

**Recitation Handout 11: Can We Win the War on Drugs?**

This recitation was designed to help you to:

1. Learn about a technique for finding approximate numerical values of an anti-derivative called Euler's Method.
2. Calculate approximate values of a function using information about the rate of change and Euler's method.
3. Practice the skill of sketching the graph of a function, given the graph of the derivative.
4. Reconstruct the equation of a polynomial function given the equation of the derivative.
5. Examine the cost-effectiveness of the War on Drugs.

**Part 1: Introduction**

Building on legislation passed during Johnson Administration, President Nixon officially began the federal government's War on Drugs in earnest during the late 1960's and early 1970's. In a press conference held on June 17, 1971, President Nixon first uttered the phrase "...war on drugs..." describing drug abuse as "...public enemy number one for the United States<sup>1</sup>." President Nixon set up a number of government organizations to combat drug abuse, culminating with the "super agency" of the Drug Enforcement Agency (DEA) founded in July 1973.

The DEA consolidated the drug enforcement efforts of a number of offices and agencies and quickly earned a reputation for zealous "cowboy" style law enforcement that stretched the limits of the Fourth Amendment to breaking point<sup>2</sup>. (Some of the major events and US government actions in the 30-year history of the "War on Drugs" are shown in Figure 2<sup>3</sup>.)

During the long and controversial history of the War on Drugs, a number of different approaches have been emphasized in the federal government's efforts to eradicate consumption of illicit drugs.

The Johnson, Nixon and (to a much more limited extent) Carter administrations largely viewed illicit drug use a public health issue best dealt with by trained psychiatrists, social workers and addiction specialists.

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<sup>1</sup> Source: The Richard Nixon Library, <http://www.nixonfoundation.org/>

<sup>2</sup> Source: <http://www.pbs.org/wgbh/pages/frontline/shows/drugs/>

<sup>3</sup> Sources: PBS, <http://www.pbs.org/>

Image sources: Linden B. Johnson Library, Richard Nixon Library, Gerald Ford Library, Ronald Reagan Library, George H. Bush Library, William Clinton Foundation and Library Project, CNN, Newsweek, <http://www.cocaine.org/>, The White House Office of National Drug Control Policy, Cannabis News, PBS, U.S. Department of Justice, Drug Enforcement Agency.

