

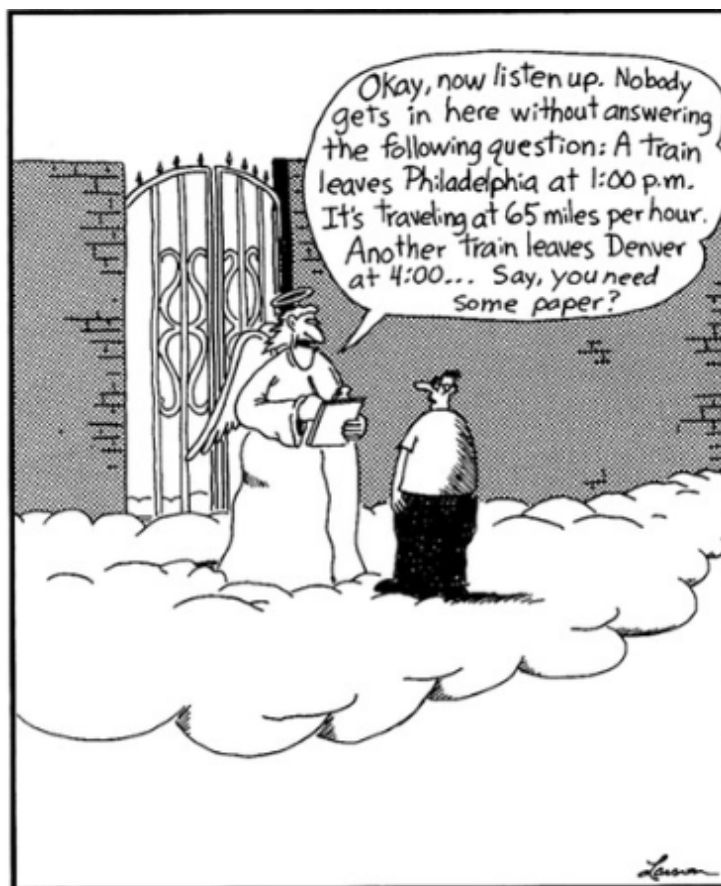
Name: _____

Problem	1 / 2	3 / 4	5 / 6	7	8 / 9	Total
Possible	15	26	18	20	21	100
Received						

**DO NOT OPEN YOUR EXAM
UNTIL TOLD TO DO SO.**

**You may use a 3 x 5 card
(both sides) of handwritten
notes and a calculator.**

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



Math phobic's nightmare

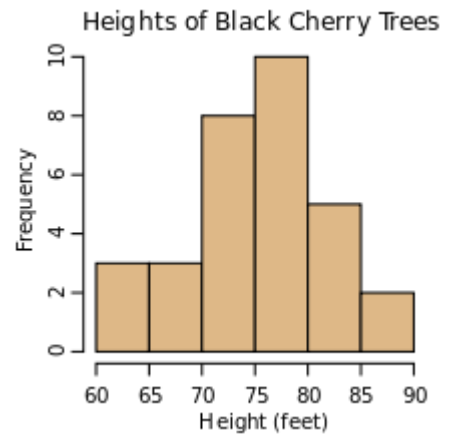
6 points 1. Consider the frequency distribution for 31 black cherry tree heights.

Estimate (don't try to compute exactly) the mean and standard deviation for this distribution (*circle one of the given values*):

/2 Mean: 70 75 80 82

/2 Standard deviation: 2 4 7 12

/2 Find the probability that a randomly selected tree (of these 31 trees) would be between 65 and 75 feet tall.



9 points 2. Find (and show appropriate work) the mean, variance and standard deviation of the following ten values:

0 1 1 4 4 5 5 10 10 10

9 points 3. Suppose that in families with two or fewer kids we have the following information:

# kids	Fraction of families
0	.10
1	.30
2	.60

/3 What is the average number of kids in these families?

/6 What is standard deviation of the number of kids in these families?

17 points 4. Suppose in a certain fish population (with normal distribution) that the average fish length is 54 mm with a standard deviation of 4 mm.

/4 What percentage of the fish are longer than 60 mm?

/2 What percentage of the fish are shorter than than 60 mm?

/6 What percentage of the fish are between 60 and 62 mm?

/5 What is the fish length at the 40th percentile?

