Name_____ Test 2 APPLICATIONS of Normal Curves 11-17-16 Hour 1 2 3 4 5 6 7

The average amount of student loan debt in 2016 was $37,172, if this debt is said to be normally distributed with a standard deviation of $7500, Use this information to answer the following questions:

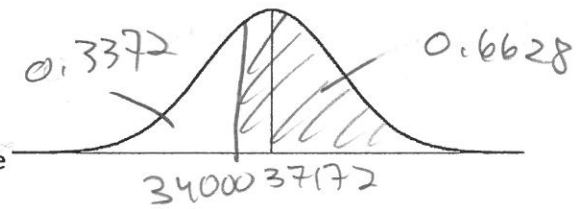
1. You randomly selected a person that has student loan debt, determine the probability that you selected a person that borrowed more than $34000.

   What is the associated Z score in this scenario? -0.42 Round to TWO decimal places

   What is the probability statement for this scenario? $P(x \geq 34000) = 0.6628$

   What is the associated probability with this problem? 0.6628 or 66.28% $\frac{34000-37172}{7500}$

   Sketch the scenario on the provided normal curve



2. You randomly selected a person that has student loan debt, determine the probability that you selected a person that borrowed either less than $15000 OR more than $32000.

   What are the associated Z scores in this scenario? -2.96 and -0.69 Round to TWO decimal places

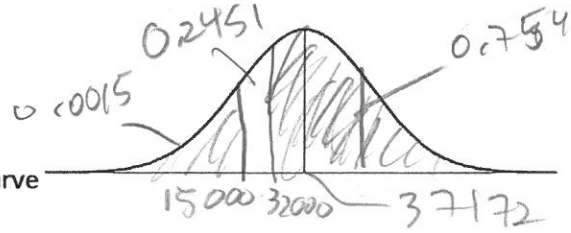
   What is the probability statement for this scenario? $P(x \leq 15000)$ or $P(x \geq 32000) = 0.7564$

   What is the associated probability with this problem? $0.0015 + 0.7549 = 0.7564$

   $\frac{32000-37172}{7500} = -0.69$

   $\frac{15000-37172}{7500}$

   Sketch the scenario on the provided normal curve



3. You randomly selected a person that has student loan debt, determine the probability that you selected a person that borrowed between $25600 and $41500.

   What are the associated Z scores in this scenario? -1.54 and 0.58 Round to TWO decimal places

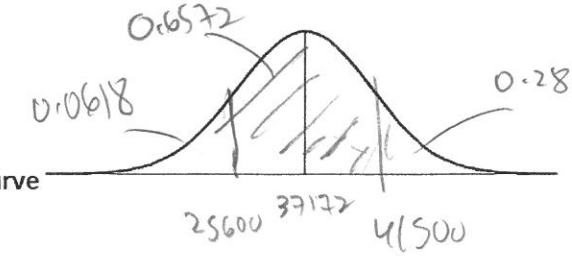
   What is the probability statement for this scenario? $P(25600 \leq x \leq 41500) = 0.6572$

   What is the associated probability with this problem? 0.6572 or 65.72%

   $\frac{25600-37172}{7500}$

   $\frac{41500-37172}{7500} = 0.58$

   Sketch the scenario on the provided normal curve



$0.7190 - 0.0618 = 0.6572$

$1 - (0.0618 + 0.2810) = 1 - 0.3428 = 0.6572$

0.7190

The amount of money spent by families on Black Friday Shopping is said to be normally distributed at $403 with a standard deviation of $58

4. You randomly selected a family determine the probability that you selected a family that spent $451 or less on Black Friday Shopping

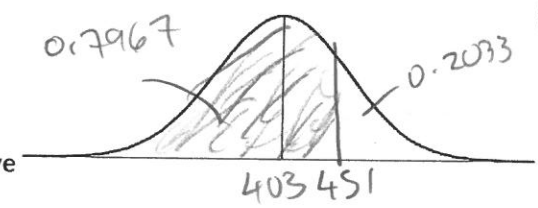
   What is the associated Z score in this scenario? 0.83 Round to TWO decimal places

   What is the probability statement for this scenario? $P(X \leq 451) = 0.7967$

   What is the associated probability with this problem? 0.7967 or 79.67%

   $\frac{451-403}{58}$

   Sketch the scenario on the provided normal curve



5. You randomly selected a family determine the probability that you selected a family that spent either $305 or less OR more than $490 on Black Friday Shopping

   What are the associated Z scores in this scenario? -1.69 and 1.5 Round to TWO decimal places