# SOLUTIONS

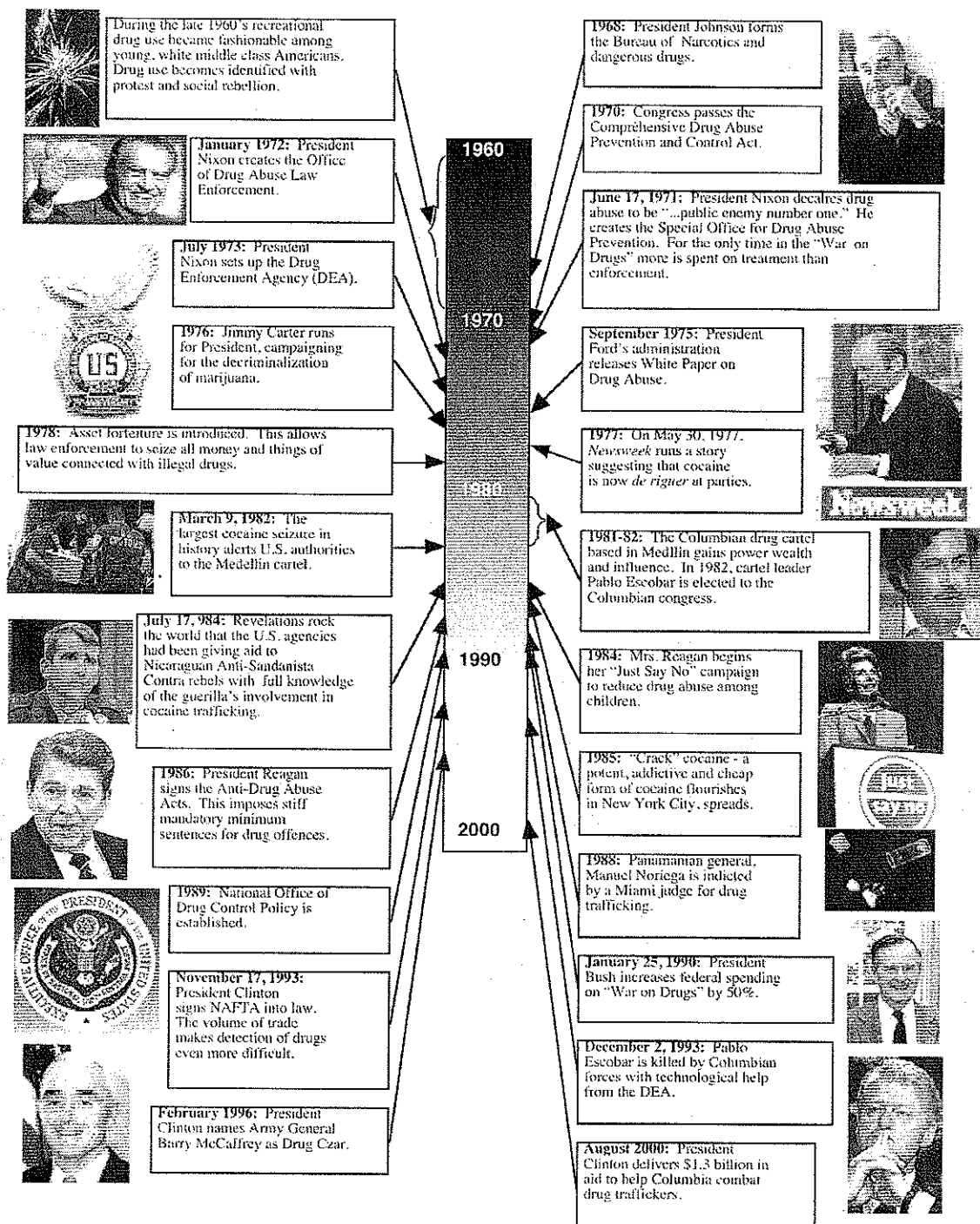


Figure 2: A selective time-line of events from the 30 year "War on Drugs."

However, in 1980, President Carter lost the election to then California governor Ronald Reagan. President Reagan, and his Vice President George H. W. Bush, arrived in Washington with a strong law-and-order agenda and a get-tough-on-crime philosophy to match. During the first September of his presidency, Mr. Reagan addressed a conference of Police Chiefs at their annual meeting in New Orleans. During his speech, Mr. Reagan outlined a plan that would end the exclusionary rule (i.e. the rule that excludes illegally obtained evidence from criminal trials), involve the military in the drug war, abolish bail and parole for drug offenders, enlist the FBI in

## SOLUTIONS

the drug war, and begin the large-scale spraying of suspected drug cultivation areas with powerful herbicides<sup>4</sup>.

Mr. Reagan continued.

“More law and order rhetoric may be justified. The studies and surveys may still be needed. The blue ribbon panels may keep investigating. But in the end, the war on crime will only be won when an attitude of mind and a change of heart takes place in America, when certain truths take hold again and plant roots deep in our national consciousness, truths like: right and wrong matters; individuals are responsible for their actions; retribution should be swift and sure for those who prey on the innocent.”<sup>5</sup>

With this speech, President Regan shifted the blame for illicit drug use away from societal conditions that public health and treatment specialists tended to emphasize – conditions such as inequality, racism, and an absence of real economic prospects. In his speech, Mr. Reagan placed the blame squarely on the shoulders of the individual drug user. In this view, criminal acts such as selling and consuming illicit drugs were the immoral acts of bad people in whom a proper “...attitude of mind and change of heart...” had not taken root. According to this theory, the role of government in the War on Drugs was not to attempt to treat or reform immoral individuals, but to visit swift and sure retribution on those who, by their individual actions for which they are personally responsible, deserve it.

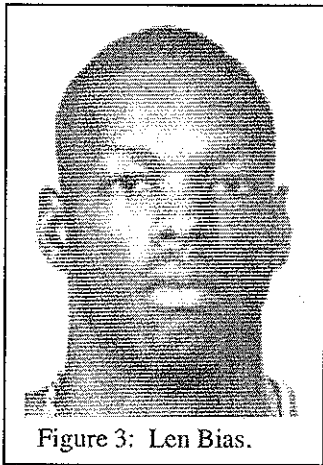


Figure 3: Len Bias.

