# Mathematics 122 Test #1   Name: _____

You are to use your own calculator, no sharing.

Show your work to get credit. This means that if you use your calculator to solve a problem, then you have to write a sentence telling how you used it to do the calculations. (That is if you graphed it and zoomed in then say that is what you did etc.)

1. (10 points.) Right after a certain drug is administered to a patient with a rapid heart rate, the heart rate plunges dramatically and then slowly rises as the drug wears off. Sketch a possible graph of the heart rate against time starting from just a little before the drug was administered. Label the axis of your graph.

2. (10 points) The following is a graph of r as function of p.
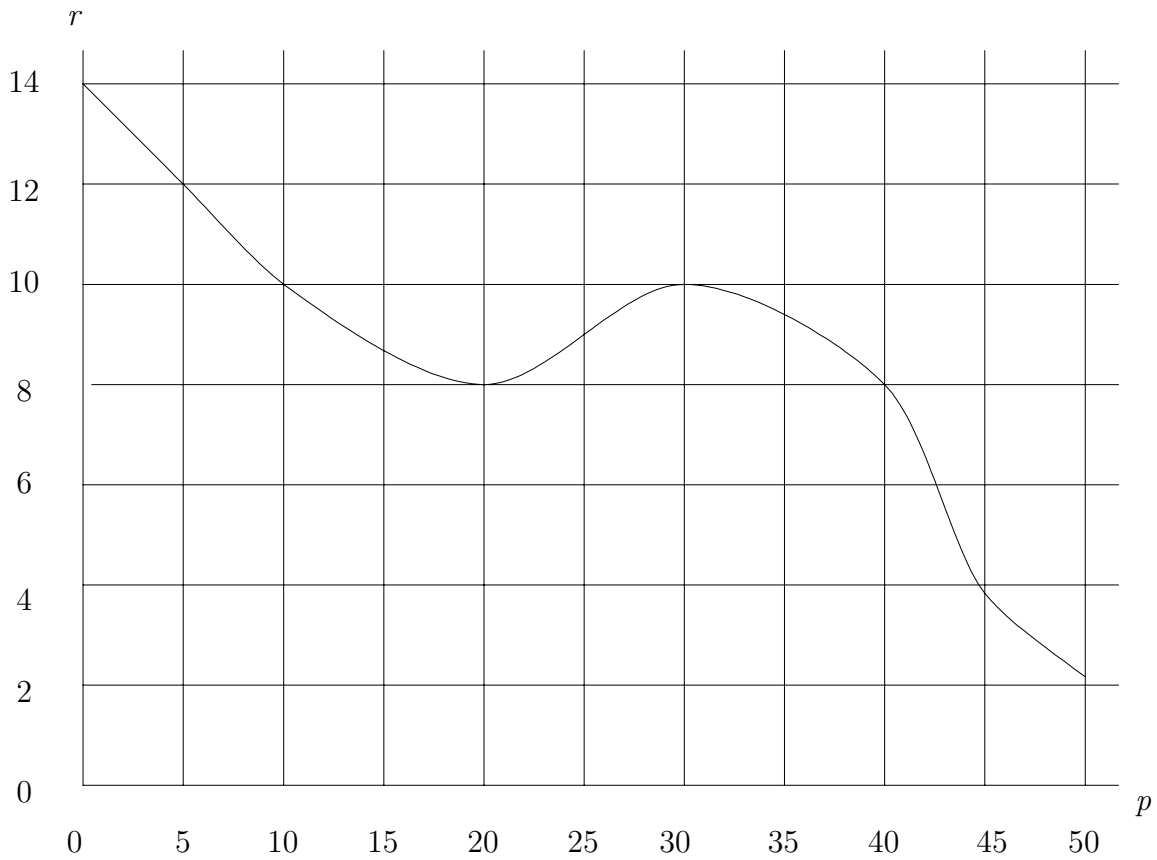
(a) What is the value of r when $p = 45$?   _____

(b) For what values of p is $r = 10$?   _____

(c) What is the average rate of change of r with respect to p between $p = 30$ and $p = 45$?

_____

(d) What is the largest that r becomes?   _____

(e) What value of p makes r the largest?   _____

3. (5 points) Find the slope, x-intercept, y-intercept and the value of y when $x = -4$ for the line $5x - 2y = 7$

Slope= _____

x-intercept= _____

y-intercept= _____

Value of y when $x = -4$ _____

4. (5 points) Find the equation of the line through $(5, 4)$ with slope $\dfrac{4}{3}$.

_____

5. (10 points) Corresponding values of r and s are given by the table:

r	1	2	4	7
s	-4	-1	5	14

Assuming that the relationship between r and s is linear answer the following:

(a) Find r as a linear function of s

_____

(b) Find s as a linear function of r

_____

(c) Find the value of s when $r = 20$ $s=$ _____

6. (10 points) In 1990 there were 500 acres of kudzu growing in Richland county. Assume that each year the amount of kudzu increases by 15%.

(a) Give a formula for the number of acres $K(t)$ of kudzu in Richland county t year after 1990.

$$K(t) = \underline{\hspace{6cm}}$$

(b) How many acres of kudzu will there be in 1998?

$$\underline{\hspace{6cm}}$$

(c) How long does it take for the number of acres of kudzu to double?

$$\underline{\hspace{6cm}}$$

7. (10 points) Find a solution to $3^x = 100 - x$ in the interval $1 \le x \le 6$ accurate to two decimal places. Be sure to write a sentence that explains how you got the answer.

8. (10 points) If the demand function for a product is $D(p) = 2000 - .15p$ and the supply function is $S(p) = 150 + .02p^2$. Then what is the equilibrium price for this product? Give your answer to at least one decimal place and explain how you got it.

_____

9. (10 points) The following table gives the some of the values of an exponential function $P = P(t)$.

t	0	1	2	3
$P(t)$	10	7.50	5.63	4.22

(a) What is the factor by which $P(t)$ changes when t is increased by 1?

_____

(b) What is a formula for $P(t)$ as a function of t?

$$P(t) = \text{_____}$$

(c) For what value of t is $P(t)$ one tenth of its initial value?

$$t = \text{_____}$$

10. (15 points) The table below shows the shows the total amount (in billions of dollars) spent by consumers on tobacco products in the US between 1987 and 1993.

Year	1987	1988	1989	1990	1991	1992	1993
Billions of dollars	35.6	36.2	40.5	43.4	45.4	50.9	50.5

(a) What is the total change in the amount spent on tobacco products between 1988 and 1992? (Show units on your answer.)

Total change = _____

(b) What is the average rate of change in the amount spent on tobacco products between 1988 and 1992? (Show units on your answer.)

Average rate of change = _____

(c) What is the average rate of change in the amount spent on tobacco products between 1992 and 1993? (Show units on your answer.)

Average rate of change = _____

(d) What is an estimate on the amount spent on tobacco products in 1994?

Amount spent in 1994 = _____

11. (5 points) Let $H(r) = r^3$. Then compute

   (a) The average rate of change of $H(r)$ between $r = 2$ and $r = 2.01$.

                                    _____

   (b) The average rate of change of $H(r)$ between $r = 2$ and $r = 2.001$.

                                    _____