Name Schlansky
Mr. Schlansky

Date _____
Algebra II

Probability Review Sheet

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?

A = Schlansky
B = Silverman

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

$P(A \cap B) = \frac{12}{19} + \frac{10}{17} - \frac{12}{16}$

$P(A \cap B) = \frac{607}{1292}$

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 = 1st Period
B = 8th Period

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

$P(A \cap B) = \frac{25}{26} + \frac{17}{19} - \frac{27}{28}$

$P(A \cap B) = \frac{6169}{6916} = .8919\ldots (100) = 89\%$

3. On a given school day, the probability that Nick oversleeps is 48% and the probability he has a pop quiz is 25%. Assuming these two events are independent, what is the probability that Nick oversleeps and has a pop quiz on the same day?

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

$P(A \cap B) = (.48)(.25)$

$P(A \cap B) = .12$

A = oversleeps
B = pop quiz

$P(A) = .48$
$P(B) = .25$

4. The probability that a student in Jacqua High School is in band is $\frac{127}{466}$ and the probability that a student is on the track team is $\frac{82}{466}$. If the probability that they are on the track team and in band is $\frac{74}{466}$, what is the probability that they are on the track team or in band?

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

$P(A \cup B) = \frac{127}{466} + \frac{82}{466} - \frac{74}{466}$

$P(A \cup B) = \frac{135}{466}$

5. At the Lakeside Resort, the probability that a guest room has a view of the lake is 0.24. The probability that a guest room has a queen-size bed is 0.74. Let A be the event that the guest room has a view of the lake, and let B be the event that the guest room has a queen-size bed. Events A and B are found to be independent of each other. Determine the exact probability that a randomly selected guest room has a view of the lake and a queen-size bed.

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

$P(A \cap B) = .24 \cdot .74$

$P(A \cap B) = .1776$

6. The probability that a person files their tax return in March is $\frac{127}{165}$. The probability that a person watches College Basketball in March is $\frac{98}{123}$. If the probability that a person watches College Basketball or files their tax return in March is $\frac{89}{95}$, what is the probability that a person watches College Basketball and files their tax return? Round your answer to the nearest percent.

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

$P(A \cap B) = \frac{127}{165} + \frac{98}{123} - \frac{89}{95}$

$P(A \cap B) = 63.0\%$

7. 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. If a person from this survey is selected at random, what is the probability that:

Age Group	Text Messages per Month			
	0–10	11–50	Over 50	
15–18	4	37	68	109
19–22	6	25	87	118
23–60	25	47	157	229
	35	109	312	456

a) the person texts over 50 messages per month given that the person is between the ages of 23 and 60?

$\frac{157}{229}$

b) the person is 15-18 and texts 11-50 messages per month?

inside $\frac{37}{456}$

c) the person texts 0-10 messages per month?

total $\frac{35}{456}$

8. 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.

Programming Preferences

	Comedy	Drama	
Male	70	35	105
Female	48	42	90
	118	77	195

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

condition $\frac{70}{105} = .66\overline{6}(100) = 66.\overline{6}\%$

b) What percentage of the schools students are female and prefer drama?

$\frac{42}{195}$ inside

c) What percent of the school's students prefer comedy?

total $\frac{118}{195}$

9. In a class of 30 students, there are 16 girls and there are 12 honors students. If there are 10 honor students that are girls, what is the probability that a student is not an honors student given that they are a girl?

	girls	not girls	
honors	10	2	12
not honors	6	12	18
	16	14	30

$\frac{6}{16}$

10. In a local high school, the probably that a student passes the Algebra II Regents is 82% and the probably that a student passes Chemistry Regents is 74%. If the probably that a student passes neither exam is 18%, find the probability that a student passes the Chemistry Regents only.

	A2	Not A2	
Chem	74	0	74
Not Chem	8	18	26
	82	18	100

Chem and not A2

$\frac{0}{100} = 0$

percents always 100

11. 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	
Male	40	10	50
Female	60	15	75
	100	25	125

A B

What is the probability that a female uses cash? Does the data suggest that the gender and type of payment are independent of each other? Explain your answer.

