<u>Homework Assignment #2: Answer Key</u>

1. a.

		Before	After	Gains
Poorest 20%	:	$ 12,338	$ 11,674	$- 664
Next 20%	:	$ 30,295	$ 29,594	$- 701
Next 20%	:	$ 50,709	$ 49,591	$-1,118
Next 20%	:	$ 78,922	$ 78,495	$- 427
Richest 20%	:	$168,302	$172,941	$ 4,639
Average	:	$ 68,113	$ 68,459	$ 346

Since average income is higher after the program than before, and since the gains outweigh the losses, it satisfies the Kaldor-Hicks Criterion.

b. To satisfy the full compensation criterion the richest 20% will need to raise the income of the poorest 80% by $2,910. This will cost (1.2)(2,910) = $3,492 still leaving the rich with a gain of $1,147 so the plan satisfies full compensation as well.

c. Given the fact that there is such a disparity between the top and the bottom (roughly 13 to 1) and the fact that the compensation can be done at a reasonable cost (20%), it is probably reasonable to do so.

d. No. Each of the poorest four income quintiles is worse off under the plan. In other words, this makes the poorest 20%, the poorest 40%, poorest 60%, and poorest 80% worse off. Thus, the Willig-Bailey Criterion of no undesirable transfers is violated.

e. Use initial starting points. (Before transfer.)

F(y) $= (y/y_{avg})^{-d}$ d = 1
F(bottom 20%) $= (12338/68113)^{-1} = 5.521$
F(next 20%) $= (30295/68113)^{-1} = 2.248$
F(next 20%) $= (50709/68113)^{-1} = 1.343$
F(next 20%) $= (78992/68113)^{-1} = 0.862$
F(top 20%) $= (168302/68113)^{-1} = 0.405$

f. Weighted gain = 5.521(-664) + 2.248(-701) + 1.343(-1118) + 0.862(-427) + 0.405(4639) =
= (-3665.9) +(-1575.8) +(-1501.5) + (-368.1) + (1878.8) = -5,232.5

g. This project has positive benefits under some criteria and negative under others. One should probably recommend this program but with reservations like requiring an attempt at compensation for poorer individuals.

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2. a. C = \$1,000, B = \$5,000/$(1+.03)^{60}$ = \$848.67. Since C > B reject the program.

   b. C = \$1,000, B = [.8(0) + .2(25,000)]/$(1+.03)^{60}$ = \$848.67. Since C > B reject the program.

   c. U (no program) = U(40,000) + U(35,000)/$(1+.03)^{60}$ = 200 + 31.754 = 231.754
   U (program) = U(39,000) + U(40,000)/$(1+.03)^{60}$ = 197.484 + 33.947 = 231.431
   The utility is lower under the program rather than without the program, so reject the program.

   d. U (no program) = U(40,000) + .2[U(15,000)/$(1+.03)^{60}$] + .8[U(40,000)/$(1+.03)^{60}$] = 200 + 27.154 + 4.158 = 231.312
   U (program) = U(39,000) + U(40,000)/$(1+.03)^{60}$ = 197.484 + 33.947 = 231.431
   The utility is higher under the program rather than without the program, so accept the program.

   e. U (no program) = U(40,000) + U(65,000)/$(1+.03)^{60}$ = 200 + 43.274 = 243.274
   U (program) = U(39,000) + U(70,000)/$(1+.03)^{60}$ = 197.484 + 44.907 = 242.391
   The utility is lower under the program rather than without the program, so reject the program.

   f. U (no program) = U(40,000) + .2[U(45,000)/$(1+.03)^{60}$] + .8[U(70,000)/$(1+.03)^{60}$] = 200 + 35.926 + 7.201 = 243.127
   U (program) = U(39,000) + U(70,000)/$(1+.03)^{60}$ = 197.484 + 44.907 = 242.391
   The utility is lower under the program rather than without the program, so reject the program.

   Just a couple of comments. First, under risk neutrality, uncertainty about the future doesn't change the results if the expected value is unchanged. Thus we reject the project in both parts a. and b. However, when people are risk averse, they will pay a premium to avoid the really bad outcome. Of course, this is why we pay insurance premiums. Thus, while we reject the project in part c., we accept it in part d. Finally, as people get richer, "bad" outcomes have less effect on them even if they are risk averse. Thus, we reject the project in both parts e. and f. It doesn't seem to make sense to harm this generation in order to benefit a far richer future generation.

3. This question will be part of Homework Assignment #3.