12 points

5. In the United States, 38% of the population has type O+ blood. Suppose we take a random sample of 10 persons, and we are interested in how many of them have O+ blood. There are 11 possible outcomes, from 0 to all 10 of them having O+ blood, as shown at right. (Variable Y is the number of persons of the 10 who have O+ blood.)

k	$Prob\{Y = k\}$
0	0.0084
1	0.0514
2	0.1419
\vdots	
6	?
\vdots	
10	0.0001

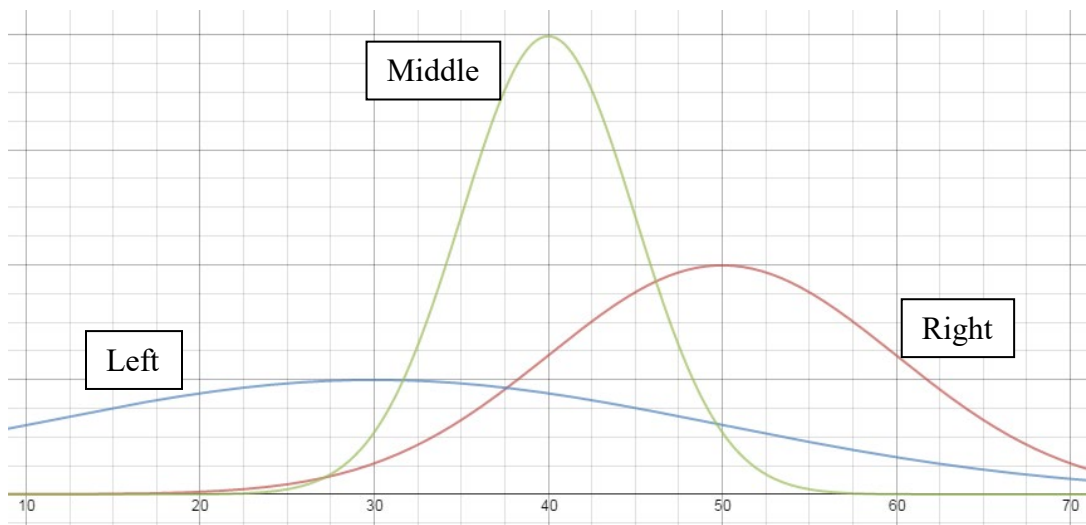
/6 Find the probability that 6 of the 10 persons have O+ blood.

/2 Of this sample of 10, what is the expected number μ_Y of persons with O+ blood?

/4 What is the standard deviation σ_Y of this distribution of outcomes?

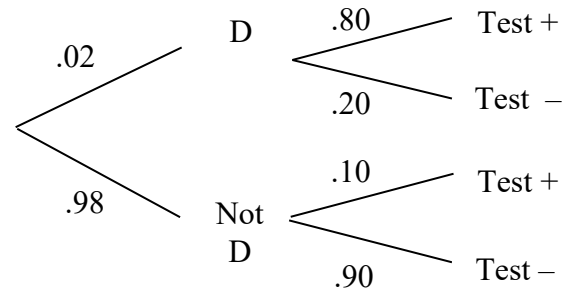
6 points

6. Three normal curves are plotted. Given that the standard deviations of these three curves are 5, 10 and 20 (not necessarily in that order), write the mean and standard deviation for each.



Curve	Mean	Std Dev
Left		
Middle		
Right		

20 points 7. Suppose that a medical test has a 80% chance of detecting a disease (D) if the person actually has it (thus there is a 20% of a false negative) and a 90% chance of correctly indicating that the disease is absent if the person really does not have the disease (so there is a 10% chance of false positive). Finally, suppose that 2% of the population actually has the disease.



/2 What is the probability that a randomly chosen person both has the disease and tests positive?

/4 What is the probability that a randomly chosen person would test positive?

/4 What is the probability that a randomly chosen person who tests positive actually has the disease?

/3 What is the probability that a randomly chosen person who tests positive does not have disease?

/7 Finally, suppose that this test did not return false positives, that is anyone without the disease would always test negative (so the .10 and .90 above would now be 0 and 1). What would the probability be that a randomly chosen person who tests positive actually has the disease?

- 13 points 8. Consider the following data from a study of 65 randomly selected adults in California regarding smoking habits and income level.

	Income			Total
	Low	Medium	High	
Smoke	8	3	2	13
Don't smoke	17	17	18	52
Total	25	20	20	65

- /2 What is the probability that someone in this study is a smoker?
- /2 What is the probability that someone in this study has low income?
- /3 What is the probability that someone who has low income is a smoker?
- /3 What is the probability that someone who is a smoker has low income?
- /3 Is being a smoker independent of having a low income? Why or why not?

- 8 points 9. Suppose that in a certain population of married couples we know that 50% of the husbands watch TV daily (that is, at least once a day), 60% of the wives watch TV daily, and that in 40% of the couples both the husband and wife watch TV daily.

- /5 What is the probability that a woman watches TV daily if we know that her husband watches TV daily?
- /3 Are the TV-watching habits (of watching TV daily or not) of married men independent of the TV-watching habits of their wives? Explain/show why or why not.