

# Algebra and Calculus Quiz 6

Name/NYU ID:

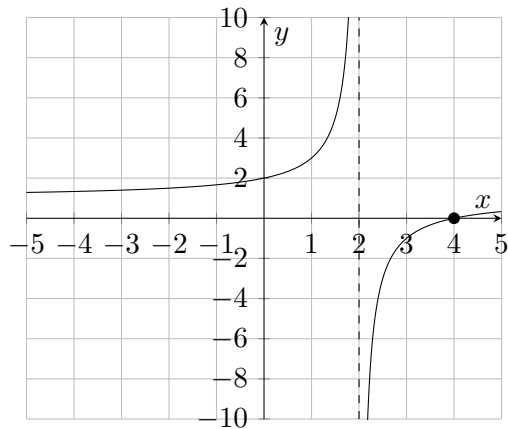
November 2, 2015

Complete all problems.

1. For **multiple choice** problems, circle the letter corresponding to the correct answer.
2. For **true or false** problems, indicate whether you believe the statement is  true or  false and put a box around your answer (as shown).
3. For **free response** problems, **show all work** and put a  box around your final answer.

**Good luck!**

1. True or false:
  - (a) The graph of the function  $f(x) = \frac{1}{x}$  never hits or crosses either axis.
  - (b) The line  $x = a$  is a vertical asymptote of  $y = f(x)$  if  $y \rightarrow \pm\infty$  as  $x \rightarrow a$  from the left or right.
  - (c) A rational function  $r(x) = \frac{P(x)}{Q(x)}$  has a slant asymptote if  $P(x)$  has the same order as  $Q(x)$ .
2. Which function does this graph represent?  
*Hint: Look at the options as transformations of the function  $f(x) = \frac{1}{x}$*



- (a)  $\frac{x-4}{x-2}$
- (b)  $\frac{x-2}{x-4}$
- (c)  $\frac{2x-4}{x-1}$
- (d)  $\frac{2x-1}{x-1}$

3. The vertical asymptote(s) of  $r(x) = \frac{x+100}{x^2-1}$  are:

- (a)  $x = 1$
- (b)  $x = 1$  and  $x = -1$
- (c)  $x = -100$
- (d) There is no vertical asymptote.

4. The horizontal asymptote of  $r(x) = \frac{x+100}{x^2-1}$  is:

- (a) There is no horizontal asymptote.
- (b)  $y = 0$ .
- (c)  $y = 1$ .
- (d)  $y = 100$

5. Graph  $f(x) = \frac{2x^2+7x-4}{x^2-x-2}$ . Label asymptotes and intercepts.  
*Hint: Check behavior close to the asymptotes.*