightarrow \begin{array}{c} \boxed{+} \\ \text{op} \end{array} 2 6 + 3 / 3 2 4 7 \rightarrow \begin{array}{c} \boxed{-} \\ \text{op} \end{array} 2 6 + 3 / 3 2 4 7 * + \rightarrow \begin{array}{c} \boxed{*} \\ \text{op} \end{array} 2 6 + 3 / 3 2 4 7 * +$$

$$\rightarrow \begin{array}{c} \boxed{*} \\ \text{op} \end{array} 2 6 + 3 / 3 2 4 7 * + 2 \rightarrow \begin{array}{c} \boxed{} \\ \text{op} \end{array} 2 6 + 3 / 3 2 4 7 * + 2 -$$

c) $3 + 2 - 4 + 5$

$$\left[\begin{array}{c} \\ \text{op} \end{array} \right] 3 \rightarrow \left[\begin{array}{c} + \\ \text{op} \end{array} \right] 3 \rightarrow \left[\begin{array}{c} + \\ \text{op} \end{array} \right] 32 \rightarrow \left[\begin{array}{c} - \\ \text{op} \end{array} \right] 32+ \rightarrow \left[\begin{array}{c} + \\ \text{op} \end{array} \right] 32+4 \rightarrow \left[\begin{array}{c} - \\ \text{op} \end{array} \right] 32+4-$$

$$\left[\begin{array}{c} + \\ \text{op} \end{array} \right] 32+4-5 \rightarrow \left[\begin{array}{c} \\ \text{op} \end{array} \right] 32+4-5+$$

f) $(3+2) \wedge 4 \wedge (3 * 2+4)$

$$\left[\begin{array}{c} \text{c} \\ \text{op} \end{array} \right] 3 \rightarrow \left[\begin{array}{c} + \\ \text{c} \\ \text{op} \end{array} \right] 3 \rightarrow \left[\begin{array}{c} + \\ \text{c} \\ \text{op} \end{array} \right] 32 \rightarrow \left[\begin{array}{c} \text{c} \\ \text{op} \end{array} \right] 32+ \xrightarrow{\text{pop when } ()} \left[\begin{array}{c} \wedge \\ \text{op} \end{array} \right] 32+$$

$$\rightarrow \left[\begin{array}{c} \wedge \\ \text{op} \end{array} \right] 32+4 \rightarrow \left[\begin{array}{c} \wedge \\ \wedge \\ \text{op} \end{array} \right] 32+4 \rightarrow \left[\begin{array}{c} \wedge \\ \wedge \\ \text{op} \end{array} \right] 32+4 \wedge \rightarrow \left[\begin{array}{c} \wedge \\ \wedge \\ \text{op} \end{array} \right] 32+4 \wedge 3 \rightarrow \left[\begin{array}{c} * \\ \wedge \\ \wedge \\ \text{op} \end{array} \right] 32+4 \wedge 3$$

$$\rightarrow \left[\begin{array}{c} * \\ \wedge \\ \wedge \\ \text{op} \end{array} \right] 32+4 \wedge 32 \rightarrow \left[\begin{array}{c} + \\ * \\ \wedge \\ \wedge \\ \text{op} \end{array} \right] 32+4 \wedge 32 * \rightarrow \left[\begin{array}{c} + \\ \wedge \\ \wedge \\ \text{op} \end{array} \right] 32+4 \wedge 32 * 4$$

$$\rightarrow \left[\begin{array}{c} \text{eof} \end{array} \right] 3 \ 2+4 \wedge 32 * 4 \wedge$$

2a) $4 \ 2 + 3 \ 3 \wedge -$

$$\left[\begin{array}{c} 2 \\ 4 \end{array} \right] + \rightarrow \left[\begin{array}{c} 6 \\ 6 \end{array} \right] 2+4 \rightarrow \left[\begin{array}{c} 3 \\ 6 \end{array} \right] \rightarrow \left[\begin{array}{c} 3 \\ 3 \\ 6 \end{array} \right] 3 \wedge \rightarrow \left[\begin{array}{c} 6 - 3^3 \end{array} \right]$$

b) $3 \ 2 \wedge 3 \ 2 * -$

$$\left[\begin{array}{c} 2 \\ 3 \end{array} \right] \rightarrow \left[\begin{array}{c} 3^2 \end{array} \right] \rightarrow \left[\begin{array}{c} 2 \\ 3 \\ 3^2 \end{array} \right] \rightarrow \left[\begin{array}{c} 3^2 \\ 3^2 \end{array} \right] 3 * 2 \rightarrow \left[\begin{array}{c} 3^2 - 3 * 2 \end{array} \right]$$

