Semester 1 Exam Review

1. What is the missing value in the equation $y = 5(?)^x$ that models the data from the data table?

x	0	1	2	3	4	5	6
y	5	10	20	40	80	160	320

$\boxed{? = 2}$

$y = 5(1)^x$

$y = 5(1)^0 =$

$y = 5(1)$

$y = 5$

$y = 5(1)^1$

$y = 5(1)$

$y = 5$

$y = 5(2)^0$

$y = 5(1)$

$y = 5$

$y = 5(2)^1$

$y = 5(2)$

$y = 10$

$y = 5(2)^2$

$y = 5(4)$

$y = 20$

2. Jim has the following two functions. Will function f always be greater than g if the chart were continued? If not, which row in the chart will show it?

x	f(x)=x+20	g(x)=2^(x-1)
1	21	1
2	22	2
3	23	4
4	24	8

A. No, Row 5

B. No, Row 6

C. No, Row 7

D. Yes

x	f(x)	g(x)
1	21	1
2	22	2
3	23	4
4	24	8
5	25	16
6	26	32

3. A survey of 200 students included 106 males. The survey found that 101 students played a sport, including 46 females. Using the table below as a guide, what is the probability that the student is female, given that she does not play a sport? Write answer as a reduced fraction.

	Play A Sport	Does Not Play A Sport	Total
Males	55	51	106
Female	46	48	94
Total	101	99	200

$$\frac{48}{99} \div 3 = \boxed{\frac{16}{33}}$$

4. Ms. Math loves teaching her lessons on conditional probability. This year she taught some of her students using concrete examples and some using just theory. She then noted if students did well on the test on conditional probability. The following table summarized her results.

	Did well on the test	Did not do well on the test
Concrete Examples	.81	.05
Theory	.09	.05

What is the probability that a student was taught using concrete examples, given that the student did not do well on the test?

.10

A. 5%

B. 10%

C. 50%

D. 86%

$$\frac{.05}{.10} = .5$$

5. A soft drink company is considering changing the slogan for their product. The management decides to take a sample of customers and create a 95% confidence interval to find the proportion of customers who like the new slogan in comparison to the old slogan. If the company used a sample of 425 customers and 253 liked the new slogan better, what is the 95% confidence interval?

A. 53.4% - 65.7%

B. 54.9% - 64.2%

C. 55.6% - 63.4%

D. 57.2% - 61.9%

$u - E \le u \le u + E$

$E = \sqrt{\frac{p(1-p)}{n}}(1.96)$

$.595 + .045 = .64 = 64\%$

$.595 - .045 = .55$

55%

$\sqrt{\frac{(.595)(.405)}{425}}(1.96)$

$\frac{253}{425} = .595 = u = p$ (mean)

$\sqrt{\frac{.241}{425}}(1.96)$

$1 - p = 1 - .595 = .405$

$.023(1.96) = .045$

95% confidence interval, z-score of 1.96 =

6. Drug company researchers are conducting human trials on the effectiveness of a new drug to treat heart disease. After gathering a group of individuals who suffer from heart disease, the researchers randomly split the individuals into two groups: a control group, which will receive a placebo, and a test group, which will receive the drug treatment. Which of these terms **best** describes the trial?

A. experiment

B. sample survey

C. controlled study

D. observational study

7. The boys' and girls' foosball teams each brag that they are the ones who get the highest scores. The following scores were recorded from both the teams.
Boys: 9, 10, 6, 10, 10, 15, 7, 9, 7, 7
Girls: 4, 11, 12, 13, 5, 11, 8, 15, 13, 8
Which team has the larger mean? What is the value of the larger statistic?

~~A.~~ boys, 9
~~B.~~ girls, 9
C. boys, 10
D. girls, 10

Boys $\frac{9+10+6+10+10+15+7+9+7+7}{10} = \frac{90}{10} = 9$

girls $\frac{4+11+12+13+5+11+8+15+13+8}{} \quad \frac{100}{10} = 10$

2/3 - male 1/3 - female

8. A recent study of a certain county claimed that two-thirds of all traffic citations are written for male drivers. Which simulation could be used to predict the total number of citations that will be written before 10 citations are written for female drivers?

3 7

A. Using a random digit table, assign the numbers 0,1,2 to female drivers and the numbers 3 through 9 to male drivers. Look at the table one digit at a time, recording the number of female drivers until 10 is reached. Repeat for at least 20 trials and average the results.

B. Using a random digit table, assign the numbers 1,2,3 to female drivers and 4 through 10 as male drivers. Look at the first 10 digits and record the number of female drivers. Repeat for at least 20 trials and average the results.

C. Using a standard six sided die, assign odd numbers to male drivers and even numbers to female drivers. Roll the die, recording the results until 10 even numbers have been rolled. Repeat for at least 20 trials and average the results.

4 - male 2 - female

D. Using a standard six sided die, assign the numbers 1,2,3,4 to male drivers and 5,6 to female drivers. Roll the die and record the results until 10 female drivers have been determined. Repeat for at least 20 trials and average the results.

