© Scarborough October 2008 Math 141 Quiz 8 KEY

(10pts) NAME (printed neatly): _____

(10pts) Section Number (circle correct section): 503 (10:20am) 521 (11:30am) 523 (1:50pm)

1. Two balls are selected at random without replacement from a drawer containing 5 red, 8 blue and 7 white balls. Let the random variable *X* denote the number of red balls.

a. (10pts) List all the outcomes of the experiment.

$0R2R^C$, $1R1R^C$, $2R0R^C$ OR RR, RB, BR, RW, WR, BB, BW, WB, WW

b. (10pts) Find the probability, as an exact fraction, that $X = 1$.

$R_1 \cap R_2^C$ or $R_1^C \cap R_2$

$$\left(\frac{5}{20}\right)\left(\frac{15}{19}\right)+\left(\frac{15}{20}\right)\left(\frac{5}{19}\right)=\frac{150}{380}=\frac{15}{38}$$

OR

$$\frac{C(5,1)C(15,1)}{C(20,2)}=\frac{5\cdot 15}{190}=\frac{75}{190}=\frac{15}{38}$$

2. (10pts) A diamond necklace is insured for $42,500. The chance that the necklace will need to be replaced in the next year is 0.38%. What premium should the insurance company charge to have an expected profit of $380?

Let *x* be the premium amount in dollars.

$E(X)=(42500-x)(0.0038)+(-x)(1-0.0038)=-380$ [from necklace owner's view]

x = **$541.50**

OR

$E(X)=(x-42500)(0.0038)+(x)(1-0.0038)=380$ [from insurance's viewpoint]

x = **$541.50**

3. (10pts) The probability that a 10-gallon chinquapin oak tree survives for at least one year after transplanting it in the ground is 0.82. If 1000 of these oaks are transplanted, what is the probability, to 4 decimal places, that at least 800 but no more than 900 survive for at least one year?

$P(800 \le x \le 900) = binomcdf(1000, 0.82, 900) - binomcdf(1000, 0.82, 799) \approx 0.9528$

4. A researcher examines 420 millipedes and counts the number of legs on each millipede. The results of the experiment are in the chart.

Number of Legs	84	180	390	250	320	190	296	350
Number of Millipedes	23	65	84	48	84	44	56	16

a. (10pts) What is the mode (include the units)?

320 and 390 legs

b. (10pts) What is the mean to 4 decimal places (include the units)?

1-Var Stats L_1, L_2

275.7333 legs

c. (10pts) What is the standard deviation to 4 decimal places (include the units)?

86.8641 legs

d. (10pts) What is the median to 4 decimal places (include the units)?

296.0000 legs