1. What factors would contribute to underinvestment in education in the absence of government intervention?

2. Why is the local provision of public education preferable under the Tiebout Model?

3. What are the benefits and costs of centralizing public education?

4. Graphically show the difference between a binding and non-binding restricted block grant to fund education expenditures. Illustrate the size of the grant and the corresponding change in education expenditures for an example district operating efficiently in each case.

5. A community has preferences for education (R) and non-education (X) spending described by the following community utility function:

\[ U(R, X) = R^{2/3} X^{2/3} \]

The values of R and X in the above equation are expressed in dollars. The community has $100 to spend on R and X, and thus faces the following budget constraint:

\[ 100 = R + X \]

How much does the community spend on R and X? Graph your solution.

Now suppose that the state government decides to issue a restricted block grant to the community of $30 that must be spent on education. How much does the community spend on R and X now? Graph your solution.

How does the size of the grant compare to the increase in educational expenditures in the community? Does it matter that the grant was restricted to be spent on education? How would you show this?

6. For a community determining how to allocate resources between education and non-education expenditures, show how a 1-for-4 matching grant on education expenditures (i.e., the central government commits to providing $1 for every $4 spent on education) affects the budget constraint. Show an example of a community moving between the two
budget constraints, optimizing utility, and the income and substitution effects of the grant on education expenditures.

7. A community has preferences for education (R) and non-education (X) spending described by the following community utility function:

\[ U(R, X) = R^{1/2} X^{1/2} \]

The values of R and X in the above equation are expressed in dollars. The community has $120 to spend on R and X, and thus faces the following budget constraint:

\[ 120 = R + X \]

Find the utility maximizing bundle of R and X.

Now suppose the central government introduces a 1-for-2 matching grant (i.e., the government will provide one extra dollar for education spending for every $2 contributed by the community).

Write down and graph the new budget constraint and identify the new optimal amount of R and X with the matching grant.

Would this community prefer the matching grant program or an unrestricted block grant that increased the total budget for R and X by $20?

8. Use a graph to show how a foundational block grant will affect the budget for education (R) and non-education (X) expenditures for a qualifying low-income community. What is the qualifying condition for a standard foundational block grant?

Can a district receive the grant but still spend less on education than the foundation level? Provide graphical support for your answer.

9. Consider an economy of families who can spend money on education for their children (S) and a composite alternative good (X). Both are normal goods for all families. Use a graphical analysis to support the following argument: the provision of some level of quality of education, S*, by the government, will concentrate the level of education that individuals receive at S*.

Using your graph(s), answer the following questions:

a. Is there any theoretical case for a family to choose a level of education below S* for their children? If so, what can you say about families that would choose education below S*?
b. Is there any theoretical case for a family to choose a level of education above $S^*$ for their children? If so, what can you say about families that would choose education above $S^*$?

10. Consider a utility-maximizing family that has the following utility function that depends on the quality of education for their child, $S$, and a composite alternative good, $X$:

$$U(S, X) = S^{1/5} X^{4/5}$$

The cost of a unit of $S$=$100 and a unit of $X$=$50. The family has an annual budget of $2000 after taxes.

a. Find the unconstrained optimal bundle of $S$ and $X$ for this family.

b. Suppose the government provides public education at no direct cost to families at a level of $S^*$=3. What is the optimal bundle for this family now?

c. Finally, suppose that rather than providing education directly, the government gives a voucher to families with children that has a value of $300, which must be used for education. Now what is the optimal bundle for this family?