# Chapter 10 Exam Prep Worksheet:

**Statypus Insight: The Logic of the Audit**

We are no longer predicting the behavior of a single platypus. We are now predicting the behavior of an *average*. The Central Limit Theorem tells us that as our sample size ($n$) grows, the distribution of those sample means ($\bar{x}$) will become perfectly Normal, and the spread of that curve will shrink.

**Raw Exam Question:**
The adult weight of the Tasmanian platypus is normally distributed with a mean of 1.8 kg and a standard deviation of 0.4 kg.

A. If a **single** adult platypus is randomly selected, what is the approximate probability that it weighs more than 2.2 kg?

B. If a random sample of **4** adult platypuses is selected, what is the approximate probability that their **mean weight** ($\bar{x}$) is more than 2.2 kg?

**Bill the Statypus says:** The Exam Trap! Part A and Part B look identical, but they require entirely different engines. Part A is a Chapter 7 question about an individual. Part B is a Chapter 10 question about an *average*.

**Sally the Statypus says:** Math Check! For Part A, your spread is just the population standard deviation ($\sigma_x = 0.4$). But for Part B, the group of 4 averages out their extremes! You must use the Standard Deviation **of the sample means**: $\mu_{\bar{x}} = \frac{\sigma_x}{\sqrt{n}}$ for your denominator. Once you have your $z$-scores, use the Empirical Rule to estimate the probability!

**Your Turn (Calculate the $z$-scores and estimate the probability for both scenarios):**

**Seneca the Statypus: The Skinnier Curve**

If you sketch the curve for Part B, you will notice it is much narrower than the curve for Part A. It is fairly common to find one massive 2.2 kg platypus (about 1 in 6). It is very rare to find a random group of 4 platypuses that *average* out to 2.2 kg (about 1 in 40)!

CHAPTER 10