STAT 107 – Spring 2021

More Normal Distribution Examples
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Computing Normal Distribution Probabilities using scipy.stats in Python

```python
from scipy.stats import norm

norm.pdf(x=0, loc=0, scale=1) #f(x) when X ~ N(mean=0, sd=1)
norm.cdf(x=0, loc=0, scale=1) #P(X <= x)= P(X < x)
norm.ppf(q=0.5, loc=0, scale=1) #x value such that P(X <= x)=0.5
```

Example 1:

The weight of fish in Lake Paradise follows a normal distribution with mean of 8.1 lbs and standard deviation of 2.5 lbs.

(a) What proportion of fish are between 9 lbs and 12 lbs?

(b) Alex boasts that he once caught a fish that was just big enough to be in the top 2.5% of of the fish population. How much did his fish weigh?

(c) If one catches a fish from the bottom 20% of the population, the fish must be returned to the lake. What is the weight of the smallest fish that one can keep?

(d) What is the probability that a randomly caught fish weighs more than 10 lbs?

(e) Suppose Alex catches 5 fishes. What is the probability that at least 1 of them weighs more than 10 lbs?

(f) Following the rule of returning the fish from the bottom 20% of the population, what is the probability that the first fish Alex gets to keep is the 10th one he has caught that day?