

Name: \_\_\_\_\_

Problem	1	2 / 3	4	5	6 / 7	Total
Possible	23	18	18	24	17	100
Received						

**SIMPLIFY ALL ANSWERS  
TO A SINGLE NUMBER.**

**FOR FULL CREDIT, SHOW ALL WORK RELATED TO FINDING EACH SOLUTION.**

23 points 1. An archer has probability of 0.4 of hitting a certain target. He shoots 10 times.

/4 (a) What is the probability of hitting the target exactly 2 of 10 times?  
Find this value exactly. Simplify your answer to a single number.

/6 (b) What is the probability of hitting the target exactly 2 of 10 times?  
Find this value by using the normal curve to approximate the probability.

/7 (c) What is the probability of hitting the target 2 or more times?  
Find this value exactly. Simplify your answer to a single number.

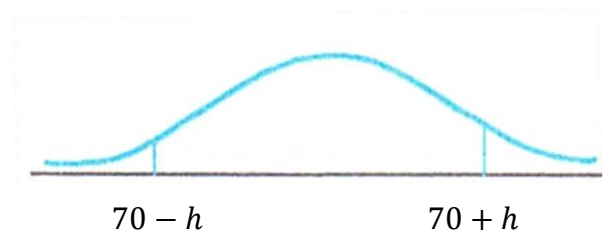
/6 (d) What is the probability of hitting the target 2 or more times?  
Find this value by using the normal curve to approximate the probability.

14 points 2. An urn contains five red balls and three yellow balls. Two balls will be selected and the number of red balls will be recorded.

/8 (a) Set up the probability distribution.

/6 (b) Compute the corresponding mean and variance.

4 points 3. At right is a normal curve with mean 70 and standard deviation 5. Find the value of  $h$  for which the area of the shaded region is 0.9876.



18 points 4. Suppose there is a game with the following outcomes and probabilities:

Outcome	Probability
\$5	0.1
-\$1	0.9

/2 (a) What is the expected winnings if you play one game?

/8 (b) What is the total expected winnings if you play two games? Show all pertinent work.

/2 (c) What would you guess is the total expected winnings if you play 100 games? No need to show any work.

/6 (d) Find the standard deviation of the above outcome random variable.

24 points 5. The height of adult females in the United States is normally distributed with  $\mu = 66$  inches and  $\sigma = 3$  inches.

/4 (a) What percent of adult females are less than 63 inches?

/5 (b) What percent of adult females are between 60 and 63 inches?

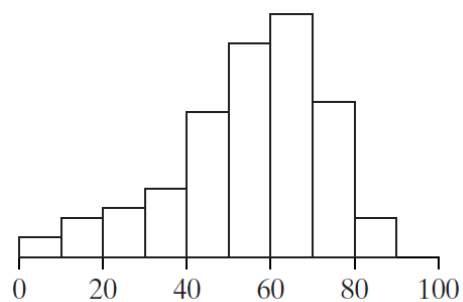
/5 (c) What percent of adult females are within 1.5 standard deviations (whether below or above) the mean?

/5 (d) What height is at the 96<sup>th</sup> percentile?

/3 (e) What height is at the 4<sup>th</sup> percentile?

/2 (f) What percent of heights are between the two heights you found in (d) and (e)?

5 points 6. Estimate the mean and standard deviation of the data shown in the histogram at right.



12 points 7. Given the three values  $a, b, c$  below for random variable  $X$  and their mean and standard deviation, find the means and standard deviations of the modified values.

	$X$	$2X$	$X + 3$	$2X + 3$
	$a$	$2a$	$a + 3$	$2a + 3$
	$b$	$2b$	$b + 3$	$2b + 3$
	$c$	$2c$	$c + 3$	$2c + 3$
Mean	10			
Standard deviation	4			