Stat 2610 Test 2 Review Names Todd

For full credit circle answers and **show all your work.**

1. Given the probability that the temperature tomorrow will be above freezing is 0.018 state the complement AND the probability this complement occurs.

State the complement: Temp is NOT above freezing tomorrow. P(Complement) = 0.982

2. In our class we determined the probability a student could raise one eye-brow was 17/36. Conversely, the probability of not being able to raise only one eye-brow is 19/36. Explain why these add to 1. (Check all that apply.)

A) They do **NOT** add to 1 B) They are independent events

C) They are mutually exclusive D) They cover the sample space

3. What are the odds that a student in our class can raise one eye-brow? 17 to 19.

Draw a tree diagram to show one stage of a student in our class raising an eye-brow.

4. According to *The Professors Guide to Grade Distribution* grades should be distributed as follows for tall students (over 5' tall) and short students (5' and under):

	A	B	C	D	F
Tall	10%	15%	50%	15%	10%
Short	5%	5%	50%	20%	20%

Assume your Stat 2610 professor follows the recommended grade distribution and 60% of our class is "tall."

Calculate the following:

.60 × .10 =

P(student is tall AND gets an A) .06 Odds a student gets a C 50:50

P(student is tall OR gets an A) .62 P(student gets B | student is short) .05

.6 + .4 × .05

.6 + .02 =

5. Your professor grades homework by randomly choosing 5 out of 18 homework problems to grade.

(a) How many different groups of 5 problems can be chosen from the 18 problems?

18 nCr 5 = 8568

(b) Shannon did only 5 problems of one assignment. What is the probability that the problems she did comprised the group that was selected to be graded? (Round your answer to four decimal places.)

1/8568 ≈ .0001167 ≈ .0001

(c) Ishant did 8 problems. How many different groups of 5 did he complete?

8 nCr 5 = 56

d) What is the probability that one of the groups of 5 he completed comprised the group selected to be graded? (Round your answer to four decimal places.)

$\frac{56}{8568} \approx .0065$

6. Movie stars, professors, and U.S. presidents have fished Pyramid Lake. It is one of the best places in the lower 48 states to catch trophy cutthroat trout. In this table, x = number of fish caught in a 6-hour period. The percentage data are the percentages of fishermen who caught x fish in a 6-hour period while fishing from shore.

x	0	1	2	3	4 or more
%	44%	37%	15%	3%	1%

Find the probability that a fisherman catches two or more fish in a 6-hour period .19 = .15+.03+.01
Compute the expected value (μ), to two decimal places, of the number of fish caught per fisherman in a 6-hour period (use 4 for the "4 or more" category).

$0 \times .44 + 1 \times .37 + 2 \times .15 + 3 \times .03 + 4 \times .01 =$ $\mu = .8$

$0 + .37 + .30 + .09 + .04 = .8$

Compute the standard deviation (σ), to two decimal places, of the number of fish caught per fisherman in a 6-hour period (use 4 for the "4 or more" category).

$\sqrt{(0-.8)^2 \times .44 + (1-.8)^2 \times .37 + (2-.8)^2 \times .15 + (3-.8)^2 \times .03 + (4-.8)^2 \times .01}$ $\sigma \approx .8718$

7. What are the necessary criteria for using the binomial probability distribution?

* Only two possible outcomes
* Independent events

8. Approximately 70% of the wolves in the New Mexico and Arizona region are male, and 30% female due to efforts cattle ranchers in this area have made to exterminate wolves. Biologists suspect that male wolves are more likely than females to return to an area where the population has been greatly reduced. (Round your answers to three decimal places.) In a random sample of ten wolves spotted in the region, what is the probability that seven or more were male? binomcdf(10, .3, 3) = .6496

0 to 3 female OR NOT 0 to 6 males : 1 − binomcdf(10, .7, 6) = .6496

What is the probability that fewer than four were female?

binomcdf(10, .3, 3) = .6496

What is the probability that the first male observed occurs on the third wolf?

geometpdf(.7, 3) = .063

9. A company is in the business of finding addresses of long-lost friends. The company claims to have a 70% success rate. Suppose that you have the names of six friends for whom you have no addresses and decide to use the company to track them. Find the mean and standard deviation of this probability distribution. What is the expected number of friends for whom addresses will be found? (Round your answers to two decimal places.)

$.7 \times 6 = 4.2$ $\sqrt{npq} = \sqrt{6 \times .7 \times .3} =$

$\mu =$ 4.2 friends $\sigma =$ 1.12 friends Expected value = 4.2 friends

How many names would you have to submit to be 97% sure that at least two addresses will be found?

Not finding 0 or 1 addresses.

