**Sample Final Questions (Bring a SCIENTIFIC calculator to final)**

1) A box contains ten $1 bills, five $2 bills, three $5 bills, one $10 bill and one $100 bill. A person is charged $10 to select one bill. Find the expected value for this game. Is the game fair? Why or why not?

2) Let A = {2,3,4,7} and B = {1,2,5,7,8} C= {1,5} with U being the universal set where U = {0,1,2,3,4,5,6,7,8,9}.

a) Correctly fill in the Venn diagram   for parts b) – f) Please list all elements in increasing order
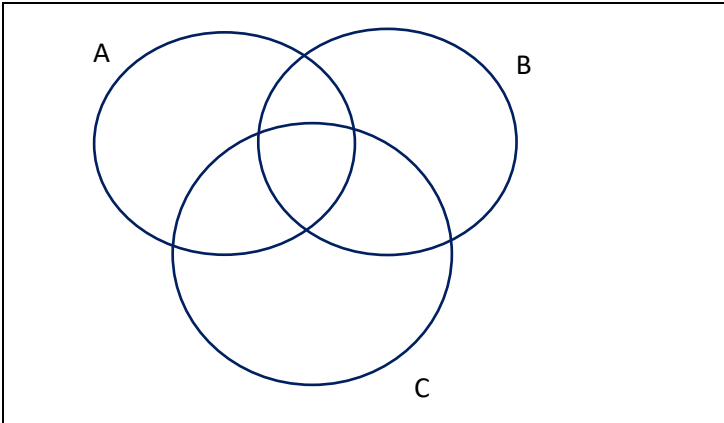
b) Find B'

c) Find $A \cap C$

d) Find $A \cup B$

e) Find $n(A \cap B)$

f) $A \cap B'$

g) $(A \cap B) \cup C$

3) Draw a two set Venn Diagram and shade: $(A \cap B)'$

4) On the imaginary planet Sunev they have an alphabet which contains 40 letters. (<u>You do not simplify your answers in this problem, just set up</u>)
   a) If a fraternity is named by 3 letters, how many names are possible if repetition is not allowed?
   b) If a fraternity is named by 3 letters how many names are possible if repetition is allowed?
   c) If a fraternity is named by two or three letters how many names are possibilities if repetition is not allowed?

5) Simplify. <u>Show all work</u>
   a) $\dfrac{n!}{(n-3)!}$ b) $5! + 0! + 1!$ c) $\dfrac{51!}{3!48!}$

6) The math department has 25 faculty members. Find :
   a) The number of ways they can select a chairperson, a co-chairperson and a media spokesman.
   b The number of ways they can select 4 people to be on the faculty senate.

7)   A committee of 5 people is to be chosen from a group of 16 people, of which exactly 7 are men. How many committees can be made if the committee consists of 3 women and 2 men? <u>Just set up, you don't need to simplify.</u>

8) Given the partially filled in Venn diagram with assigned probabilities find the following. Fill in the rest of the diagram first.

a) P(F)
b) P(E')

c) P(E U F)
d) P($E \cap F$)

e) P(E|F)

f) P(F|E')
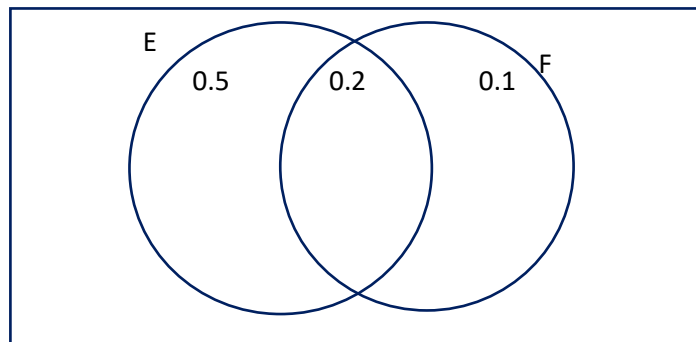
9) Use the chart to answer the following. Find the probability (to two decimal places) that a randomly selected person of the 150 is

What is your favorite sport to watch on television?			
	Football	Basketball	Baseball
Males	40	22	15
Females	12	16	45

a) Male or chooses baseball as favorite sport
b) male and chooses baseball as favorite sport
c) Not male
d) Chooses football as favorite sport
e) P(male given football is favorite sport)
f) P(football is favorite sport given male)

10) In a small high school of 150 students the following is known. Seventy-six students take a math class and forty-four take a chemistry class. Eighteen take both a math and a chemistry class.

a) Correctly construct and label the Venn diagram for this data.

b) how many took neither Math or Chemistry?

c) How many students took only Chemistry?

d) How many took math or chemistry?

