

Growth of Facebook

Facebook has been an amazingly successful phenomenon. Mark Zuckerberg created it when he was only a sophomore at Harvard College. His first iteration of Facebook was called Facemash. He was 20 years old when he first opened the site on October 28, 2003.

The initial site generated 450 visitors and 22,000 photo-views in its first four hours online. That means that 450 unique visitors visited the site and they viewed 22,000 photos.

1. On average, about how many photos did each visitor view in that first 4 hours of Facemash?

On February 4, 2004, Zuckerberg launched "Thefacebook", originally located at thefacebook.com. Membership was initially restricted to students of Harvard College, and within the first month, more than half the undergraduate population at Harvard was registered on the service. In 2004, Harvard's undergraduate population was 7,000 students.

2. About how many users registered to "thefacebook" in that first month of its existence?

In March 2004, Facebook expanded to Stanford, Columbia, and Yale. This expansion continued when it opened to all Ivy League schools, Boston University, New York University, MIT, and gradually most universities in Canada and the United States.

Facebook launched a high school version in September 2005, which Zuckerberg called the next logical step. At that time, high school networks required an invitation to join. Facebook later expanded membership eligibility to employees of several companies, including Apple Inc. and Microsoft. Facebook was then opened on September 26, 2006, to every one of ages 13 and older with a valid e-mail address.

Total Active Facebook Users

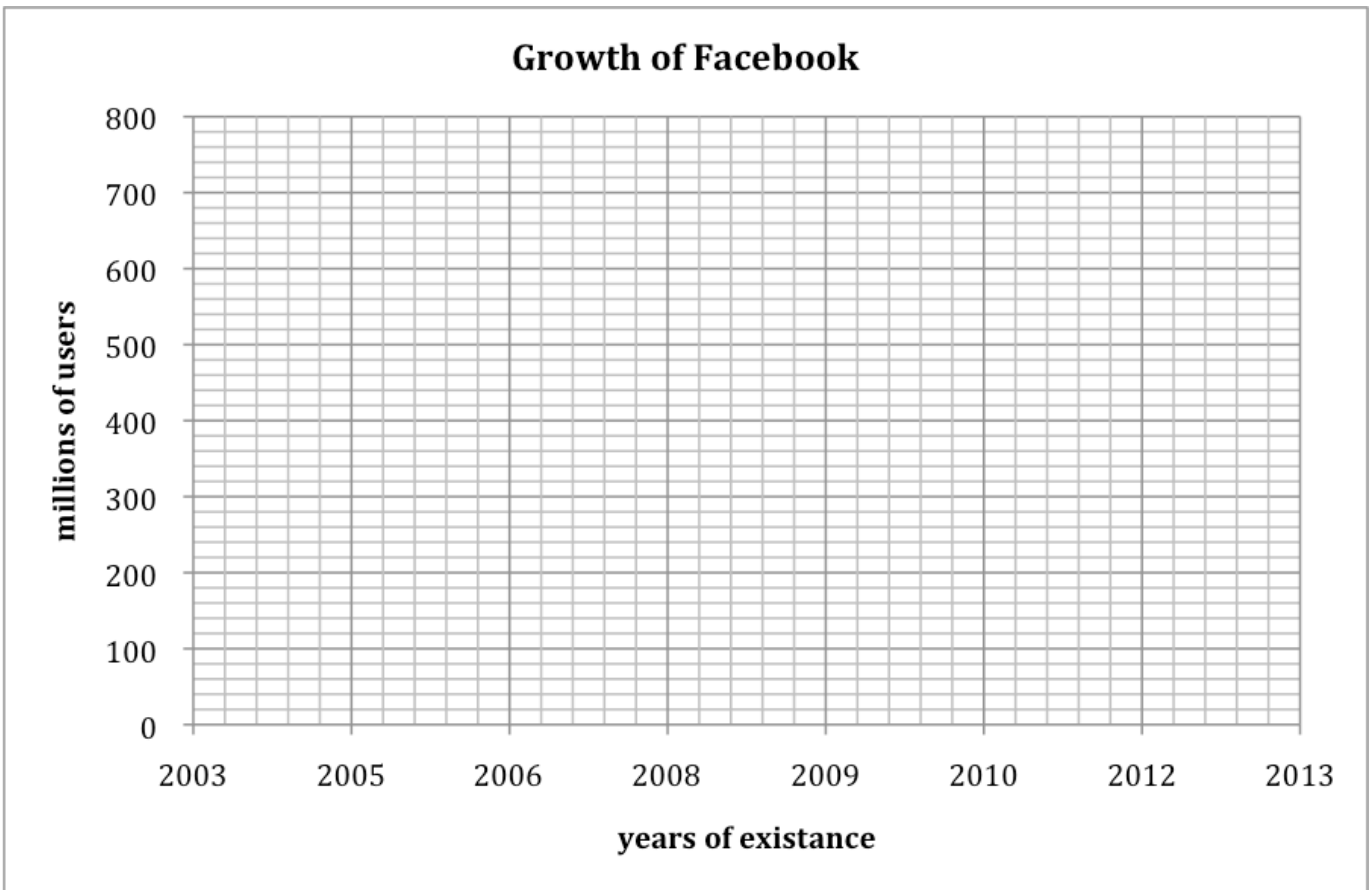
Date	Users	Yearly growth
October 28, 2004	450	
December, 2004	nearly 1 million	
December, 2005	more than 5.5 million users	450%
December, 2006	more than 12 million	
October, 2007	50 million	
August 26, 2008	100 million	
January, 2009	150 million	
April 8, 2009	200 million	
September 15, 2009	300 million	
December, 2009	350 million	
February 5, 2010	400 million	
July 21, 2010	500 million	
January 5, 2011	600 million	
May 30, 2011	700 million	
January 2012	800 million	

3. In order to complete the table above, you will need to figure out percent yearly growth even when the interval between dates is not one year. How might you do that?

4. Using the data from the table above, please complete the chart with yearly percent change numbers. Yearly growth is a bit tricky since some of the intervals are not one year. If an interval represents .5 years (6 months) find the percent annual growth with this sort of calculation:

$$\frac{6 \text{ months}}{12 \text{ months in a year}} \cdot \% \text{ growth} = \frac{\text{difference between user numbers}}{\text{earlier user number}} \cdot 100\%$$

5. Graph the data (number of users by date) on a scatter plot using the grid below. Make sure you are very careful marking your dates on the x-axis.



When describing growth rates, mathematicians try to predict the future of data by examining the shape of its growth rate graph.

3. How would you describe the growth of the number of Facebook users? Is it roughly linear or is it nonlinear? Explain.

When you were an infant, your pediatrician probably kept a record of your weight and height at each of your visits partly to be able to predict your adult size and weight.

4. As you look at the growth of active users on Facebook. Can you begin to predict the number of users in 2012 and 2013?
5. If the growth trend continues determine the year (or even month and year) that Facebook will have one billion active users. Show or explain how you arrived at your answer.

There are approximately 7 billion people in the world now. 2,095,006,005 of the world's population have internet access.

6. What percent of the world's population has internet access?
7. What percent of the world's population are active users on Facebook?
8. About what percent of internet users are active Facebook users?

Sources: <http://en.wikipedia.org/wiki/Facebook>
http://www.cambridgema.gov/cdd/cp/tg/tg2004/tg_2004_harvard_1.pdf