c) $4 \ 2 \ 3 \ * \ -3 \ 2 \ 1 \ -6 \ +$

$$\begin{aligned} & \left[\begin{array}{c} 3 \\ 2 \\ 4 \end{array} \right] \rightarrow \left[\begin{array}{c} 4 \\ 2 \end{array} \right] \xrightarrow{2*3=6} \left[\begin{array}{c} 4 \\ -2 \end{array} \right] \xrightarrow{4-6=-2} \left[\begin{array}{c} 2 \\ 3 \\ -2 \end{array} \right] \xrightarrow{3^2=9} \left[\begin{array}{c} -2 \\ 3 \end{array} \right] \\ & \rightarrow \left[\begin{array}{c} -6 \\ -6 \end{array} \right] \xrightarrow{-6-9=-15} \left[\begin{array}{c} 6 \\ -15 \end{array} \right] \rightarrow \left[\begin{array}{c} -15 \\ 6 \end{array} \right] \end{aligned}$$

d) $4 \ 3 \ + \ 2 \ * \ 1 \ -$

$$\begin{aligned} & \left[\begin{array}{c} 3 \\ 4 \end{array} \right] \rightarrow \left[\begin{array}{c} 4 \\ 3 \end{array} \right] \xrightarrow{4+3=7} \left[\begin{array}{c} 2 \\ 7 \end{array} \right] \xrightarrow{2*7=14} \left[\begin{array}{c} - \\ 14 \end{array} \right] \rightarrow \left[\begin{array}{c} 14 \\ - \end{array} \right] \end{aligned}$$

e) $3 \ 5 \ * \ 1 \ + \ 4 \ / \ 6 \ +$

$$\begin{aligned} & \left[\begin{array}{c} 5 \\ 3 \end{array} \right] \rightarrow \left[\begin{array}{c} 15 \\ 3 \end{array} \right] \xrightarrow{3*5=15} \left[\begin{array}{c} 1 \\ 15 \end{array} \right] \xrightarrow{15+1=16} \left[\begin{array}{c} 4 \\ 16 \end{array} \right] \xrightarrow{4/16=0.25} \left[\begin{array}{c} 0.25 \\ 4 \end{array} \right] \rightarrow \left[\begin{array}{c} 4 \\ 0.25 \end{array} \right] \end{aligned}$$

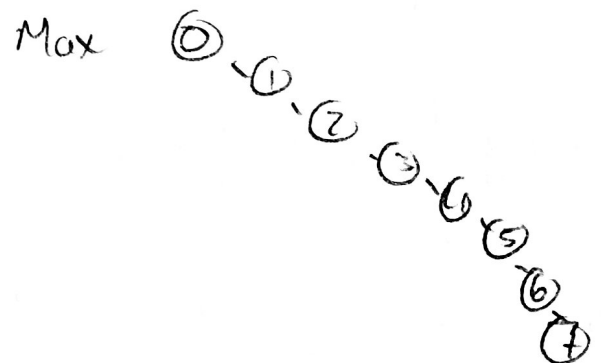
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4) 445

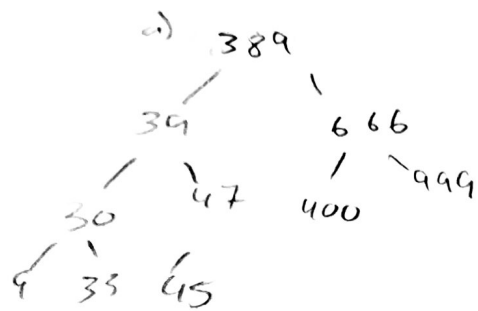
- 5) (a) *
 (b) -
 (c) 3, 4, 5, 8
 (d) +, -
 (e) 1
 (f) 1

- (g) 6
 (h) 4, -
 (i) +
 (j) $4 + 5 - 8 * 3$
 (k) $* + 4 - 5 8 3$
 (l) $4 5 8 - + 3 *$

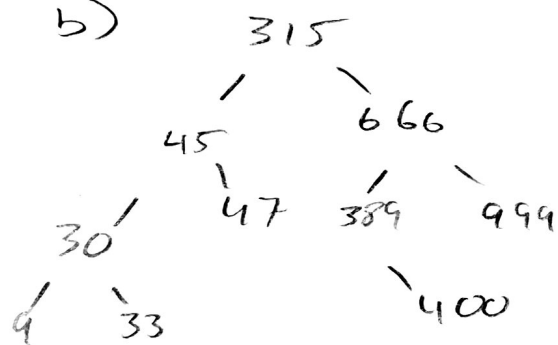
6)



a)



b)



c)

