

Build-A-Function: Graphical Edition II
or
“Find the graph of a function given a set of characteristics.”

Engagement Activity which covers many of the graphical concepts presented in Precalculus, Third Edition, Stitz and Zeager

Primary Sections: 1.6, 3.1, 4.1, 5.3

Secondary Sections: 1.2, 1.3, 2.1, 2.2, 2.3, 4.2, 6.1

Key Concepts: Graphs of functions, asymptotes, local extrema, end behavior

This activity is designed to help you review all of the graphical concepts presented in College Algebra and can be used as a portion of your review for the Final Exam. Your professor will have specific instructions as to how he/she wants the activity to fit into the class so please pay attention in class when this activity is assigned.

Sketch the graph of a function f that has the desired characteristics. There may be many correct answers so please be creative! As an extra challenge, see if you can find an expression for the function. (Hint: Many of these require a piece-wise defined function.)

1.
 - The domain is $(-\infty, 3) \cup (3, \infty)$
 - As $x \rightarrow \infty$, $f(x) \rightarrow -5$
 - The point $(1, 0)$ is a local maximum on the graph of $y = f(x)$

2.
 - The range is $(-\infty, \infty)$
 - $x = 0$ is a vertical asymptote to the graph of $y = f(x)$
 - The point $(-4, 7)$ is a hole in the graph
 - As $x \rightarrow -\infty$, $f(x) \rightarrow \infty$

3.
 - f is increasing on the intervals $(-\infty, -6)$ and $(4, 7)$
 - f is decreasing on the intervals $(-6, 4)$ and $(7, \infty)$
 - $y = 0$ is a horizontal asymptote to the graph of $y = f(x)$

- 4.
- The points $(-11, 5)$ and $(0, -7)$ are local maximums on the graph of $y = f(x)$
 - The points $(4, 0)$ and $(6, 0)$ are x -intercepts of the graph of $y = f(x)$
- 5.
- As $x \rightarrow 3^-$, $f(x) \rightarrow -\infty$
 - As $x \rightarrow 3^+$, $f(x) \rightarrow -\infty$
 - Both $y = -\pi$ and $y = \pi$ are horizontal asymptotes to the graph of $y = f(x)$
- 6.
- f is an odd function
 - The point $(3, 9)$ is a local minimum on the graph of $y = f(x)$
 - f is decreasing on the interval $(-\infty, -8)$

- 7.
- f is an even function
 - The point $(3, 9)$ is a local minimum on the graph of $y = f(x)$
 - f is decreasing on the interval $(-\infty, -8)$
- 8.
- The line $y = 2x + 5$ is a slant asymptote to the graph of $y = f(x)$
 - The graph of $y = f(x)$ has “unusual steepness” at $x = 4$
 - The domain of f is all real numbers
- 9.
- The point $(0, 0)$ is a local maximum on the graph of $y = f(x)$
 - The graph of $y = f(x)$ has “cusps” at $x = -24$ and $x = 0$
 - As $x \rightarrow \infty$, $f(x) \rightarrow -\infty$
 - As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$

**Student Questionnaire for
Build-A-Function: Graphical Edition II**

This Engagement Activity was created with one purpose in mind - to help you the student better understand the concepts presented in College Algebra. Whereas we think the activity does its job, the truth is that we need to know from you if it actually helped you learn. Please take a few minutes to complete this questionnaire anonymously and return it to your instructor. Your feedback will be used to improve the activity for next semester.

1. For Questions 1a through 1e below, please place an X in the box which most closely matches your opinion.

- (a) Before I began the activity, my understanding of the material was best described as

Clueless	Not so good	Meh	Pretty good	I pwned it!

- (b) After completing the activity, my understanding of the material is best described as

Clueless	Not so good	Meh	Pretty good	I pwn it!

- (c) The connection between the activity and the course material was clear

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

- (d) The activity's instructions were clear

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

- (e) The activity was a good use of class time

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. What did you like about the activity?

Continued on back →

3. How can we improve the activity?

4. Other comments: