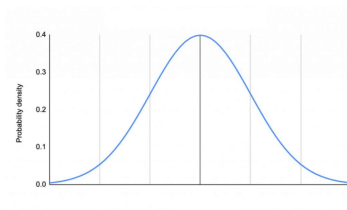


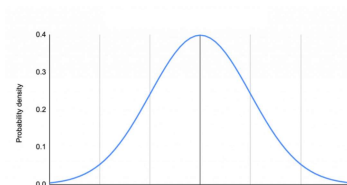
**ACTIVITY 14** For each question where applicable 1) shade the normal distribution, 2) state the function you use (pnorm, qnorm, pt, qt) 3) state the answer.

**Part 0** In class examples

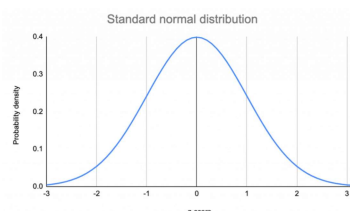
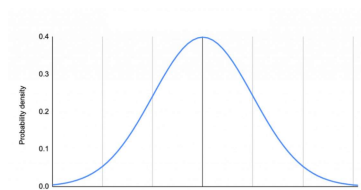
Example 1: Calculate the probability of being LESS THAN 1 std dev BELOW the mean.



Example 2: Find the STAT (CV) for being in the highest 30%.

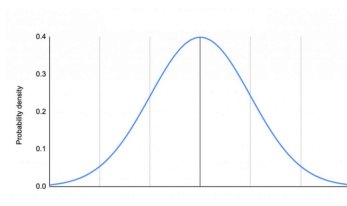


Example 3: The amount of money spent buying weekly groceries follows a normal distribution. We are lucky enough to know the population mean is \$150 and the population standard deviation is \$20. Find the probability an individual spent less than \$120.

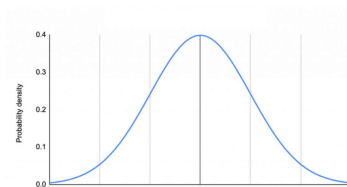


**Part 1** The following set of questions are using the STANDARD NORMAL distribution.

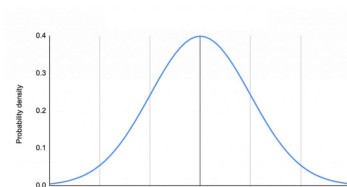
a) What is the probability of being more than two standard deviations above the mean (STAT = 2)?



b) 30% of our data is below what STAT (critical value)? (ie: is how many standard deviations below the mean?)

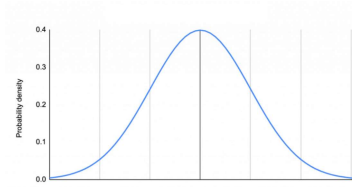


c) 95% of our data is between what two STAT (critical values)?

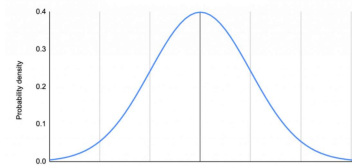


**Part 2** Now let's compare the spread of a standard normal distribution to a t-distribution.

a) Consider a t-distribution with  $df = 10$ . 95% of our data is between what two STAT values?



b) Consider a t-distribution with  $df = 30$ . 95% of our data is between what two STAT values?



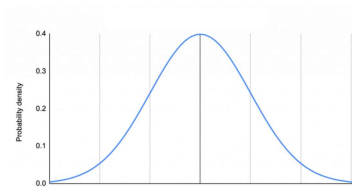
c) How do the percents in 2a and 2b compare to the normal distribution in 1c? In other words, how does the distribution change as sample size increases?

Consider a t-distribution with  $df=10$  and we find that 95% of our data is between two STAT values ( $-X$  and  $X$ ). Will the STAT values ( $-X$  and  $X$ ) be more extreme (farther from 0) or less extreme (closer to 0) than the STAT values from 1c?

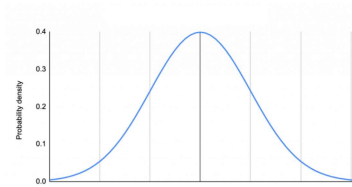
**Part 3** The scores on SAT scores are normally distributed with a mean of 1050 and a sd of 200.

a) Using the empirical rule, 68% of SAT scores are between what two values?

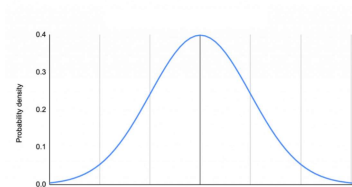
b) What percent of students score lower than 900?



c) In order to get into the University your SAT score must be in the top 15% of all students. What is the lowest SAT score you can get to be accepted?



d) What proportion of students score between 1100 and 1300 on the SAT?



#### Part 4: Standardization

The weight of male elephants follows a normal distribution with an average of 9,000 pounds and standard deviation of 1,300 pounds. The weight of female elephants follows a normal distribution with an average of 7,000 pounds and standard deviation of 1,000 pounds.

- Mabu is a male elephant that weighs 13,015 pounds.
- Nandi is a female elephant that weighs 3,585 pounds.

Whose weight is more extreme?