

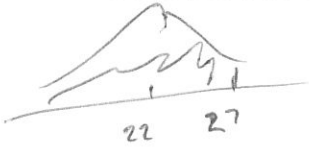
Use the following to answer questions 1 through 5

The weight of mice is normally distributed with a mean of 22 g and a standard deviation of 3.4 g.

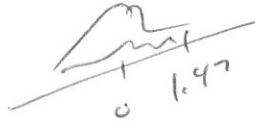
1. Let X be the weight of a randomly selected mouse. Describe the probability distribution of X.

$$X \sim N(22, 3.4)$$

2. What is the probability a randomly selected mouse weighs less than 27 grams?

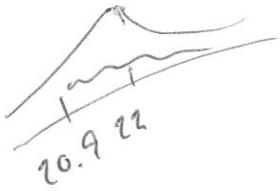


$$z = \frac{27 - 22}{3.4} = 1.47$$

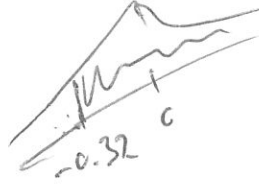


$$0.9292$$

3. What is the probability a randomly selected mouse weighs at least 20.9 grams?

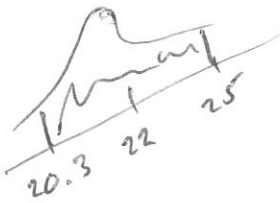


$$z = \frac{20.9 - 22}{3.4} = -0.32$$



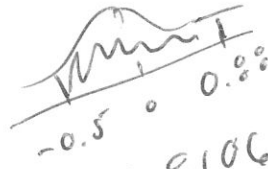
$$1 - 0.3745 = 0.6255$$

4. What is the probability a randomly selected mouse weighs between 20.3 and 25.0 grams?



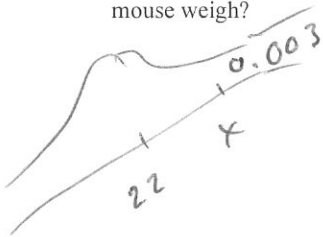
$$z_1 = \frac{20.3 - 22}{3.4} = -0.5$$

$$z_2 = \frac{25 - 22}{3.4} = 0.88$$

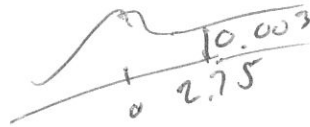


$$0.8106 - 0.3085 = 0.5021$$

5. There is one particular mouse which has a weight such that only 0.3% weigh more than this mouse. How much does this particular mouse weigh?



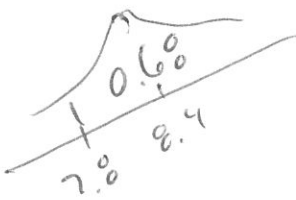
$$z = \frac{x - 22}{3.4}$$



$$2.75 = \frac{x - 22}{3.4}$$

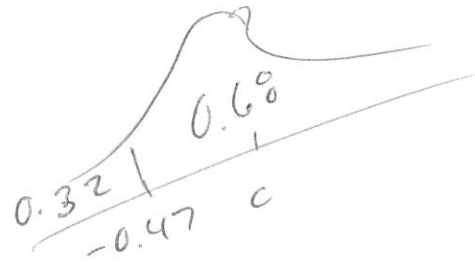
$$x = 31.35$$

6. The body length of mice is normally distributed, with a mean of 8.4 cm. If 68% of mice have a body length of at least 7.8 cm, what is the standard deviation of body length in mice?



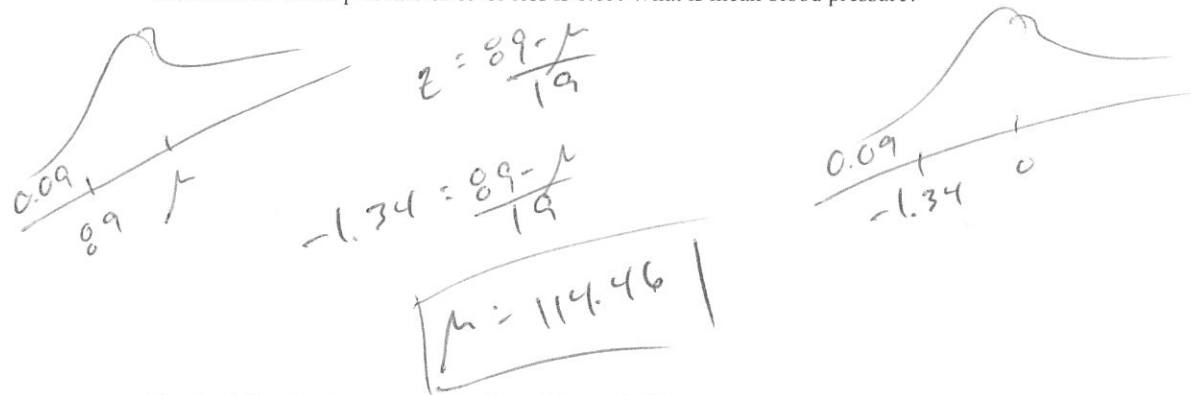
$$z = \frac{7.8 - 8.4}{\sigma}$$

$$-0.47 = \frac{7.8 - 8.4}{\sigma}$$



$$\sigma = 1.28$$

7. The blood pressure of adults is normally distributed with a standard deviation of 19 mm Hg. The probability a randomly selected adult would have a blood pressure of 89 or less is 0.09. What is mean blood pressure?



