

Name Schlansky
Mr. Schlansky

Date _____
Algebra II

Probability Review Sheet

A = Schlansky
B = Silverman

1. The probability that Chloe the cardinal shows up in the Schlansky's backyard is $\frac{12}{19}$. The probability that Chloe shows up in the Silverman's backyard is $\frac{10}{17}$. If the probability that Chloe shows up in the Schlansky's backyard or the Silverman's backyard is $\frac{12}{16}$, what is the probability that Chloe shows up in both backyards?

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$\frac{12}{16} = \frac{12}{19} + \frac{10}{17} - x$$

$$\frac{12}{16} = \frac{394}{323} - x$$

$$\frac{-394}{323} \quad \frac{-394}{323}$$

$$\frac{-607}{1292} = \frac{-x}{-1}$$

$$\frac{607}{1292} = x$$

2. The probability that a student in Mr. Orkofsky's first period class passes the Regents is $\frac{25}{26}$ and the probability that a student in his period 8 class passes the Regents is $\frac{17}{19}$. If the probability that a student in period 1 or period 8 passing the Regents is $\frac{27}{28}$, what is the probability that a student passes the regents in period 1 and period 8? Round your answer to the nearest percent.

A = period 1
B = period 8

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$\frac{27}{28} = \frac{25}{26} + \frac{17}{19} - x$$

$$\frac{27}{28} = \frac{917}{494} - x$$

$$\frac{-917}{494} \quad \frac{-917}{494}$$

$$\frac{-6169}{6916} = \frac{-x}{-1}$$

$$\frac{6169}{6916} = x$$

3. The set of data in the table below shows the results of a survey on the number of messages that people of different ages text on their cell phones each month.

Age Group	Text Messages per Month			Total
	0-10	11-50	Over 50	
15-18	4	37	68	109
19-22	6	25	87	118
23-60	25	47	157	229
<u>total</u>	<u>35</u>	<u>109</u>	<u>312</u>	<u>456</u>

If a person from this survey is selected at random, what is the probability that the person texts over 50 messages per month given that the person is between the ages of 23 and 60?

- 1) $\frac{157}{229}$
- 2) $\frac{157}{312}$
- 3) $\frac{157}{384}$
- 4) $\frac{157}{456}$

$$\frac{157}{229}$$

4. A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

	Comedy	Drama	total
Male	70	35	105
Female	48	42	90
<u>total</u>	<u>118</u>	<u>77</u>	<u>195</u>

What percentage of the school's male students would prefer comedy?

condition $\frac{70}{105} = .666\bar{6} \approx 66.7\%$

5. The guidance department has reported that of the senior class, 2.3% are members of key club, K, 8.6% are enrolled in AP Physics, P, and 1.9% are in both. Determine the probability of P given K, to the nearest tenth of a percent. The principal would like a basic interpretation of these results. Write a statement relating your calculated probabilities to student enrollment in the given situation.

	Key club	No Key Club	Total
AP Physics	1.9	6.7	8.6
No AP Physics	.4	9.1	9.5
<u>total</u>	<u>2.3</u>	<u>9.7</u>	<u>100</u>

82.6% of seniors in Key club are enrolled in AP Physics.

$$\frac{1.9}{2.3} \approx 82.6\%$$

6. A study was designed to test the effectiveness of a new drug. Half of the volunteers received the drug. The other half received a sugar pill. The probability of a volunteer receiving the drug and getting well was 40%. What is the probability of a volunteer getting well, given that the volunteer received the drug?

	drug	no drug	total
well	40		
not well	10		
total	50	50	100

$$\frac{40}{50}$$

* choose a gender and payment type

7. At a local mall, 125 people were asked how they choose to pay for their merchandise. The data is shown in the table below:

	Credit Card	Cash	total
Male	40	10	50
Female	60	15	75
total	100	25	125

A = male
B = credit card

Does the data suggest that the gender and type of payment are independent of each other? Explain your answer.

you don't have to do both formulas

$$P(A \cap B) = P(A) \cdot P(B)$$

$$\frac{40}{125} = \frac{50}{125} \cdot \frac{100}{125}$$

$$P(A) = P(A|B)$$

$$\frac{50}{125} = \frac{40}{100}$$

Independent

Independent

8. One-hundred employees of a company were asked their opinion on paying high salaries to the CEO. Their responses are summarized in the following contingency table.

A = male
B = In Favor

	In Favor	Against	total
Male	15	45	60
Female	4	36	40
total	19	81	100

Based on the data, are gender an opinion on salaries independent of each other? Justify your answer.

$$P(A \cap B) = P(A) \cdot P(B)$$

$$\frac{15}{100} = \frac{60}{100} \cdot \frac{19}{100}$$

$$P(A) = P(A|B)$$

$$\frac{60}{100} = \frac{15}{19}$$

Not Independent

Not Independent

9. The number of hours of sleep employees at a company get per night is normally distributed with a mean of 7.1 hours and a standard deviation of 1.4 hours. If an employee is randomly selected, what is the probability they sleep between 5 and 8 hours each night? Round your answer to the nearest percent. If there are 2500 employees at the company, approximately how many of them, to the nearest person, got less than 5 hours of sleep?

$$\bar{x} = 7.1$$

$$\sigma_x = 1.4$$

normal cdf

$$\text{lower} = 5$$

$$\text{upper} = 8$$

$$\mu = 7.1$$

$$\sigma = 1.4$$

.673...

67%

normal cdf

$$\text{lower} = 0$$

$$\text{upper} = 5$$

$$\mu = 7.1$$

$$\sigma = 1.4$$

.0668... (2500)

.0668...

167

10. The heights of students in an elementary school are normally distributed with a mean of 35.7 inches and a standard deviation of 3.2 inches. If a student is chosen at random from the elementary school, what is the probability that they will be between 34 and 35 inches? If there 235 students in the elementary school, to the nearest child, how many students are more than 40 inches tall?

$$\bar{x} = 35.7$$

$$\sigma = 3.2$$

normal cdf

$$\text{lower} = 34$$

$$\text{upper} = 35$$

$$\mu = 35.7$$

$$\sigma = 3.2$$

.1157...

12%

normal cdf

$$\text{lower} = 40$$

$$\text{upper} = 1,000,000$$

$$\mu = 35.7$$

$$\sigma = 3.2$$

.0895... (235)

.0895...

21

11. Ricky and Marissa are very competitive with each other. Ricky took a physics test where the mean was 82, the standard deviation was 4, and he scored an 85. Marissa took a chemistry test where the mean was 78, the standard deviation was 6, and she scored an 83. Who scored better on their exam? Explain your answer.

Ricky

Marissa

Marissa did better because she has a higher z score

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{85 - 82}{4}$$

$$z = .75$$

$$z = \frac{83 - 78}{6}$$

$$z = .83$$