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Answer the following Questions

**Q1: [6 points]** Draw an expression tree corresponding to each of the following:

a. In order traversal is x / (y + 3) \* b / c

b. Post order traversal is  **a b - c d e f + - + \***

c. Pre order traversal is  **\* + a – x y / c d**

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| Use this space to answer the question |

**Q2: [4 points]** build a BST using the following data items.

a. happy, depressed, manic, sad, ecstatic, crazy

b. 15, 20, 45, 70, 10, 33, 25, 100

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| Use this space to answer the question |

**Q3: [5 points]** Write a recursive member method to find out if the binary tree is a full tree or not.

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| Use this space to answer the question |

**Q4: [4 points]** Draw the BST that results when you insert items with keys:

2 4 6 8 10 13 15 17 20 27 33

in that order, into an initially empty tree.

How accurate is to state that the Big O notation for the search operation is log(n) using the BST you created using the data set listed above. Discuss that.

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| Use this space to answer the question |

**Q5: [6 points]**

1. build a mini heap using the following data set: 15, 20, 45, 70, 10, 33, 25, 100

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| Use this space to answer the question |

1. Insert the element 5 into this heap and show how the heap will maintain the properties of mini heap.

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| Use this space to answer the question |

1. After that, remove the root and show how the heap will maintain the properties of mini heap.

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| Use this space to answer the question |