Exam 1, M119, C. Judge, Spring 2002

NAME: ______________________________

Directions: For each question, mark in the table below the CAPITAL letter that corresponds to the single best completion.

Q	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A															

1. A minute of Super Bowl advertising cost a company \$300,000 in 1995 and \$450,000 in 2001. What was the average rate of change in the cost of a minute of Super Bowl advertising between 1995 and 2001?

   A. \$25,000 B. \$50,000 C. \$100,000 D. \$150,000 E. None of the preceding

2. The slope of the line $6x + 2y + 8 = 0$ is

   A. -3 B. -4 C. $-\frac{1}{3}$ D. $\frac{3}{4}$ E. 6

3. Consider the linear function $y = f(x)$ determined by the table below:

x	4	6	8	10
y	300	360	420	480

   Which of the following is true?

   A. The slope is 60 B. The y-intercept is 180 C. The equation is $y = 30x + 300$ D. The equation is $x = 60y + 300$
   E. None of the preceding

4. The following table gives the supply and demand functions for the number of thousands of haircuts given in Bloomington per week.

price p in \$	8	10	12	14
supply $S(p)$	12	14	16	18
demand $D(p)$	20	16	12	8

   What is the equilibrium price?

   A. $p = 10.5$ B. $p = 10.6$ C. $10\frac{2}{3}$ D. 11 E. None of the preceding

5. The function $y = \sqrt{3x}$ is a power function. That is, it can be written as $y = k \cdot x^p$ where

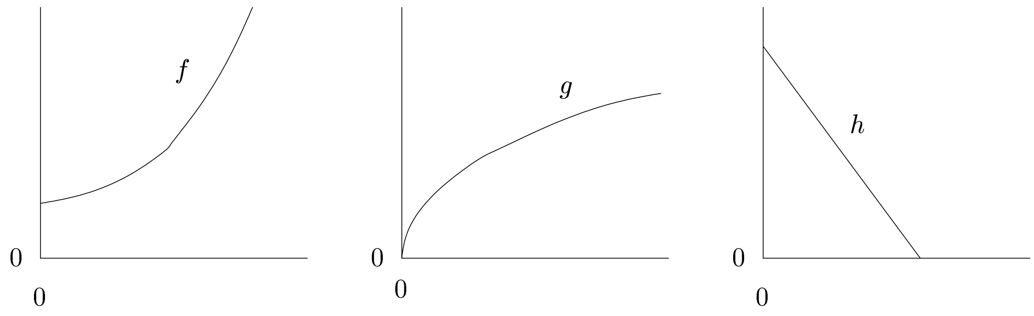
   A. $k = 3$ and $p = \sqrt{2}$ B. $k = 1.732050$ and $p = 2$ C. $k = \sqrt{3}$ and $p = \frac{1}{2}$ D. $k = 3$ and $p = .5$
   E. None of the preceding

6. Suppose that a company that creates widgets has the cost function $C(x) = 2400 + .5 \cdot x$ and the revenue function $R(x) = .75 \cdot x$. Which of the following is true?

   A. The fixed costs equal 1200.
   B. The profit function is $\Pi(x) = 2400 + .25 \cdot x$.
   C. At the break-even point, the company produces 9600 widgets.
   D. The variable cost per unit is .75.
   E. None of the above is true.

7. The amount of skin on a human is proportional to the square of the human's height. If a 6 foot tall human has 30 square feet of skin, then a 5 foot tall human has approximately how much skin?

   A. 20.83 sq. ft. B. 22.31 sq. ft. C. 23.66 sq. ft. D. 25.00 sq. ft. E. 25.66 sq. ft.



8. This problem refers to the three graphs above. Which of the following could be true?

    A. f is an exponential function, g is a power function, and h is decreasing.
    B. f is an increasing function, g is an exponential function, and h is a linear function.
    C. f is a power function, g is concave down, and h is a power function.
    D. f is concave up, g is a power function, and h is an exponential function.
    E. None of the above statements are true.

9. This problem refers to the three graphs above. Which of the following could be true?

    A. f represents the proportionality of the area of a circle to the square of its radius.
    B. g represents the amount of money in a savings account earning 10% compounded continuously.
    C. h represents the propotionality of the price of a product and the quantity supplied at that price.
    D. All of the above statements could be true.
    E. None of the above statements could be true.

10. The population of a certain beetle is known to be declining at an exponential rate. Suppose that the population has declined by 40% over the past 5 years. How long does it take the population to decline by 60%?

    A. 8.97 B. 7.50 C. 5.33 D. 2.79 E. None of the preceding

11. Your uncle buys a \$50 savings bond that earns 8% per year compounded annually. Approximately how long will it take before the bond is worth \$1,000.

    A. 34 years B. 39 years C. 42 years D. 47 years E. None of the preceding

12. The annual rate of return on a certain investment is 7.2% compounded continuously. For this investment to grow to be approximately \$10,000 in 8 years, you should now invest

    A. \$3456.33 B. \$ 3683.28 C. \$ 4189.73 D. \$4867.52 E. None of the preceding

13. If $f(x) = 4x - 5$, then $2 \cdot f(x-2)$ equals

    A. $8x - 10$ B. $8x - 16$ C. $8x - 21$ D. $8x - 26$ E. None of the preceding

14. The following incomplete table represents an exponential function.

t	3	6	9
$P(t)$	300	900	

    The missing entry, $P(9)$, equals

    A. 2700 B. 1200 C. 1000 D. 600 E. None of the preceding

15. Your laboratory will receive two shipments each containing 200 black mice. One arrives today and another will arrive one month from now. Assuming that the number of mice grows by 10% each month, how many mice will you have in 2 months?

    A. 400 B. 440 C. 462 D. 500 E. None of the preceding