   What is the probability statement for this scenario? $P(x \leq 305)$ OR $P(x \geq 405) = 0.1123$

   0.0455 + 0.0668

   What is the associated probability with this problem? 0.1123 or 11.23%

   $\frac{305-403}{58}$ $\frac{490-403}{58}$

   Sketch the scenario on the provided normal curve

6. You randomly selected a family determine the probability that you selected a family that spent between $460 and $565 on Black Friday Shopping

   What are the associated Z scores in this scenario? 0.98 and 2.79 Round to TWO decimal places

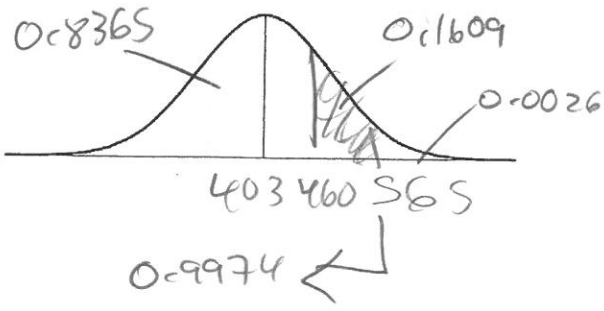
   What is the probability statement for this scenario? $P(460 \leq x \leq 565) = 0.1609$

   What is the associated probability with this problem? 0.1609 or 16.09%

   $\frac{565-403}{58} = 2.79$

   $\frac{460-403}{58}$

   Sketch the scenario on the provided normal curve



0.9974 − 0.8365

1 − (0.0026 + 0.8365)

The average amount of snowfall in December in Peoria is 7.1 inches. If the amount of snowfall in Peoria in December is said to be normally distributed and has a standard deviation of 1.75 inches then answer the following questions:

7. Determine the randomly selected a year in which the amount of snowfall in December is in the top 64% of all Decembers over the history of collecting this type of data

What is the associated Z score in this scenario? -0.36 Round to TWO decimal places

What is the probability statement for this scenario? $P(x \geq B) = 0.6400$

mean + SD(z) = 7.1 + 1.75(-0.36) = 6.47

What is the associated amount of snowfall with this problem? _____

look up 0.3600
(0.3594)
↳ -0.36

Sketch the scenario on the provided normal curve

8. According to the given information, find the missing amount of December snowfall if you know that 56% of the of the years selected are between 5.05 inches and T inches

What are the associated Z scores in this scenario? -1.17 and 0.47 Round to TWO decimal places

What is the probability statement for this scenario? $P(5.05 \leq x \leq T) = 0.5600$

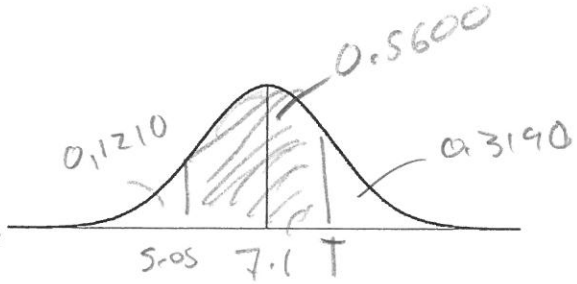
mean + SD(z) = 7.1 + 1.75(0.47) = 7.9225

What is the missing associated amount of snowfall in December in Peoria with this problem? _____

look up 0.6810
(0.6808)
↳ 0.47

$\frac{5.05 - 7.1}{1.75} = -1.17$

Sketch the scenario on the provided normal curve



0.5600 + 0.1210
0.6810

The average cost of car insurance for a person who is 18 years old is $6456. If the cost of this car insurance for 18 year olds is said to be normally distributed and has a standard deviation of $175 then answer the following questions:

9. According to the given information, find the missing cost of car insurance if you know that 21% of the these 18 year olds are paying between B and ~~$6250~~ 6350

   What are the associated Z scores in this scenario? -0.61 and -1.55 Round to TWO decimal places

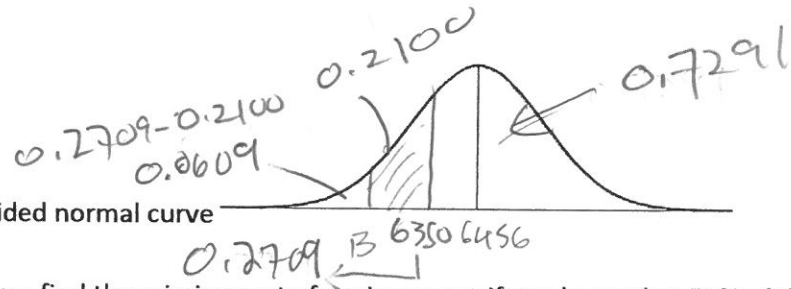
   What is the probability statement for this scenario? $P(B \le x \le 6350) = 0.2100$

   mean + SD(Z) = 6456 + 175(-1.55)

