Name _____ Date _____ Period _____

Genetics Practice Problems #4 - ABO Multiple Allele Worksheet 1

Directions: Given the alleles, genotypes and phenotypes for human blood typing ABO, solve the following multiple allele problems. Recall that A and B alleles are co-dominant and O is recessive. A = B > O. When figuring out problems don't forget that there are two ways to observe the Blood Type A and Blood Type B phenotypes

Phenotypes	Genotypes
A	I^AI^A, I^Ai^O
B	I^BI^B, I^Bi^O
AB	I^AI^B
O	i^Oi^O

1. What is the expected genotypic ratio among children born to a mother having the genotype I^Ai^O and a father with the phenotype AB?

	A	B
A	AA	AB
O	AO	BO

$1\ I^AI^A : 1\ I^AI^B : 1\ I^Ai^O : 1\ I^Bi^O$

2. One parent has the blood type A and the other blood type B. What are the genotypes of the parents if they produce children with only blood type AB? Answer: I^AI^A I^BI^B

possibilities

1) $I^AI^A \times I^BI^B$ →

	A	A
B	AB	AB

2) $I^AI^O \times I^BI^B$

3) $I^AI^A \times I^BI^O$ etc. > Not all children would produce Type AB!

	A	A
B	AB	AB

3. One parent has the blood type A and the other blood type B. What are the genotypes of the parents if 1/2 the offspring are AB and the other 1/2 A?

$I^AI^A \times I^BI^O$

	B	O
A	AB	AO
A	AB	AO

4. One parent has the blood type A and the other blood type B. What are the genotypes of the parents if the offspring produce the following blood types...1/4 AB, 1/4 A, 1/4 B, and 1/4 O?

$I^AI^O \times I^BI^O$

	B	O
A	AB	AO
O	BO	OO

5. From the following blood types, determine which baby belongs to which parents.

Baby 1 belongs to the Doe Family Baby 2 belongs to the Jones Family

Mrs. Doe.....Type A
Mr. Doe .....Type A

Mrs. Jones ..... Type A
Mr. Jones ..... Type AB

Baby 1 ..... Type O
Baby 2 ..... Type B

Baby # 1 = Doe

	A	O
A	AA	AO
O	AO	OO - 25%

Baby # 2 = Jones

	A	B
A	AA	AB
O	AO	BO - 25%

6. In a particular family, one parent has Type A blood, the other has Type B. They have four children. One has Type A, one has Type B, one has Type AB, and the last has Type O. What are the genotypes of all six people in this family?

	B	O
A	AB	AO
O	BO	OO

Parents: $I^A I^O \times I^B I^O$

Children: $I^A I^B$, $I^A I^O$, $I^B I^O$, $I^O I^O$

Extra Credit - Hand in for Marks!

7. Another woman has the same problem. Her blood type is A, her child's is B. She again has three candidates for fatherhood. Their blood types are: Man #1, B; Man #2, AB; Man #3, O. Based on blood types, the mother says it must have been #1.

a. Do you agree? Why or why not?

b. This child, a son this time, is also colorblind. The only one of the men in question to share this characteristic is #2. The mother is not colorblind. Can you now determine who the father of the little boy is, assuming it must be one of these men? Explain your answer.