11)   Suppose an urn contains 8 red balls, 5 yellow balls and 7 green balls. One ball is chosen at random, not replaced, then an other ball is chosen. Give answers as reduced fractions.

a) Draw and completely label a probability tree for this scenario

b) Find the probability both are yellow

c) find the probability the first is red and the 2nd is green.

d) find the probability the 2nd is red given that the first is green.

e) find the probability the first is red given the second is green.

12) Three cards are drawn at random (without replacement) from a regular deck of 52 cards. What is the probability that the first card is a heart, the second card is red, and the third card is black? Round your answer to three decimal places.

13) A new flu shot can prevent the flu 70% of the time. If 3 randomly selected people are given the flu shot, what is the probability that
a) All 3 people don't get the flu?
b) All 3 people get the flu?

14) The airline industry reports that 10% of ticketed passengers fail to show up on time for a scheduled flight. A scheduled flight of a jet with 26 seats is sold out. What is the probability that
a) Exactly 4 passengers don't show up on time? a) at least 1 passenger doesn't show up on time?

15) Suppose Video America has two plants manufacturing televisions. Plant 1 manufactures 90% of the televisions. At plant 1, 75 out of every 100 TVs are rated standard quality or better. At plant 2, 70 out of every 100 TVs are rated standard or better. What is the probability that the TV came from plant 1 if it is known that the TV is of standard quality?

16) Suppose Kim owes $1000 an pays $30 a month toward her bill. The amount owed at the end of each month is recorded.
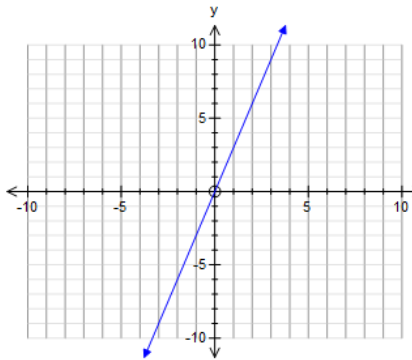   a) What is the rate of change? Include units.
   b) Write an equation showing the amount Kim owes at the end of x months.
   c) Use your equation to show how many months it would take to get the balance below $400.

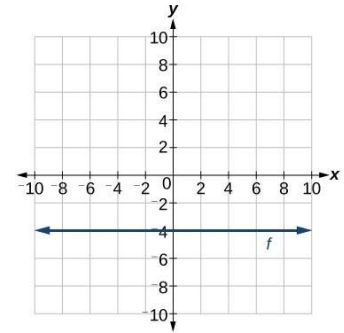17) Find the equations of the lines in slope-intercept form:

a)
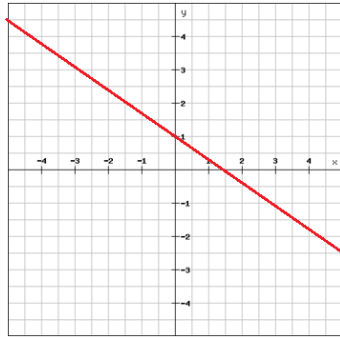
b

c)

18) A homeowner rents a floor sander in order to refinish his hardwood floors. The rental charge consists of a flat fee of $40 plus $26 per day for each day that the sander is checked out.

a) Write a linear equation that expresses the total rental charges for a rental term of x days.

b) Interpret the slope and y-intercept.

c) Use your equation to find the charge for renting a sander for 4 days.

d) how many days can a sander be rented for if the total is $200? Use your equation!

19) Triangle Ice Company sells 10-lb bags of ice to retailers for $1.10 per bag. The production cost per bag (including delivery to the retailer) is $0.80 and the weekly fixed costs are $8400.

a). Determine the revenue R from selling x bags of ice in a week.

b). Determine the cost C of producing and delivering x bags per week.

c). Determine the profit P from selling and delivering x bag in a week.

d). Determine the break-even point.

20). Find the equation of the line through (2, -4) and (8, 6).

21) Given linear equation. $19x - 16y = 31$ a) find the slope   b) find the x and y-intercepts.

