Math 17: Quiz 6 Solutions Name:

For full credit you must show your work. Partial credit may be given for incorrect solutions if sufficient work is shown.

Each part is worth 2.5 points.

1. A normal distribution has $\mu = 100$ and $Q_3 = 110.125$. Find σ and Q_1.

$Q_3 = \mu + .6750\sigma$

$110.125 = 100 + .6750\sigma$

$10.125 = .6750\sigma$

$\sigma = \frac{10.125}{.675} = 15$

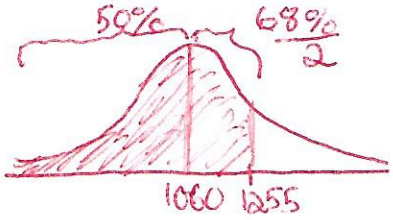
$Q_1 = \mu - .6750\sigma$

$= 100 - .675(15)$

$= 89.875$

2. SAT scores are normally distributed with $\mu = 1060$ and $\sigma = 195$. ACT scores are normally distributed with $\mu = 20.8$ and $\sigma = 4.8$.

   (a) A college only accepts students that scored at least 1255 on the SAT. What percentile does a score of 1255 correspond to?



$50\% + \frac{68\%}{2} = 84\%$

84th percentile

   (b) What is the interquartile range of ACT scores?

$Q_3 = \mu + .6750 = 20.8 + .675 \cdot 4.8 = 24.04$

$Q_1 = \mu - .6750 = 20.8 - .675 \cdot 4.8 \approx 17.56$

$IQR = 24.04 - 17.56 = 6.48$

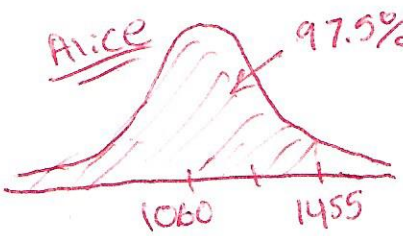
   (c) Alice scored 1450 on the SAT. Her friend Bob took the ACT and scored 34. Who did better?

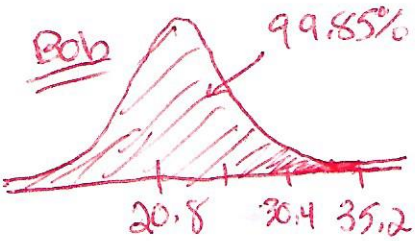
$z_{Alice} = \frac{1450 - 1060}{195} = 2$

$z_{Bob} = \frac{34 - 20.8}{4.8} = 2.75$

Bob's z-value is higher which means he scored better relative to his test.

Alternatively,





Bob scored in higher percentile (Between 97.5 and 99.85)