# How Much Will College Cost?

College costs keep going up and up! Whether or not you are going off to college next fall, or in several years, it is useful to know how much, on average, college costs. The chart below gives the national US four-year institution (public and private) average cost of room and board and tuition over a recent 30-year period. Not going to college this fall? No worries, we can use the information below to predict the cost of college in the future. After completing this activity you will have a better idea of how much four years of college could cost you!

***Average college room and board, tuition and fees***

| Year | Room and board | Tuition and fees |
|---|---|---|
| 1978 - 1979 | $1,521 | $1,397 |
| 1983 - 1984 | $2,404 | $2,344 |
| 1988 - 1989 | $3,253 | $3,472 |
| 1993 - 1994 | $4,168 | $5,119 |
| 1998 - 1999 | $5,166 | $6,723 |
| 2003 - 2004 | $6,476 | $9,029 |
| 2008 - 2009 | $8,361 | $12,075 |
| 2012 – 2013 | $9,771 | $14,101 |

Source: https://nces.ed.gov/programs/digest/d13/tables/dt13_330.10.asp and http://awesome.good.is/transparency/web/1012/education-infographics/affordable-college/flash.html

1. What do you see in the data? Record a few mathematical observations below:

2. Create a scatter plot of the data in the chart. You should plot both sets of data on the same grid, but use different colors for the data points for tuition than you do for room and board.

Let your y-axis represent cost, make sure to set up your y-axis scale so that it leaves room to go beyond $20,000 per year, so that we can use the graph to make future predictions. Your x-axis should represent years since 1978. This means that 1978 will be year zero and 1983 will be year five and so on. Make sure to set up your x-axis scale so that you can use your graph to make predictions of college costs in the future.

Using either your graph or the chart…

3. Describe the typical yearly increase in the cost of room and board during this period. Would you say it is has been roughly increasing at a constant rate, exponentially or in some other way?

4. Describe the increase in the cost of tuition during this period. Would you say it is has been roughly increasing at a constant rate, exponentially or in some other way?

5. Describe the increase in the total cost of college (tuition and room and board). Would you say it is has been roughly increasing at a constant rate, exponentially or in some other way?

6. Draw a line or curve of best fit for each cost and year relationship. Since the cost of room and board is roughly linear, a line of best fit may make the most sense. When making a line of best fit you do not connect each point. Instead draw a line that seems to best represent the data points. This line may go between or through your data points. As for the cost of tuition, these points are somewhat linear, but may also be represented with an exponential graph. In an exponential relationship one output is multiplied by a constant amount to get to the next output. This is different than a linear relationship, because in a linear relationship we add a constant amount to get to the next output. Draw a line or curve of best for each cost over time. Make sure to extend your line or curve so that it continues on to at least 40 years after 1978.

7. Use your graphs to predict the cost of tuition and room and board during the four years that you could be attending college. Use the table below to display your answer:

| Year | Room and board cost | Tuition cost | Total cost |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

8. About how much might four years of college cost you (remember, this is based off average college costs, there is a great range of costs, depending on where you attend)?

9. If you are currently taking an algebra class (or higher math) you may have learned how to model this data with a linear equation in the form y = mx + b. Write a linear equation that can be used to model the cost of room and board based off years since 1978. Explain what each variable represents, and find the average room and board cost in the year 2028.

10. If you are currently taking an algebra class (or higher mathematics) you may have learned how to model this data with an exponential equation in the form $y = ab^x$. Write an exponential equation that can be used to model the cost of tuition based off years since 1978. Explain what each variable represents, and find the average tuition cost in the year 2028.

11. Try to determine the total cost of college for years before 1978. According to your model how much did college cost in the early 70's or in the 60's?



Sources: https://nces.ed.gov/programs/digest/d13/tables/dt13_330.10.asp
http://awesome.good.is/transparency/web/1012/education-infographics/affordable-college/flash.html