Use the following to answer questions 8 through 12

Final exam scores in a History class are normally distributed, with a mean score of 84 and a standard deviation of 6.79.

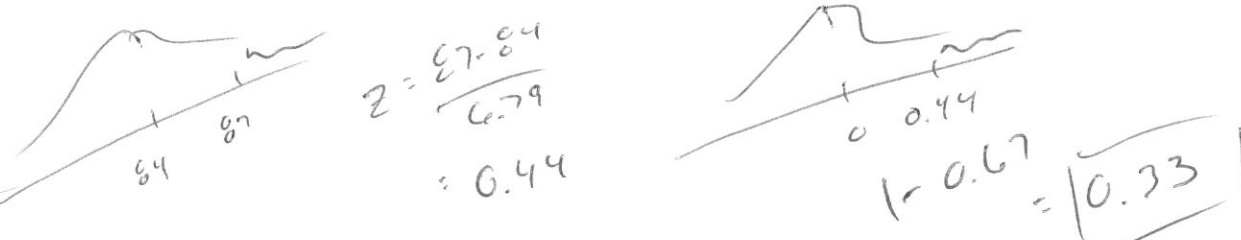
8. Let X be the score of a randomly selected exam. Describe the probability distribution of X .

$$X \sim N(84, 6.79)$$

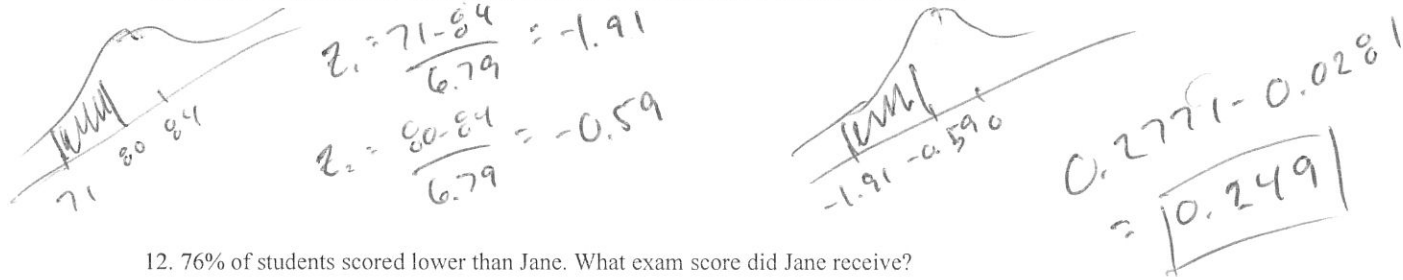
9. What is the probability a randomly selected exam has a score of 70 or less?



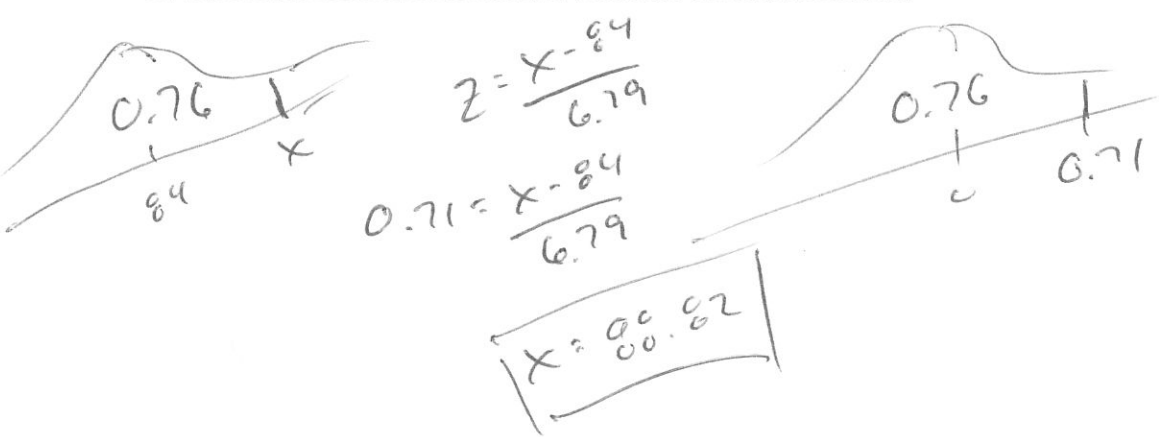
10. What is the probability a randomly selected exam has a score of 87 or higher?



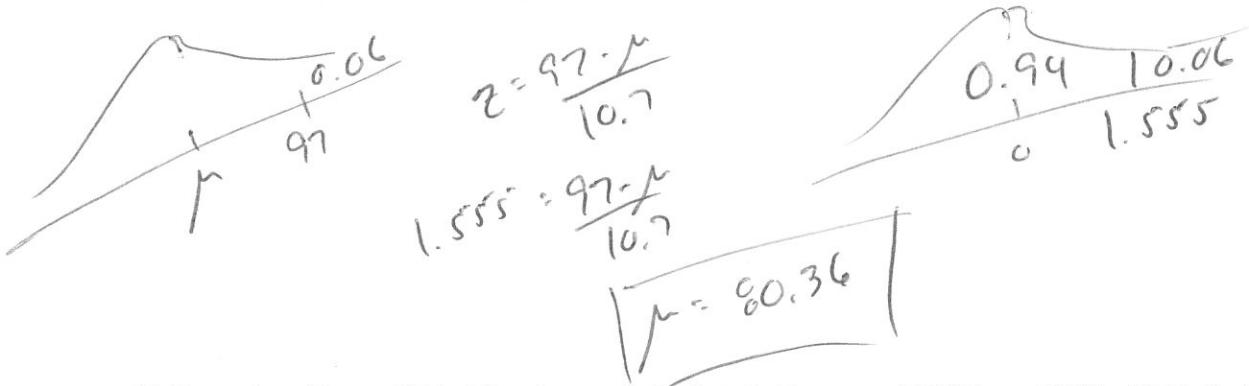
11. What is the probability a randomly selected exam has a score between 71 and 80?



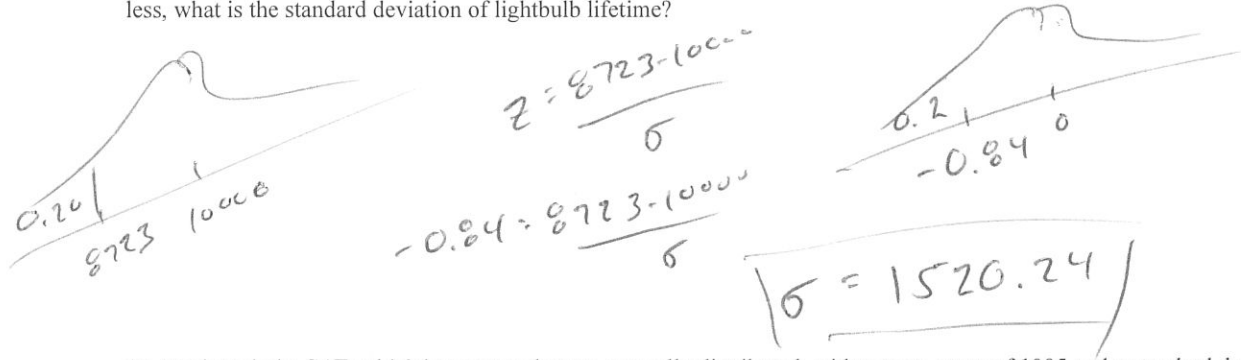
12. 76% of students scored lower than Jane. What exam score did Jane receive?



13. The distribution of resting heart rate in beats per minute is normal with a standard deviation of 10.7 bpm. 6% of adults have a higher resting heart rate than one particular subject, who has a resting heart rate of 97 bpm. What is the mean resting heart rate of adults?



14. The number of hours a lightbulb lasts is normally distributed with a mean of 10000 hours. If 20% of lightbulbs last for 8723 hours or less, what is the standard deviation of lightbulb lifetime?



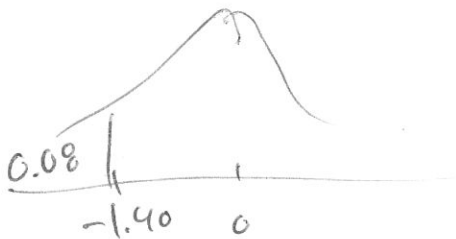
15. Hank took the SAT, which has scores that are normally distributed, with a mean score of 1005 and a standard deviation of 197. Bob took the ACT, which has scores that are normally distributed, with a mean score of 19 and standard deviation of 5. Hank scored a 729 while Bob score a 21. Who did better?

Hank

SAT $\sim N(1005, 197)$

$X = 729$

$z = \frac{729 - 1005}{197} = -1.40$

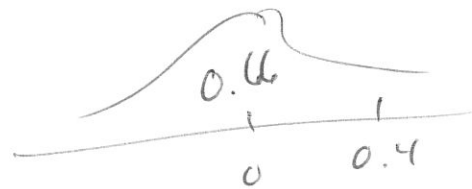


Bob

ACT $\sim N(19, 5)$

$X = 21$

$z = \frac{21 - 19}{5} = 0.4$



Bob, scored at higher percentile