1. The next 3 questions refer to the list {–12, –6, –4, 5 , 5, 14, 0, 10}. Show your work where appropriate, for credit. (5 points total)

A. What is the range? (show your work) (1 point)

range = max − min = 14 − (−12) = 26

−12, −6, −4, 0, 5, 5, 10, 14

B. What is the median of this list? (show your work) (2 points)

−12, −6, −4, 0, 5, 5, 10, 14 $\quad \frac{0+5}{2} = 2.5$

C. What is the mean of this list? (show your work) (2 points)

$$\frac{-12+-6+-4+0+5+5+10+14}{8} = 1.5$$

2. The next 3 questions refer to this statement, but each question is separate (i.e. you can get the first one wrong and its result will not affect the others): You are on the verge of investing some of your hard-earned money in the stock market and you are examining two funds, let's call them A and B. Your investment adviser, I'll call him The Oracle, gives you some information on their performance (as measured by percentage returns over many, many days). Fund A has mean return of 2% with a standard deviation of 3%. It had a minimum of –13% and a maximum of 17%. Fund B has a mean return of -7% with a standard deviation of 12%. It had a minimum of –67% and a maximum of 53%. Assume both funds are normally distributed. SHOW YOUR WORK FOR FULL CREDIT.

A. Oracle says you know what? You need to take inflation into account in all of your calculations. So subtract 5% (professor: just subtract 5, don't worry about the percentage sign) from all of the returns and then multiply by 3. So for example, on a given day, Fund A returned 7%, so following Oracle's instructions subtracting 5 yields 2% and multiplying by 3 yields 6%. If you do this, what are the new mean, median, and standard deviations for funds A and B? **(6 points)**

Fund A:

old mean = 2% return

(2% − 5%)3 = −9% ⇒ new mean

old standard deviation = 3%

(3%)3 = 9% ⇒ new Standard Deviation

old mean = old median because assumed to be normally distributed

Therefore, new mean = new median

(2% − 5%)3 = −9% ⇒ new median

Fund B:

old mean = −7% return

(−7% − 5%)3 = −36% ⇒ new mean

old mean = old median because of normal distribution

new mean = new median

(−7% − 5%)3 = −36% ⇒ new median

old Standard Deviation = 12%

(12%)3 = 36%

B. Using only the information given at the beginning (i.e. ignore any additional information from part A) You need to invest in a fund that spends as much time as possible giving returns in excess of 6%. Which fund is more likely to do this (7 points)

Fund A: $\bar{X}=2\%$ Fund B: $-7\%=\bar{X}$

$SD=3\%$ $SD=12\%$

$\frac{6-2}{3}=1.33=Z$ score $\quad \frac{6-(-7)}{12}=1.08=Z\text{score}$

$=82.3+8.85=91.15\%$ below it $\quad 72.87+13.565=86.44\%$ below it

It is more probable, or in other words, a higher percentage of Fund B exists at 6% or higher in returns than Fund A. $100-91.15\%=8.85\%$ above or at 6% for Fund A, yet $100-86.44\%=13.56\%$ above or at 6% return for Fund B.

C. Using only the information given at the beginning (i.e. ignore any additional information from parts A and B), is it possible to calculate the inter-quartile range for Fund B? If yes, please calculate the IQR for this fund. If no, please write "not calculable" in the space below and explain verbally why it is not calculable. (7 points)

Yes it is possible

$Q_3=75^{th}$ percentile = Zscore of 50% (add tail) = .65 (closest to 50% at 48.5%)

$.65=\frac{X-(-7\%)}{12\%}=$ ~~[illegible]~~ $=.8\%$ return

$Q_1=25^{th}$ percentile = Zscore of 50% (just tail), $=-.65$

$-.65=\frac{X-(-7\%)}{12\%}=-14.8\%$ return

$IQR=.8\%-(-14.8\%)=15.6\%$

excellent