$\frac{10}{75}$

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

$\frac{15}{125} = \frac{75}{125} \cdot \frac{25}{125}$

$\frac{3}{25} = \frac{3}{25}$

Independent

12. 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. What is the probability that someone is male given that they are against? Based on the data, are gender an opinion on salaries independent of each other? Justify your answer.

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

$\frac{45}{100} = \frac{81}{100} \cdot \frac{60}{100}$

$\frac{9}{20} = \frac{243}{500}$

Not Independent

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

A

B

$\frac{45}{81}$

normal cdf

13. The lifespan of a 60-watt lightbulb produced by a company is normally distributed with a mean of 1450 hours and a standard deviation of 8.5 hours. If a 60-watt lightbulb produced by this company is selected at random, what is the probability that its lifespan will be between 1440 and 1465 hours?

1) 0.3803
2) 0.4612
3) 0.8415
4) 0.9612

lower = 1440
upper = 1465
μ = 1450
σ = 8.5

.8415

normalcdf

14. The number of hours students spent studying for their Regents exam is normally distributed with a mean of 14 hours and a standard deviation of 3.2 hours. If a student is randomly selected, what is the probability that a student spent more than 22 hours studying? Round your answer to the nearest tenth of a percent.

lower = 22
upper = 99999
μ = 14
σ = 3.2

.006... (100) = 0.6%

normalcdf

15. The scores on a math test are normally distributed with a mean of 76.2 and a standard deviation of 4.7. If 248 students took the exam, to the *nearest student*, how many scored less than a 70?

lower = -99999
upper = 70
μ = 76.2
σ = 4.7

.09... (248)

23

16. What is the completely factored form of $k^4 - 4k^2 + 8k^3 - 32k + 12k^2 - 48$?

1) $(k^2-4)(k^2+7k+12)$
2) $(k^2-4)(k^2+8k+12)$
3) $(k+2)(k-2)(k+3)(k+4)$
4) $(k+2)(k-2)(k+6)(k+2)$

17. The completely factored form of $n^4 - 9n^2 + 4n^3 - 36n - 12n^2 + 108$ is

1) $(n^2-9)(n+6)(n-2)$
2) $(n+3)(n-3)(n+6)(n-2)$
3) $(n-3)(n-3)(n+6)(n-2)$
4) $(n+3)(n-3)(n-6)(n+2)$

18. For $x > 0$, which expression is equivalent to $\frac{\sqrt[3]{x^2} \cdot \sqrt{x^5}}{\sqrt[6]{x}}$?

1) x
2) $x^{\frac{3}{2}}$
3) x^3
4) x^{10}

19. Given $y > 0$, the expression $\sqrt{3x^2y} \cdot \sqrt[3]{27x^3y^2}$ is equivalent to

1) $81x^5y^3$
2) $3^{1.5}x^2y$
3) $3^{\frac{5}{2}}x^2y^{\frac{5}{3}}$
4) $3^{\frac{3}{2}}x^2y^{\frac{7}{6}}$

20. Dee is planning on decreasing the amount of time she eats fast food per month. During the first month, she ate fast food 42 times. Each month, she eats at fast food restaurants 10% less than the previous month. How many total times does she eat fast food in the first 4 months rounded to the *nearest integer*?

1.025

21. Kina earns a $27,000 salary for the first year of work at her job. She earns annual increases of 2.5%. What is the total amount, to the *nearest cent*, that Kina will earn for the first eight years at this job?

$S_n = \frac{a_1 - a_1(r)^n}{1-r}$

$a_1 = 27{,}000$
$r = 1.025$
$n = 8$

$S_8 = \frac{27{,}000 - 27{,}000(1.025)^8}{1-1.025}$

$S_8 = 235875.13$

22. The depth of the water at a marker 20 feet from the shore in a bay is depicted in the graph below.

If the depth, d, is measured in feet and time, t, is measured in hours since midnight, what is an equation for the depth of the water at the marker?

