**W1D5 Solution**

***Question 1.***

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| **Iteration** | **Inversions** | **# inversions** |
| 0 | (34,8), (34,32), (34,21), (64,51), (64,32), (64,21), (51,32), (51,21), (32,21) | 9 |
| 1 | (34,32), (34,21), (64,51), (64,32), (64,21), (51,32), (51,21), (32,21) | 8 |
| 2 | (32,21), (34,21), (64,51), (64,21), (51,21) | 5 |
| 3 | (64,51) | 1 |

**Total number of inversions for Bubble Sort = 23**

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| **Iteration** | **Inversions** | **# inversions** |
| 0 | (34,8), (34,32), (34,21), (64,51), (64,32), (64,21), (51,32), (51,21), (32,21) | 9 |
| 1 | (34,32), (34,21), (64,51), (64,32), (64,21), (51,32), (51,21), (32,21) | 8 |
| 2 | (64,51), (64,32), (64,34), (51,32), (51,34) | 5 |
| 3 | (51,34), (64,34) | 2 |
| 4 | (64,51) | 1 |

**Total number of inversions for Selection Sort = 25**

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| **Iteration** | **Inversions** | **# inversions** |
| 0 | (34,8), (34,32), (34,21), (64,51), (64,32), (64,21), (51,32), (51,21), (32,21) | 9 |
| 1 | (34,32), (34,21), (64,51), (64,32), (64,21), (51,32), (51,21), (32,21) | 8 |
| 2 | (34,32), (34,21), (51,32), (51,21), (64,32), (64,21), (32,21) | 7 |
| 3 | (32,21), (34,21), (51,21), (64,21) | 4 |

**Total number of inversions for Insertion Sort = 28**

***Question 2.***

add, add, add, add, clear, add, add, add, add, add, add, clear, add, add, add, add, clear, add, add, add, add, add, add, add, add, clear.

(a) What is the actual total cost? **30**

(b) What is the average actual cost? **30/26 = 15/13**

(c) What is the amortized total cost? **44**

(d) What is the average amortized cost? **2n/n = 2\*26/26 = 2**