   What is the missing associated cost with this problem? 6184.75 (round to TWO decimal places)

$\frac{6350 - 6456}{175} = -0.61$ look up 0.0609 (0.0606) → -1.55

0.2709 - 0.2100



Sketch the scenario on the provided normal curve

10. According to the given information, find the missing cost of car insurance if you know that 55% of the these 18 year olds are paying less than $6000 OR more than W dollars

    What are the associated Z scores in this scenario? -2.61 and -0.11 Round to TWO decimal places

    What is the probability statement for this scenario? $P(x \le 6000)$ OR $P(x \ge W) = 0.5500$

    mean + SD(Z) = 6456 + 175(-0.11) = 6436.75

    What is the missing associated cost with this problem? _____ (round to TWO decimal places)

$\frac{6000 - 6456}{175} = -2.61$ look up 0.4545 (0.4562) → 0.11

0.5500 - 0.0045 = 0.5455

Sketch the scenario on the provided normal curve

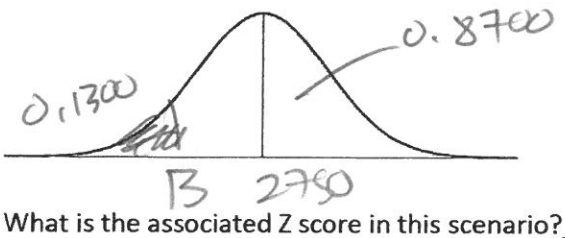
0.4500 + 0.0045
0.4545

Extra Credit: DO NOT ATTEMPT UNTIL ALL OTHER PROBLEMS ARE COMPLETED NO WORK = NO CREDIT

If the average monthly salary of a college graduate is said to be normally distributed and is $2750 has a standard deviation of $250 and the average monthly student loan payment is said to be normally distributed at $806.74 with a standard deviation of $82.50, then answer the following questions.

If a person is earning a monthly salary in the bottom 13% of all monthly salaries, then what percent of people T have a loan payment higher that that same person, if the person in question has a MAXIMUM TAKE HOME PAY after paying their student loan that is $1900 (assume the pay is NET PAY and NOT GROSS PAY, that is taxes have been paid already).

Sketch the scenario related average monthly pay on the provided normal curve



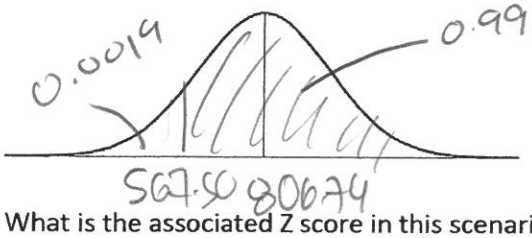
lookup 0.1300
(0.1292)
→ -1.13

What is the associated Z score in this scenario? -1.13 Round to TWO decimal places

What is the probability statement for this scenario? $P(X \le B) = 0.1300$

What is the associated amount of monthly pay with this problem? $2750 + 250(-1.13) = \$2467.50$

Sketch the scenario related average monthly student loan payment on the provided normal curve



$\frac{567.50 - 806.74}{82.50}$

-2.89

$2467.50 - 1900$

$\$567.50$

What is the associated Z score in this scenario? -2.89 Round to TWO decimal places

What is the probability statement for this scenario? $P(X \ge 567.50) = 0.9981$

What is the associated amount of monthly student loan payment with this problem?

$567.50 Round to TWO DECIMAL PLACES

The percentage of people, T, that have a student loan higher than the person who has take-home pay of $1900 after paying their student loan payment (before any other expenses are paid) is 99.81% or 0.9981

JUSTIFY THE ANSWER YOU GAVE or NO extra credit of any type will be awarded

MR HICKMAN IS ASKING YOU IF YOU CAN READ AND INTERPRET THESE PROBLEMS WELL ENOUGH TO PERFORM THE MATHEMATICS INVOLVED.

DO **NOT** ASK HIM TO READ AND INTERPRET THE QUESTIONS FOR YOU, BECAUSE IT IS SPECIFICALLY THE MAJOR LEARNING TARGET HE IS ASSESSING **YOU** ON! GOOD LUCK!