

Questions 1-5 are multiple choice. Circle the letter of the best answer. Each question is worth 4 points.

- 1) Let  $f$  be an exponential function whose growth factor is 4. Suppose  $f(6) = 24$ . For what value of  $x$  does  $f(x) = 6$ ?
  - a) 2
  - b) 3
  - c) 4
  - d) 5
  
- 2) If  $\log(a) = 0.5$ , what is the value of  $\log(10a)$ ?
  - a) 1.5
  - b) 5
  - c) 10.5
  - d) 15
  
- 3) Two variables are said to be positively associated if
  - a) Above average values of one variable tend to accompany below average values of the other.
  - b) Above average values of one variable tend to accompany above average values of the other.
  - c) Above average values of one variable can be accompanied by either above or below average values of the other.
  - d) Below average values of one variable can be accompanied by either above or below average values of the other.
  
- 4) If two variables have a correlation of 0.05, that means
  - a) There is very little linear relationship between the variables.
  - b) The difference in one variable is caused by a difference in the other variable.
  - c) As one variable gets larger the other one gets smaller.
  - d) One variable is always 0.05 smaller than the other variable.
  
- 5) Suppose you want to conduct a survey of Holland residents to find out how much they plan on spending for Christmas gifts this year. To make sure you have a low level of sampling variability you should
  - a) Have a large sample size.
  - b) Have questions that are very clear.
  - c) Make sure you have a random sample.
  - d) Ask just a small number of questions.

- 6) The following table contains the height (in inches) for Robert Wadlow, the tallest person in the world according to the Guinness Book of World Records, from age 8 to 20. [12 points]

Age ( $x$ )	8	10	12	14	16	18	20
Height (in) ( $y$ )	72	77	82	89	95	100	103

- a) Find the regression equation where age is the input and height is the output.
- b) Using your regression equation, determine the height of Wadlow at age 15.
- c) Find the correlation for age and height.
- 7) If you have \$5000 in a mutual fund that is earning 5% each year, what will be the value of the fund in 15 years? [6 points]
- 8) Suppose the function  $f$  is a periodic function with a period of 4. Suppose  $f(0) = 2$ ,  $f(1) = 3$ ,  $f(2) = 4$ , and  $f(3) = 3$ . What is  $f(10)$ ? [4 points]
- 9) Find  $p$  such that  $10^p \approx 800$ ? Round your answer to three decimal places. ? [4 points]

10) Suppose a Ferris wheel has a diameter of 40 feet and each revolution takes 15 seconds. Also suppose the person has to walk up a ramp that is 5 feet off the ground to get to the position of the lowest car. Sketch a graph of the height of a person on the wheel for 2 revolutions. Label the period and the amplitude on your graph and write down values for the period and amplitude. [8 points]

11) Determine formulas for the following functions, one is exponential and the other is a power function. [12 points]

$x$	0	1	2	3	4
$f(x)$	0	2	16	54	128
$g(x)$	2	6	18	54	162

12) A Gallup poll was taken to find out how many books Americans read all of or part of during the past year. A simplified version of this is shown in the probability distribution below where  $X$  equals the number of books read and  $P(X)$  is the probability that a randomly chosen person read that many books. In this, you can see that 15% read no books, 30% read 3 books, and so on. What is the mean (or expected value) of this distribution? [6 points]

$X$	0	3	8	31	60
$P(X)$	0.15	0.30	0.16	0.32	0.07

13) On a bottle of Pepsi it is stated that 1 in 6 will have a cap that says "Buy one 20 oz. and get one free." This means that the probability of you winning is  $1/6$ . You decide to buy two bottles of Pepsi. [12 points]

a) What is the probability that you win with both bottles?

b) What is the probability that you lose with both bottles?

c) What is the probability that you win with one bottle and lose with the other?

14) Using the formula  $\hat{p} \pm 1.96 \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$  compute a 95% confidence for the proportion of red beads in a bag when a sample of 100 of the beads shows that 20 of them are red. [6 points]

15) A restaurant serves 6 different kinds of sandwiches, 4 different kinds of tossed salad, and 8 different kinds of drinks. How many different kinds of meals are possible if you include one sandwich, one salad, and one drink? [6 points]

16) Write  $4x^{2/5}$  using radicals. [4 points]