Unsurprisingly, the emphasis of the early years of President Reagan’s administration was to combat drugs almost exclusively by means of conventional law enforcement. However, in 1986 this emphasis shifted yet again when young University of Maryland basketball star and Boston Celtics draftee Len Bias (see Figure 3<sup>6</sup>) died of cocaine poisoning on June 18, 1986. The death of Bias, followed soon after by the death of Cleveland Browns defensive back Don Rogers on July 28 due to cocaine poisoning, galvanized the United States Congress into action.

Between 1790 and 1986, the United States Congress had passed only fifty-eight laws that imposed mandatory minimum sentences. However, in the four months following the death of Len Bias, Congress added another twenty-nine to the list. With this flurry of legislative action, Congress had created another tool for dealing with the War on Drugs: Mandatory minimum sentencing.

Where does the War on Drugs stand now? The current administration has released its National Drug Control Strategy for 2009<sup>7</sup>. However, this document contains few descriptions of the current administration’s goals for persecuting the ongoing drug war. Instead, the national drug control strategy mainly describes programs initiated under President George W. Bush’s administration with the apparent intention of continuing with them. In only one portion of the

<sup>4</sup> Source: Baum, D. 1996. *Smoke and Mirrors. The War on Drugs and the Politics of Failure*. Boston MA: Back Bay Books.

<sup>5</sup> This excerpt of President Reagan’s speech was taken from the copy of the transcript on file at the Reagan Library. The speech was delivered on September 28, 1981, at the Rivergate Convention Center, New Orleans LA.

<sup>6</sup> Image source: <http://www.otal.umd.edu/>

<sup>7</sup> You can read it on-line at: <http://www.whitehousedrugpolicy.gov/>

# SOLUTIONS

current national drug control strategy was a measurable goal stated, and this had to do with increasing the percentage of drug shipments interdicted.

Under President Bush, the Office of National Drug Control Policy formulated some measurable goals by which to gauge their progress in the coming rounds of the ongoing drug war. The former National Drug Control Strategy Goals (formulated in 2002)<sup>8</sup> are:

- **Two Year Goals**
  - A 10% reduction in current use of illegal drugs by the 12-17 age group.
  - A 10% reduction in current use of illegal drugs by adults aged 18 and older.
- **Five Year Goals**
  - A 25% reduction in current use of illegal drugs by the 12-17 age group.
  - A 25% reduction in current use of illegal drugs by adults aged 18 and older.

In the next two parts of the recitation you will estimate the cost of achieving these goals and compare these estimates to the current ONDCP budget. Your immediate objective will be to determine how the ONDCP can achieve these goals in the most cost-effective way, and approximately how much this will cost.

## Part 2: Which approach to the War on Drugs is the most cost effective?

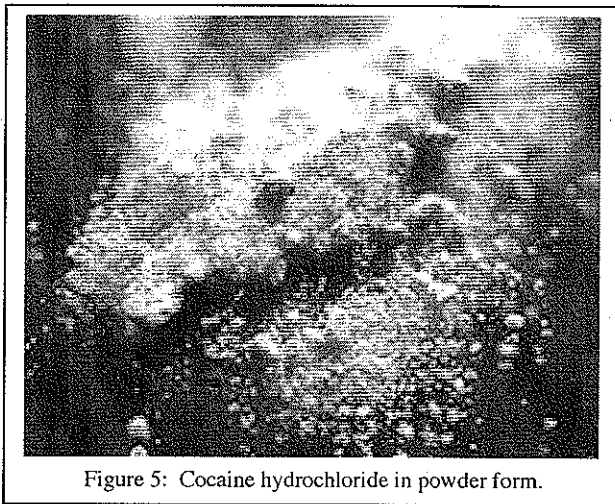


Figure 5: Cocaine hydrochloride in powder form.

In this section of the recitation you examine the cost-effectiveness of the three main strategies that have been employed in the federal government's War on Drugs. These are mandatory minimum sentences for drug offenses, conventional law enforcement and treatment for heavy users. In this section, your focus will be on government efforts to reduce consumption of cocaine (see Figure 5<sup>9</sup>) by Americans.

For each method of waging the War on Drugs, you are supplied with information about the rate (i.e. the derivative) at which cocaine consumption can be prevented. Your task is to reconstruct the original function.

In each case the original function is the cumulative total number of kilograms of cocaine consumption that can be prevented. The independent variable of this original function is the number of years that the method of waging the War on Drugs is actually used. In each case, we have assumed an annual budget of one million dollars.