Try 6: binomcdf(6, .3, 4) = .989
(up to 4 failures)

Try 5 - binomcdf(5, .3, 3) = .969

Five names

10. Much of Trail Ridge Road in Rocky Mountain National Park is over 12,000 feet high. Although it is a beautiful drive in summer months, in winter the road is closed because of severe weather conditions. Sustained gale-force winds (over 32 miles per hour and often over 90 miles per hour) occur on the average of 1.7 times every 52 hours at a Trail Ridge Road weather station. For an interval of 107 hours, what are the probabilities that $r = 2$, 3, and 4? What is the probability that $r < 2$? (Use 2 decimal places for λ. Use 4 decimal places for your answers.)

$\frac{\lambda}{107} = \frac{1.7}{52}$

$\lambda \approx 3.50$

P(2) = .1950 = poissonpdf(3.5, 2)

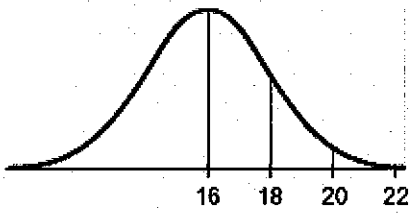
P(3) = .2158

P(4) = .1888 = poissonpdf(3.5, 4)

P(r<2) = .1359

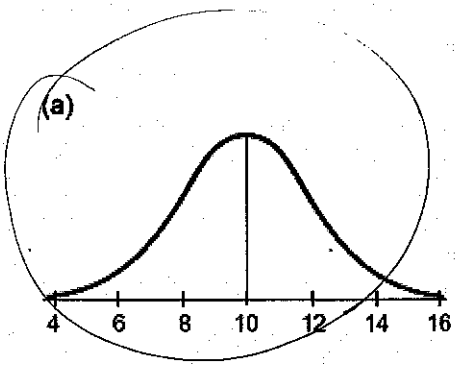
poissoncdf(3.5, 1) = poissonpdf(3.5, 0) + poissonpdf(3.5, 1)

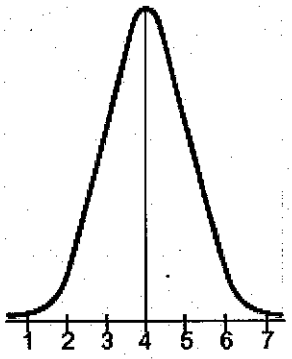
11. Find the mean and standard deviation from the normal curve pictured below.



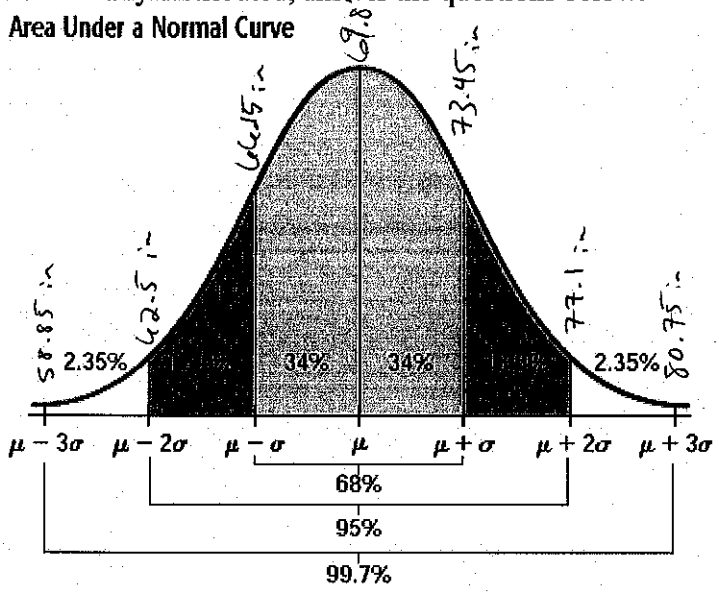
$\mu =$ 16 $\sigma =$ 2

12. Circle the distribution below which has the larger standard deviation.





13. Given our class mean height is 69.8 inches tall with a standard deviation of 3.65 and assuming our heights are normally distributed, answer the questions below.



What percent of our class is shorter than 69.8"?

50%

What percent of our class is shorter than 77.1"?

50% + 34% + 13.5% = 97.5%

Find the height that 97.5% of our class is taller than.

62.5"

14. If our class heights truly are normally distributed and the mean height is 69.8 inches tall then circle the correct statement below:

The median height is less than 69.8"

The median height is greater than 69.8"

The median height is equal to 69.8"

No information about median height is known

15. I acquired measurements of every second grader's height at Ben's school. From the measurements I calculated the following:

Min = 39"
Max = 53"
$\bar{x}$ = 46.79"
Median = 47"
s = 4.25

$$\frac{3(46.79-47)}{4.25} = -.148$$

$-1 \leq -.148 \leq 1$

I'm thinking a few of the kids are "funny" with all the missing teeth and short pants. Please determine if their heights are normally distributed using Pearson's index.