1) $d = 5\cos\left(\frac{\pi}{6}t\right) + 9$

2) $d = 5\cos\left(\frac{\pi}{9}t\right) + 9$

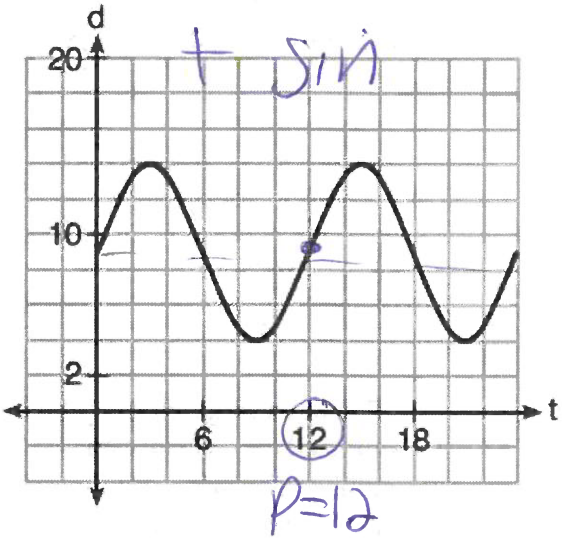
3) $d = 5\sin\left(\frac{\pi}{6}t\right) + 9$

4) $d = 5\sin\left(\frac{\pi}{9}t\right) + 9$

$f = \frac{2\pi}{P}$

$f = \frac{2\pi}{12}$

$f = \frac{\pi}{6}$



+ sin

$P = 12$

23. Which equation would represent the given graph?

1) $y = 2\cos(3x) + 3$

2) $y = 2\cos(6x) + 3$

3) $y = -2\sin(3x) + 3$

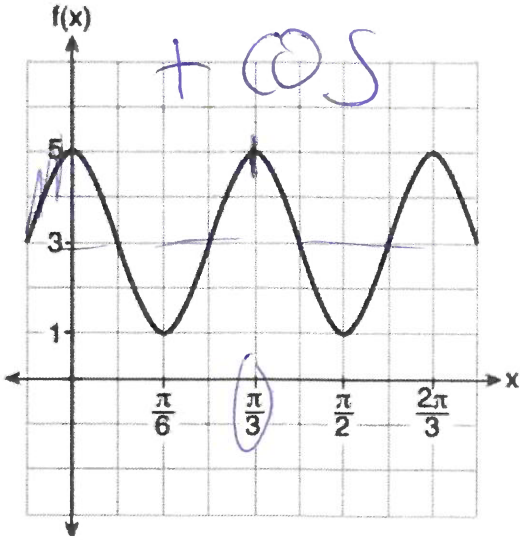
3) $y = -2\sin(6x) + 3$

$f = \frac{2\pi}{P}$

$f = \frac{2\pi}{\frac{\pi}{3}}$

$f = \frac{2\pi}{1} \cdot \frac{3}{\pi}$

$f = 6$



+ cos

X coordinate only

24. Which value, to the *nearest tenth*, is a solution of $f(x) = g(x)$ if $f(x) = 4\sin 2(x-4)+3$ and $g(x) = 4\ln(x)+3$?

1) 0.5
2) 2.03
3) (2.03,5.84)
4) (0.5, 0.8)

$Y_1 = 4\sin 2(x-4)+3$

$Y_2 = 4\ln|x|+3$

Intersect

x-coordinate only

25. Which value, to the *nearest tenth*, is the *smallest* solution of $f(x) = g(x)$ if $f(x) = 3\sin\left(\frac{1}{2}x\right) - 1$ and $g(x) = x^3 - 2x + 1$?

1) -3.6
2) -2.1
3) -1.8
4) 1.4

$Y_1 = 3\sin(\frac{1}{2}x) - 1$

$Y_2 = X^3 - 2X + 1$

Intersect

26. Find, to the *nearest hundredth*, the average rate of change of $f(x) = -3\cos(2x) + 1$ over the interval $-1 \le x \le 4$.

$\frac{y_2 - y_1}{x_2 - x_1}$

X	Y
-1	2.2484
4	1.4365

$\frac{1.4365 - 2.2484}{4 - -1} = -.16$

27. The average monthly high temperature in Buffalo, in degrees Fahrenheit, can be modeled by the function $B(t) = 25.29\sin(0.4895t - 1.9752) + 55.2877$, where t is the month number (January = 1). State, to the *nearest tenth*, the average monthly rate of temperature change between August and November.

8 11

$\frac{y_2 - y_1}{x_2 - x_1}$

X	Y
8	78.866
11	48.598

$\frac{48.598 - 78.866}{11 - 8}$

-10.1