<sup>8</sup> Source: Office of National Drug Control Policy: 2002. *National Drug Control Strategy*. Washington DC: Government Printing Office.

<sup>9</sup> Image source: <http://www.usdoj.gov/>

## SOLUTIONS

1. The table<sup>10</sup> given below shows the derivative when one million dollars is spent each year on mandatory minimum sentences for drug offenders. Use the table and Euler's Method to calculate the cumulative total kilograms of cocaine consumption that are prevented by mandatory minimum sentences for drug offenders.

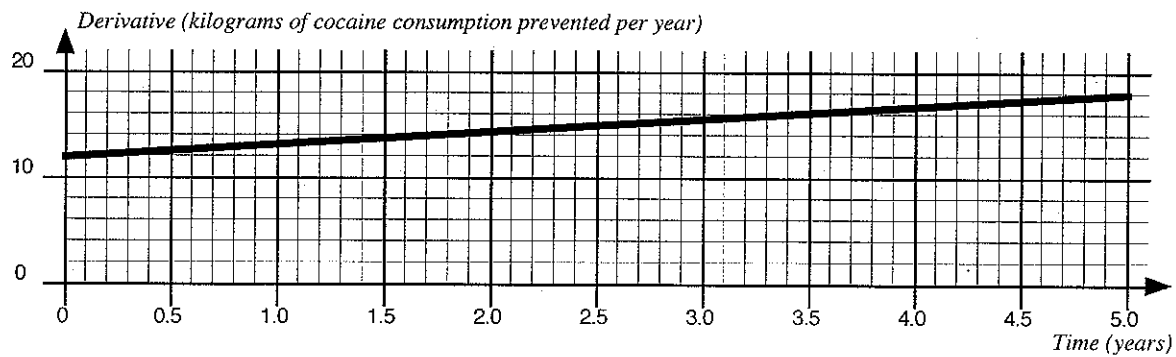
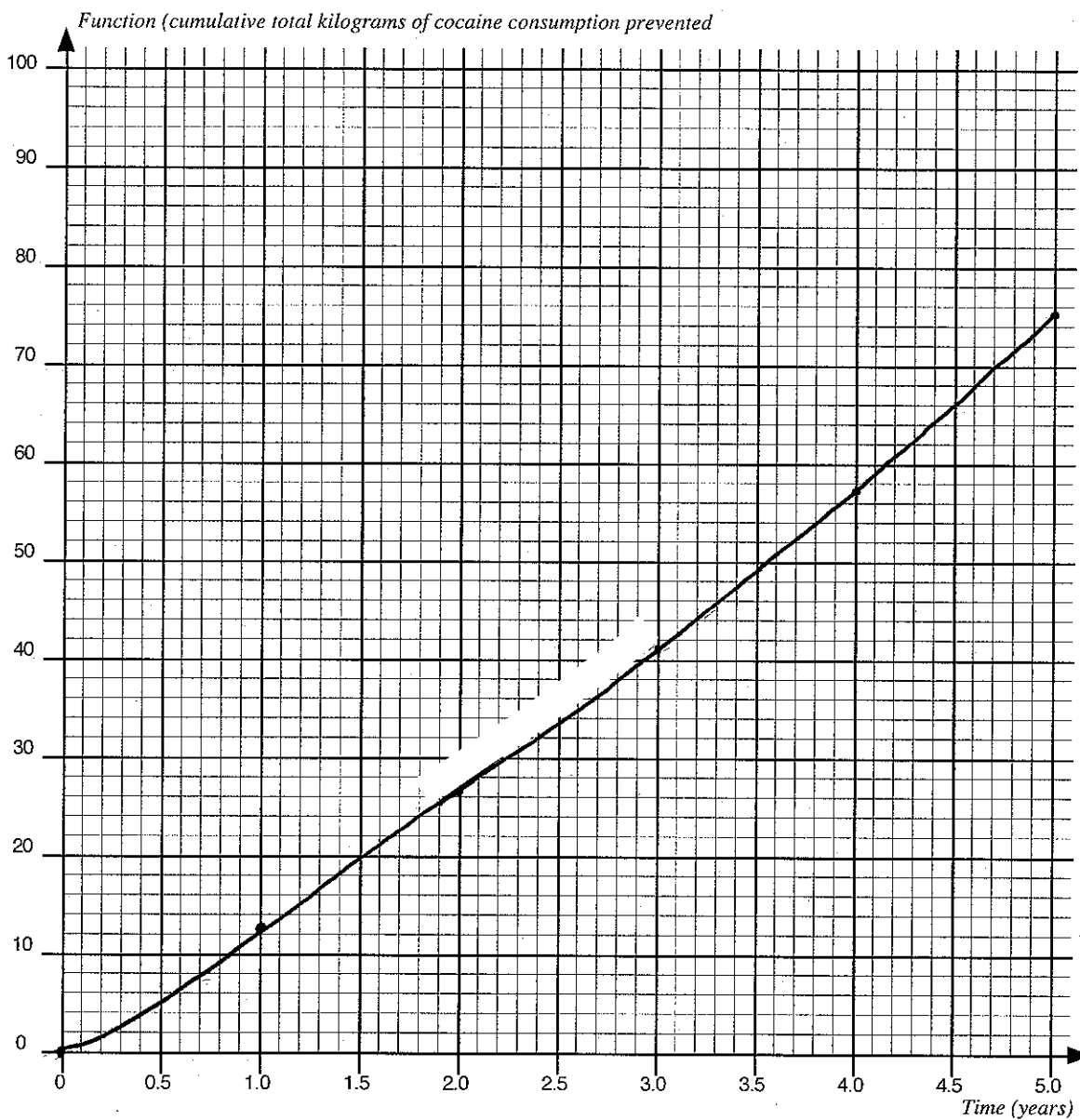
Time	Current total kilograms of cocaine consumption prevented	Rate at which cocaine consumption is prevented (kilograms per year)	Amount of cocaine consumption prevented in the next year (kilograms)	New total kilograms of cocaine consumption prevented
0	0	68.13	68.13	68.13
1	68.13	26.37	26.37	94.5
2	94.5	16.48	16.48	110.98
3	110.98	12.09	12.09	123.07
4	123.07	10.44	10.44	133.51
5	133.51	9.89	9.89	143.40