22) Set up the following linear programming problems, **you don't need to solve:**

   a) An advertising company wants to attract new customers by placing a total cost of at most 10 ads in 3 newspapers. Each ad in the *Sentinel* costs $200 and will be read by 2000 people. Each ad in the *Journal* costs $200 and will be read by 500 people. Each add in the *Tribune* costs $100 and will be read by 1500 people. The company wants at least 16000 people to read its ads. How many ads should it place in each paper in order to minimize the advertising costs? What is the minimum cost? Just set up.

   b) An investor has at most $100,000 to invest in government bonds, mutual funds, and money market funds. The average yields for government bonds, mutual funds, and money market funds are 8%, 13% and 15% respectively. The investor's policy requires that the total amount invested in mutual funds and money market funds not exceed the amount invested in government bonds. How much should be invested in each type of investment in order to maximize the return? What is the return? Just set up.

3

23) The following augmented matrices represent systems of equations in terms of x, y and z. For each one state the general solution or that no solution exists.

a) $\begin{pmatrix} 1 & 0 & 0 & | & 4 \\ 1 & 1 & 1 & | & 12 \\ 0 & 0 & 0 & | & 0 \end{pmatrix}$

b) $\begin{pmatrix} 0 & 0 & 0 & | & 0 \\ 1 & 0 & 0 & | & 2 \\ 0 & 0 & 1 & | & 0 \\ 0 & 1 & 0 & | & 3 \end{pmatrix}$

c) $\begin{pmatrix} 1 & 0 & 0 & | & 7 \\ 0 & 0 & 0 & | & 3 \\ 0 & 1 & 0 & | & 2 \end{pmatrix}$

24) Consider the following linear programming problem.

Maximize P = 8x + 9y subject to the constraints:

$x \geq 0$, $y \geq 0$, $x + y \leq 11$, $5x + 6y \leq 60$

a) Sketch the feasible region and label the corner points

b) Solve the problem geometrically and report the complete solution.

25) At a price of $9 per box of oranges, the supply is 320,000 boxes and the demand is 200,000 boxes. At a price of $8.50 per box, the supply is 270,000 boxes and the demand is 300,000 boxes.

a) Find the price-supply equation in the form p=mx+b where p is the price in dollars and x is the corresponding supply in **thousands of boxes**.

b) Find the price-demand equation of the form p=mx+b where p is the price in dollars and x is the corresponding demand in **thousands of boxes.**

c) Find the equilibrium quantity and price.

26) Set up the following system. **You do NOT need to solve:**

A landscaping company placed two orders with a nursery. The first order was for 13 bushes and 4 trees, and totaled $487. The second order was for 6 bushes and 2 trees, and totaled $232. The bills do not list the per-item price. What were the costs of one bush and of one tree?

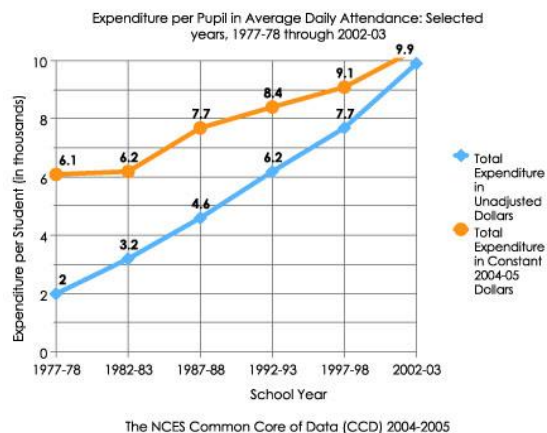27) Find the mean, median and mode: 25, 56, 38, 24, 48, 46, 51, 46

28) If the 38 was replaced by 102, would you expect the standard deviation to increase or decrease? Explain.

29)

Time it Takes to Get to School
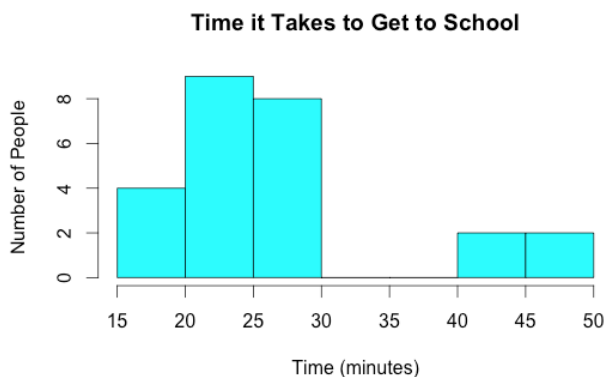
a) What percent of people take between 20-25 minutes to get to school?

b) What is the average (mean) time to get to school?

30)

Expenditure per Pupil in Average Daily Attendance: Selected years, 1977-78 through 2002-03

The NCES Common Core of Data (CCD) 2004-2005

What is the percent increase in total expenditure in Unadjusted Dollars from 1887-88 to 1997-98?