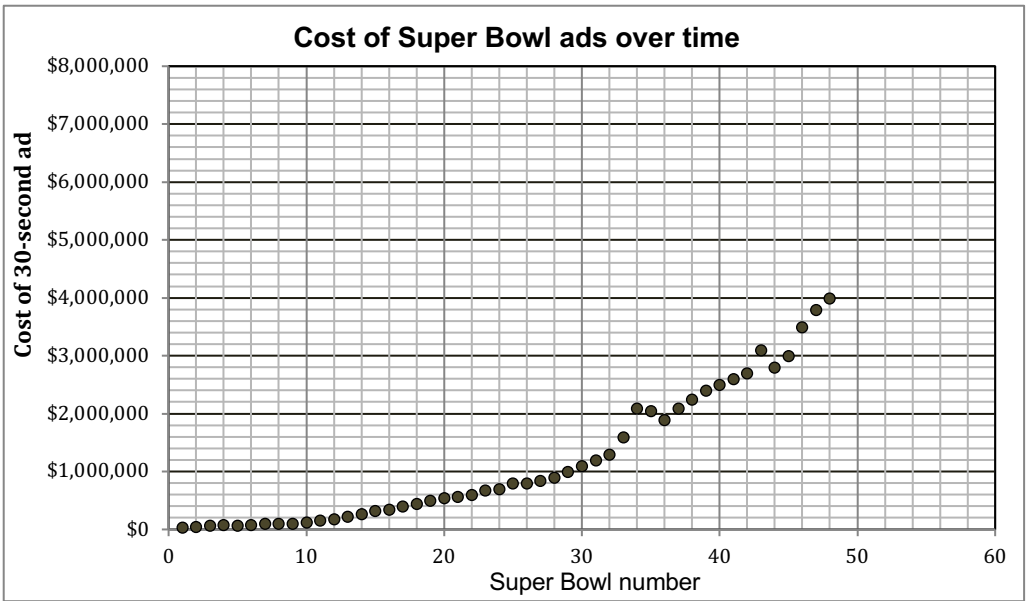
Super Bowl number	Cost of 30-second ad	quotient of increase
1	$40,000	
2	$54,000	
3	$67,500	
4	$78,200	
5	$72,000	
6	$86,000	
7	$103,500	
8	$107,000	
9	$110,000	
10	$125,000	
11	$162,000	
12	$185,000	
13	$222,000	
14	$275,000	
15	$324,300	
16	$345,000	
17	$400,000	
18	$450,000	
19	$500,000	
20	$550,000	
21	$575,000	
22	$600,000	
23	$675,000	
24	$700,000	
25	$800,000	
26	$800,000	
27	$850,000	
28	$900,000	
29	$1,000,000	
30	$1,100,000	
31	$1,200,000	
32	$1,300,000	
33	$1,600,000	
34	$2,100,000	
35	$2,050,000	
36	$1,900,000	
37	$2,100,000	
38	$2,250,000	
39	$2,400,000	
40	$2,500,000	
41	$2,600,000	
42	$2,700,000	
43	$3,100,000	
44	$2,800,000	
45	$3,000,000	
46	$3,500,000	
47	$3,800,000	
48	$4,000,000	
49	$4,500,000	
50	$5,000,000	
51	$5,000,000	
52	$5,000,000	
53	$5,000,000	
54	$5,600,000	
55	$5,600,000	

Super Bowl commercial costs 2021

Somewhere around 98 million people in the U.S. plan to watch the Super Bowl this year. With all of those people watching, the value of commercial time is very expensive. The table to the left shows the cost of a 30-second Super Bowl ad each year since 1967.

We didn't want you to have to plot 55 points. So, we began creating a scatter plot of the data on the grid below. When creating a scatter plot, you do not connect the data points with lines as you might do on a line graph.

1. Add the remaining data points to the grid below.



2. How has the cost of a 30-second Super Bowl commercial grown over time? Describe this in detail. Has it increased or decreased? Has it grown at a constant rate of change?

3. Try to draw a smooth curve that models the cost of an ad over time. It should go through many of the data points, but may not go through all of the data points. It should be a good model of how the cost is growing over time and be usable to make future predictions.

You should have noticed that the cost of a Super Bowl ad has not grown linearly. The cost may have grown somewhat ***exponentially***.

This means that we can multiply by the same value year after year to find the cost of the following year's ad. To determine whether this is true, simply divide an ad cost by the cost from the year before.

For example, I will divide Super Bowl 41's ad cost by Super Bowl 40's cost:

$2,600,000/$2,500,000 = 1.04

This means that I should be able to multiply $2,500,000 by 1.04 and get $2,600,000. Go ahead and try that out.

4. As a group or as a class, try to find the quotient between each year of Super Bowl ads. Write these quotients to the right of the table on the first page. You should put the values to the right and between the two years that you computed with. These values represent the number that we multiply by to get to the following year's cost of a Super Bowl ad.

5. What does the typical quotient look like? Can you find an average?

> This average value can represent a rough estimate of what we multiply by to get future ad costs. When we multiply by this value over and over again to find the next ad cost we refer to it as the ***growth factor***. If you found that the typical quotient is 1.0997, that means that, typically, the Super Bowl cost increases by 0.0997 or 9.97% per year and that our average growth factor is roughly 1.10.

6. Use your typical growth factor to find the potential cost of a 30-second ad during the next three Super Bowls. For example, if your typical growth factor is 1.10, then multiply the last Super Bowl cost by 1.10 to find the potential cost of an ad during Super Bowl 56. Repeat this process until you have potential ad costs for Super Bowls 57 and 58.

7. Graph your potential Super Bowl ad costs for these three Super Bowls on your graph. Do they seem to fit in with the trend?

Actually, we could find a more accurate average growth factor by using just the initial and final values of this exponential growth relationship. (You could use any two values of an exponential growth situation.)

a. Decide how many growth intervals have occurred between the two values and let that value = n. For instance, there have been 8 intervals between the 1st year of a Super Bowl game and the 9th year of the Super Bowl. n = Super Bowl game number - 1

b. Divide the final value ($5,600,000) by the original value ($40,000) to find out, in total, how much the initial value has been repeatedly increased.

In our example,

- The initial value (I) was $40,000.
- The final value (F) was $5,600,000.
- The Growth Factor = $\sqrt[n]{\left(F/I\right)}$

c. Do the math and find what a more precise growth factor calculation might have been.

8. Does it seem realistic that a cost of a Super Bowl ad will continue to grow at this rate? Please explain.

Extension: Can you find an exponential equation that gives the cost for a Super Bowl ad for any number Super Bowl?

If you have studied enough algebra, consider which model: linear, exponential or quadratic fits the data best. You can use Excel, a graphing calculator or the Desmos graphing calculator app (linked to on our web page) to quickly come up with algebraic models.

According to your model, can you predict when a 30-second Super Bowl ad will cost one billion dollars?

Source: http://www.nielsen.com/us/en/insights/news/2016/nielsen-estimates-118-4-million-tv-homes-in-the-us--for-the-2016-17-season.html