Name _____   Date _____

Calculating Blood Alcohol Concentration (BAC)
(The Widmark Formula)

Background

Formulas: **A** = Alcohol consumed in ounces (oz.)
              D = % alcohol written as a decimal (ex. 6% = 0.06 and 40% = 0.40)
              Wt = weight of person in pounds (lbs.)

Male Formula $\dfrac{(A)(D)(5.14)}{(Wt)(0.73)}$

Female Formula $\dfrac{(A)(D)(5.14)}{(Wt)(0.66)}$

Beer: 12 oz. serving is average @ 6% alcohol
Wine: 5 oz. serving is average @ 12% alcohol
Hard Liquor (shot):   1.25 oz @ 40% alcohol (80 proof)

When the alcohol is consumed over a long period of time, the following additional calculation is done.
  1. estimate the hours since drinking commenced
  2. multiply the hours x 0.015
  3. subtract this value from the BAC calculation
Entire calculation (for a male):

Male Formula $\dfrac{(A)(D)(5.14)}{(Wt)(0.73)}$ subtract   (0.015 x hours)

Example Problems:
185 pound <u>male</u> consumes one beer.

$$\frac{(12oz)(0.06)(5.14)}{(185)(0.73)} = \frac{3.7008}{135.05} = 0.03 \text{ BAC}$$

120 pound <u>female</u> drinks one beer.

$$\frac{(1\ oz)(0.0\ )(5.1\ )}{(1\ )(0.6\ )} = \frac{3.7008}{79.2} = 0.05 \text{ BAC}$$
2   6
0

Problems:

1. A 150 lb man has 2 beers, determine his BAC.

                                                                BAC= _____

2. A 112 lb woman has 3 glasses of wine. Determine her BAC.

                                                                BAC= _____

3. The same 112 lb woman has 3 beers. Determine her BAC.

                                                                BAC= _____

4. The same 112 lb woman has 3 rum and cokes. Determine her BAC.

                                                                BAC= _____

5. How many ounces of beer would a 200 lb man need to consume to have the same BAC as the woman in question 3?

                                                                Ounces= _____

                                        How many beers would this be?_____

6. A 150 lb male consumed a six pack of beer over a 2.25 hour period of time. Determine the BAC for this person.

                                                                BAC= _____

7. A 110 lb female consumed 2 glasses of wine in a 2 hour period of time. Determine the BAC for this person.

BAC= _____

8. A 140 pound female has 3 mixed drinks one right after the other.
    a.   What is her BAC after consuming the 3 drinks?
    b.   What is her BAC three hours after finishing the last drink?

a. BAC= _____

b. BAC= _____

9. A police officer is investigating an auto accident. The officer looks at the evidence file and finds a tab from a local bar in his pocket. The bar tab was started at 9:15 PM and it shows that the 185 lb deceased male had 5 beers. The accident occurred at 2:30 AM. At the time of the accident, what was the BAC of the person?

BAC= _____

10. A 125 lb woman is pulled over by a police officer. The officer gives her the field sobriety tests, and then the officer gives her a BAC test. The test indicates a BAC of 0.085. The woman claimed she drank only two glasses of wine in the past four hours. If she truthfully drank wine and it was within the last four hours, then how many glasses of wine did she really have?

Glasses of wine = _____