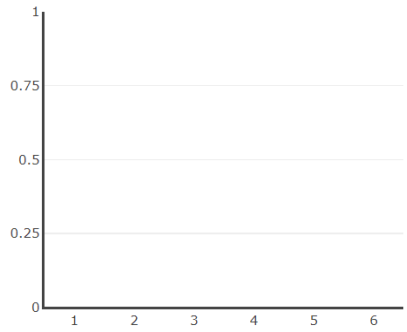
EXERCISE #3 - Distributions

1. What is a distribution?

2. What is the difference between a discrete and a continuous distribution?

3. Fill in the graph below to show the probability mass function of the outcomes of a fair die. What is the name of this type of distribution where the probability of each event is the same?



4. In the above graph, does changing the number of trials change the appearance of the graph? Why or why not?

BINOMIAL DISTRIBUTIONS

5. If you flip a fair coin five times, what is the probability that heads come up twice?

$$P(x: n, p) = \left(\frac{n!}{x!(n-x)!}\right)(p)^x(1-p)^{(n-x)}$$ x=_____ n=_____ p=_____

6. What is the difference between a Binomial Distribution and a Poisson Distribution?

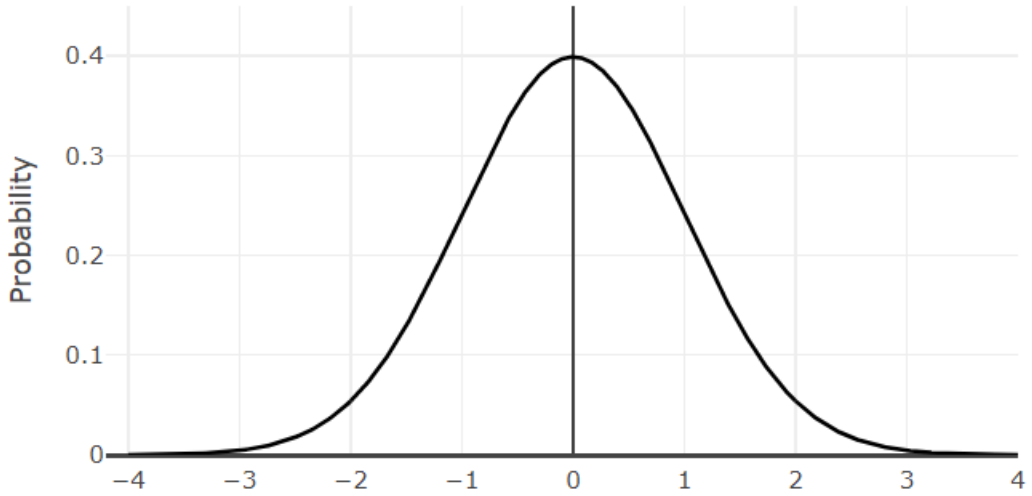
7. On average, five hurricanes form in the Atlantic Ocean each year. Given this, what is the probability that 7 hurricanes form next year?

$$P(x) = \frac{\lambda^x e^{-\lambda}}{x!} \qquad e = 2.71828 \qquad \text{x=}\_\_\_\_\_ \qquad \lambda\text{=}\_\_\_\_\_$$

NORMAL DISTRIBUTIONS

8. In a Normal Distribution, what is meant by the "**68-95-99.7 Rule**"?

9. The graph below shows a Standard Normal Distribution curve. Shade in the area that represents 95.45% of values (that is, the area inside of 2 standard deviations).



10. The IQ Test is designed to have a mean score of 100 with a standard deviation of 15 points. A score above 140 is considered to be genius level. What is the calculated z-score for an IQ of 140?

11. Into what percentile does this put people who have an IQ of 140?

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981