Review Sheet

The purpose of this review sheet is to demonstrate how to remove the incentive to overstate one's net benefits. It is crucial to remember that the chief obstacle that one faces in overstating one's benefits is the information required to do so. You do not know the other voter's willingness to pay (but you could guess). In addition, what really matters is whether you are risk averse. If you are risk averse, you would not be willing to risk the chance of becoming pivotal for the possibility of increased Clarke taxes. If you are risk seeking, you would like to make this gamble.

	Policy 1	**Policy 2**	**Clarke Tax**
Voter 1	$40		19
Voter 2		$30	0
Voter 3	$11		0

If voter 2 exaggerates up to $39 he can earn an additional $9 for a total of $28 in Clarke taxes.

Essentially the risk of over stating your preferences is having to pay Clarke taxes. The problem of asymmetric information may prevent voters from taking advantage of this feature. How are you to know the willingness to pay of your fellow voters? It also depends upon whether a person is *risk averse* or risk-seeking.

Now let's use Martin Bailey's formula from page 216:

$$\text{Formula} = \frac{\text{Clarke taxes if voter } x \text{ was not present}}{\text{Total number of voters}} = \frac{(S-i)}{N}$$

	Policy 1	**Policy 2**	**Clarke Tax**
Voter 1	$40		31
Voter 2		$30	0
Voter 3	$11		0
Voter 4		$12	0

Bailey's Simple method

In this case, if we did not apply Bailey's method then voters 2 and 4 would receive $31/2 =$15.5.

Now as per Bailey's Simple Method this would be reduced to $7.75 such that voters 2, 3, and 4 would receive a Clarke tax payment of $7.75 each. This means that about $7.75 of the Clarke tax would be wasted, or could be used to cover the cost of implementing the procedure.

There is also a slightly more complex, and actually more correct formula:

Bailey's Complex Method

$$\frac{S\text{-}i \cdot (N-2)}{(N-1)^2}$$

In this formula, S-i: The Clarke tax
N=Total number of participants in the system.

Let's apply this formula to the example above. Since N=4, you would multiply the Clarke taxes to be paid by 2/9. In other words (31 · 2/9). Now each voter would get $6.89 (except for the one who pays the Clarke tax).

Why is this important

Why is this important? Let's assume voter 2 wants to "milk" as much money out of voter 1 possible (ala the Clarke tax). He can overstate his net benefits up to $38 (from $3) without becoming pivotal (and hence paying Clarke taxes). If he does so, voter one would pay $39 in Clarke taxes. Divided between voters 2,3,4 each would now receive $9.75 in Clarke taxes instead of $7.75. Adjust this with Bailey's complex method and each voter gets a Clarke tax of $8.67 (instead of $6.88).

Now assume that we did not use any of Bailey's adjusted formulas, and voter 2 overstates their value to be $38. If we split this evenly between the two winners, each would receive a whopping Clarke tax of $19! This is much greater than one of $8.44. So Bailey's adjusted formulas *reduce* an individual's incentive to overstate their preferences. I would note that Bailey's formulas are designed more for the **incentive compatibility problem**. If there is a surplus, then voters can adjust their preferences to try and acquire it for themselves. In other words, they're true preferences have been altered by the mechanism, and they are not honestly revealing them. This is the incentive compatibility problem.

Why is this useful? Well, it particularly helps with the problem of budget balancing.

Take a look at the following example:

	War	Peace	Clarke Tax
Voter 1	$200		0
Voter 2		$1000	$200

Now let's assume Voter 1 overstates their net benefit to be $999.
Under complete payment, Voter two would not pay a $999 incentive tax. If legislatures or some organization were conducting this VCG "experiment" than there would only be $1 left to cover the costs of covering it.

If we use Bailey's simplified method S-i/N than we get $999 /2 which is $499.5, so balanced budget is no longer a problem. You still have $499.5 left in the treasury to cover costs of the legislature. Waste, however could be a problem.