9. Which expression is equivalent to $\sqrt[3]{x} \cdot \left(\sqrt[4]{x^3}\right)^2$?

A. $\sqrt{x}$

B. $\sqrt[6]{x^{11}}$

C. $\sqrt[16]{x^3}$

D. $\sqrt[48]{x^{43}}$

$x^{\frac{1}{3}}\left(x^{\frac{3}{4}}\right)^2$

$x^{\frac{1}{3}} x^{\frac{6}{4}} = x^{(4)\frac{1}{3} + \frac{6}{4}(3)}$

$= x^{\frac{4}{12} + \frac{18}{12}}$

$= x^{\frac{22}{12}} = x^{\frac{11}{6}}$

10. When multiplying rational exponents with the same base, how should a student apply the rules for exponents to evaluate the expression $\left(8^{\frac{2}{3}}\right)\left(8^{\frac{5}{3}}\right)$?

$8^{2/3} \cdot 8^{5/3} = 8^{7/3}$

A. Multiply the exponents to give $8^{\frac{10}{9}}$. Find the ninth root of 8 and raise that answer to the tenth power.

B. Multiply the exponents to give $8^{\frac{10}{9}}$. Find the tenth root of 8 and raise that answer to the ninth power.

C. Add the exponents to give $8^{\frac{7}{3}}$. Find the cube root of 8 and raise that answer to the seventh power.

D. Add the exponents to give $8^{\frac{7}{3}}$. Find the seventh root of 8 and raise that answer to the third power.

11. For what value of x is the equation $8^{2x+1} = 2^{5x}$ true?

A. $-\frac{3}{2}$

B. -3

C. 1/3

D. -11

$2^3 = 8$

$\cancel{2}^{3(2x+1)} = \cancel{2}^{5x}$

$3(2x+1) = 5x$

$6x+3=5x$

$-6x \quad -6x$

$3=-x$

$-3=x$

12. Consider:

$$\sqrt{1} \cdot 2 \cdot \sqrt{3} \cdot 4 \cdot \sqrt{5} \cdot 6 \cdot \sqrt{7} \cdot 8 \ldots 98 \cdot \sqrt{99} \cdot 100$$

Will the final product be rational or irrational and why?

A. rational because there are so many rational factors

B. irrational because there are so many irrational factors

C. irrational because $\sqrt{11}$, for example, will not be made rational

D. rational because $\sqrt{3}$, for example, will multiply with other factors, which will result in a rational number

13. The *doubling period, d,* of an exponential function $f(x) = a \cdot b^x$ is the value of x such that $f(d) = 2 \cdot f(0)$. To the nearest 0.1, what is the doubling period of $f(x) = 0.7 \cdot 1.22^x$?

A. 1.6

B. 3.5

C. 5.3

D. 9.1

$f(0) = 0.7 \cdot 1.22^0$

$f(0) = 0.7$

$2(f(0)) = 0.7(2)$

$2f(0) = \boxed{1.4}$

$1.4 = 0.7 \cdot 1.22^x$

$0.7 \cdot 1.22^{1.6}$ $0.7 \cdot 1.22^{3.5}$ $0.7 \cdot 1.22^{5.3}$

$0.7 \cdot 1.22^{9.1}$

14. Which of these expressions can be used to find the sum of the first 12 terms of the series below?

$-3+1-\frac{1}{3}+\frac{1}{9}-\frac{1}{27}+\ldots$

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

$a_1=-3$

$n=12$

$r=\frac{-1}{3}$

A. $\frac{-3\left(1-\left(\frac{1}{3}\right)^{12}\right)}{\left(1-\frac{1}{3}\right)}$

C. $\frac{-2\left(1-\left(\frac{1}{3}\right)^{12}\right)}{\left(1-\frac{1}{3}\right)}$

B. $\frac{-3\left(1-\left(\frac{-1}{3}\right)^{12}\right)}{\left(1+\frac{1}{3}\right)}$

D. $\frac{-2\left(1-\left(\frac{-1}{3}\right)^{12}\right)}{\left(1+\frac{1}{3}\right)}$

$1-\left(-\frac{1}{3}\right)=1+\frac{1}{3}$

15. Consider the following equation:

$5e^{3x} = 7$

What is the value of x?

A. $x = \frac{1}{3}\ln\left(\frac{7}{5}\right)$

B. $x = 3\ln\left(\frac{7}{5}\right)$

C. $x = \frac{\ln 7}{15}$

D. $x = \frac{\ln 21}{5}$

$$\frac{5e^{3x}}{5} = \frac{7}{5}$$

$$\ln e^{3x} = \ln \frac{7}{5}$$

$$\frac{3x}{3} = \frac{\ln\left(\frac{7}{5}\right)}{3}$$

$$x = \frac{1}{3}\ln\left(\frac{7}{5}\right)$$