#  Homework 6 Reverse Polish Notation Answers

1. Convert the following to Reverse Polish Notation.

 (a) 3 / (9 + 5) 3 9 5 + /

 (b) (g / h^i) + (h \* g) g h i ^ / h g \* +

 (c) 7 \* x + 8 \* y + 4 7 x \* 8 y \* + 4 +

 (d) (a + b) / (c – d) a b + c d - /

 (e) (a + b) \* c / (b + c) a b + c \* b c + /

[5]

1. (a) Create a binary tree for y = (3 \* x) + 9 / (x + y), with the first + sign at the root. [3]

 (b) State the output of a pre-order traversal (Polish Notation, prefix) [1]

 (c) State the output of a post-order traversal (Reverse Polish Notation, post-fix) [1]



 (3 \* x) + (9 / (x + y))

 Preorder: + \* 3 x / 9 + x y

 Postorder: 3 x \* 9 x y + / +

1. Evaluate this RPN expression, showing the state of the stack for each step.

	1. 5 2 \* 3 4 \* +

[5]

|  |  |  |
| --- | --- | --- |
| **Stack** | **Pop, execute, push** | **5 2 \* 3 4 \* +** |
| 25 | 10 = 5 \* 2 | 5 2 \* |
| 10 |  | 3 4 \* |
| 4310 | 12 = 3 \* 4 |  |
| 1210 |  | + |
|  | 22 = 10 + 12 |  |
| 22 |  |  |

 [Total 15 Marks]