2. The graph<sup>11</sup> given at the bottom of the next page shows the derivative when one million dollars is spent every year on conventional law enforcement. Use the axes provided to sketch a graph showing the cumulative total kilograms of cocaine consumption that are prevented by conventional law enforcement. (At time zero, no cocaine consumption has been prevented so your graph should start off at the point (0, 0).)

<sup>10</sup> The rate data included in the table is adapted from data contained in: Caulkins, J. P., C. R. Rydell, W. L. Schwabe and J. Chelsea. *Mandatory Minimum Sentences: Throwing Away the Key or the Taxpayer's Money?* Lanham MD: National Book Network.

<sup>11</sup> The graph shown here is adapted from data contained in: Caulkins, J. P., C. R. Rydell, W. L. Schwabe and J. Chelsea. *Mandatory Minimum Sentences: Throwing Away the Key or the Taxpayer's Money?* Lanham MD: National Book Network.

# SOLUTIONS



## SOLUTIONS

3. Let  $x$  represent the number of years that treatment<sup>12</sup> has been offered to heavy cocaine users, and  $f(x)$  the cumulative total number of kilograms of cocaine consumption that have been prevented when one million dollars have been spent on treating the addictions of heavy cocaine users. The derivative of this function is given by the equation<sup>13</sup>:

$$f'(x) = 6.2 \cdot x + 11.38.$$

Find an equation for the original function  $f(x)$ . Remember that when no time has elapsed, no cocaine consumption has been prevented, so your equation should satisfy  $f(0) = 0$ .

$$f(x) = 3.1 x^2 + 11.38 x$$

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<sup>12</sup> As with mandatory sentences and conventional law enforcement, an annual budget of one million dollars is assumed here also.

<sup>13</sup> The equation for the derivative was obtained by performing regression analysis on data contained in: Caulkins, J. P., C. R. Rydell, W. L. Schwabe and J. Chelsea. *Mandatory Minimum Sentences: Throwing Away the Key or the Taxpayer's Money?* Lanham MD: National Book Network.

# SOLUTIONS

## Part 3: How much should it cost to achieve the two and five year National Drug Control Strategy goals?

According to the Office of National Drug Control Policy<sup>14</sup>, between 1996 and 1999, each year an average of 291,750 kilograms of cocaine were sold to and used by people aged 12 and older<sup>15</sup>.

