Problem 1:

1. Expected number of tosses to get a 2:
2. Expected number of tosses to get 3 times a 2:

Problem 2:

* Based on Lower bound theorem, every comparison-based algorithm would require at least comparisons. In this case, input size of 4 requires at least

Problem 4:

1. *Will Goofy’s sorting procedure work at all?*

* Yes, it can work.

1. What is a best case for GoofySort?

* When the input array is already sorted.

1. What is the running time in the best case?
2. What is the worst-case running time?
3. What is the average case running time?
4. Is the algorithm inversion-bound?

* No, it’s not. Inversion-bound algorithm has running time of

Problem 5:

1. *Which x in A are good pivots? In other words, which values x in A satisfy:* 
   1. *the number of elements < x is less than 3n/4, and also*
   2. *the number of elements > x is less than 3n/4 b*.

* 2, 3, 3, 4, 5

1. Is it true that at least half the elements of A are good pivots?

* There are 5 good pivots out of 9 elements of A are good pivots. Hence, it is true to say that half the element of A are good pivots.