Pearson's index: $\frac{3(\bar{x}-Median)}{s}$

Conclusion: Normal or NOT Normal

16. At Fontaine Lake Camp on Lake Athabasca in northern Canada, history shows that about 32% of the guests catch lake trout over 20 pounds on a 4-day fishing trip. Let *n* be a random variable that represents the *first* trip to Fontaine Lake Camp on which a guest catches a lake trout over 20 pounds.

Find the probability that a guest catches a lake trout weighing at least 20 pounds for the *first* time on trip number 3. (Round your answer to three decimal places.)

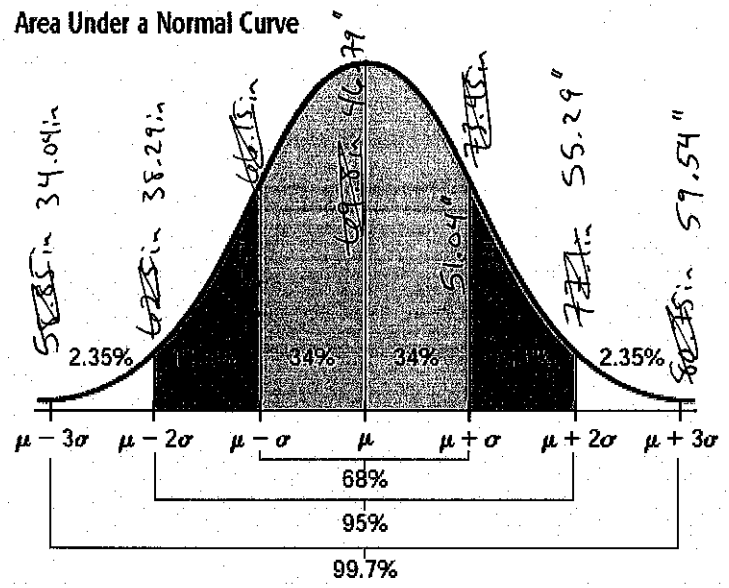
Geometric

geometpdf(.32, 3) ≈ .148

Find the probability that it takes more than three trips for a guest to catch a lake trout weighing at least 20 pounds. (Round your answer to three decimal places.)

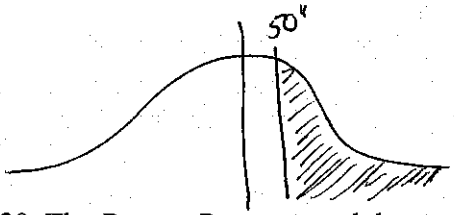
1 − geometcdf(.32, 3) = .314

17. Regardless of your conclusion from #15, assume the heights of Ben's classmates are normally distributed. Sketch their information onto the bell shaped curve.



18. What percent of his class is taller than 50"?
Sketch and shade a bell shaped curve to represent this.

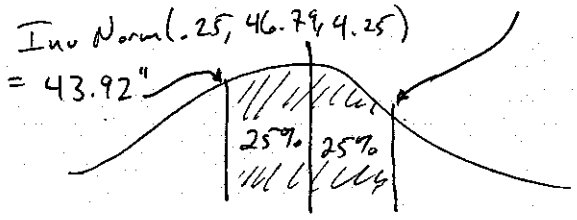
normalcdf(50, 9999, 46.79, 4.25) = .2250



19. Find the range of values that covers the middle 50% of students in his grade.
Sketch and shade a bell shaped curve to represent this.

InvNorm(.75, 46.79, 4.25) = 49.66"

InvNorm(.25, 46.79, 4.25) = 43.92"



20. The *Denver Post* reported that, on average, a large shopping center had an incident of shoplifting caught by security 1.6 times every three hours. The shopping center is open from 10 A.M. to 9 P.M. (11 hours). Let r be the number of shoplifting incidents caught by security in an 11-hour period during which the center is open. Using the Poisson distribution, calculate the following. $\frac{1.6}{3} = \frac{\lambda}{11} \Rightarrow \lambda = 5.87$

The probability that from 10 A.M. to 9 P.M. there will be at least one shoplifting incident caught by security (Use 4 decimal places.)

1 − poissoncdf(5.8667, 0) = .9972

↖ Not zero

The probability that from 10 A.M. to 9 P.M. there will be at least three shoplifting incidents caught by security? (Use 4 decimal places.) 1 − poissoncdf(5.8667, 2) = ~~.9573~~ .9318

↖ Not zero, one, or two.

What is the probability that from 10 A.M. to 9 P.M. there will be no shoplifting incidents caught by security? (Use 4 decimal places.)

poissonpdf(5.8667, 0) = .0028