To achieve the two-year National Drug Control Strategy for cocaine alone<sup>16</sup>, the amount of cocaine consumed in the United States would have to be reduced by about 5.2% per year. Given the above figure, this means that in order to achieve the two-year goals, cocaine consumption must be reduced by 15,171 kilograms for both of the next two years<sup>17</sup>. Cumulatively, this means over the course of the next two years, consumption of 30,342 kilograms of cocaine must be prevented in order to achieve the two years goals of the National Drug Control Strategy.

4. Use the figures given above together with the graphs that you made in Part 2 of the recitation to complete the table given below.

Method of preventing cocaine consumption	Amount of cocaine consumption that can be prevented in two years with a budget of \$1 million per year (kilograms of cocaine)	Amount of spending required each year for the next two years to achieve the two-year goals of the National Drug Control strategy (\$ millions)
Mandatory minimum sentences for drug offenders	94.5	$\frac{30\ 342}{94.5} = 321.08$
Conventional law enforcement	26.4	$\frac{30\ 342}{26.4} = 1149.32$
Treatment for heavy cocaine users	35.16	$\frac{30\ 342}{35.16} = 862.97$

In order to achieve the five-year National Drug Control Strategy for cocaine alone, the amount of cocaine consumed in the United States will have to be reduced by about 5.6% per year. In absolute terms, this means that consumption of cocaine must be reduced by 16,312 kilograms every year for the next five years<sup>18</sup>. Cumulatively, this means that over the course of the next

<sup>14</sup> Source: Office of National Drug Control Policy. 2000. *Estimation of Cocaine Availability, 1996-1999*. Washington DC: Government Printing Office.

<sup>15</sup> Source: Johnston, L. D., P. M. O'Malley and J. G. Bachman. 2002. *Monitoring the Future National Survey Results on Drug Use, 1975-2001. Volume 1: Secondary School Students*. Bethesda MD: National Institute on Drug Abuse.

<sup>16</sup> The major categories of illicit drugs listed on the ONDCP website include: club drugs, cocaine, crack, heroin, inhalants, LSD, marijuana, methamphetamine and steroids.

<sup>17</sup> To be completely truthful, this is a slight over-estimate. When you learn about geometric series in Math 122 we will be able to refine this estimate.

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## SOLUTIONS

five years, consumption of 81,562 kilograms of cocaine must be prevented in order to achieve the five-years goal of the National Drug Control Strategy.

5. Use the figures given above together with the graphs that you made in Part 2 of the recitation to complete the table given below.

Method of preventing cocaine consumption	Amount of cocaine consumption that can be prevented in five years with a budget of \$1 million per year (kilograms of cocaine)	Amount of spending required each year for the next five years to achieve the five-year goals of the National Drug Control strategy (\$ millions)
Mandatory minimum sentences for drug offenders	133.51	$\frac{81562}{133.51} = 610.91$
Conventional law enforcement	75.00	$\frac{81562}{75.00} = 1087.49$
Treatment for heavy cocaine users	134.40	$\frac{81562}{134.40} = 606.86$

### Part 4: Questions for Discussion

6. Which method of preventing cocaine consumption seems to be the most cost-effective in the short term? Which method would be best suited to achieving the two-year goals of the National Drug Control Policy?
7. Which method of preventing cocaine consumption seems to be the most cost-effective in the longer term? Which method would be best suited to achieving the five-year goals of the National Drug Control Policy?
8. During the administrations of President Reagan and President G. H. W. Bush, cocaine was perhaps the highest profile hard drug in the United States. In 2007, approximately 44 million Americans admitted using cocaine at least once in their lives, compared with 3.8 who had tried heroin and 13 million who had tried methamphetamine<sup>19</sup>. Given that cocaine is the most abused hard drug in the United States, how do the numbers that you calculated in your tables compare to the 2009 budget for the Office of National Drug Control Policy (\$14.1 billion<sup>20</sup>). (Remember, that's the budget for one year. Over the next five years, ONDCP is likely to appropriate more than \$70 billion for the War on Drugs.) Do our tax dollars appear to be well spent by the Office of National Drug Control Policy in the War on Drugs?

<sup>19</sup> Source: Office of Applied Statistics. 2008. *2007 National Household Survey on Drug Abuse*. Rockville MD: National Clearinghouse for Alcohol and Drug Information.

<sup>20</sup> Source: Office of National Drug Control Policy. 2009. *National Drug Control Strategy*. Washington DC: Government Printing Office.