17 pts

Math 105, Precalculus Name ANSWER KEY A

Quiz 7, Sections 3.6 and 4.1 November 19, 2009

Use of calculators is not permitted on this quiz. Please show all work neatly.

1. Let $f(x) = \dfrac{12}{x^2 - 4}$

   a) Find the following, if they exist. If they do not exist, write "not applicable" and show work to explain why.

   1 i) x-intercept(s) None / N/A (because $12 \neq 0$ anywhere, no variable in numerator) (-½ if no justification: be generous on justifications. ☺)

   1 ii) y-intercept $y = -3$ $f(0) = \frac{12}{0^2-4} = -3$ (or $(0, -3)$)

   2 pts iii) Vertical asymptote(s) $y = ?, x = -2$ let $x^2-4=0$; $(x+2)(x-2)=0$; $x=-2, x=2$

   1 iv) Horizontal asymptote 0 (degree of denominator is > degree of numerator)

   b) Graph the function $f(x)$, checking your work by finding at least one function value in each interval you create.

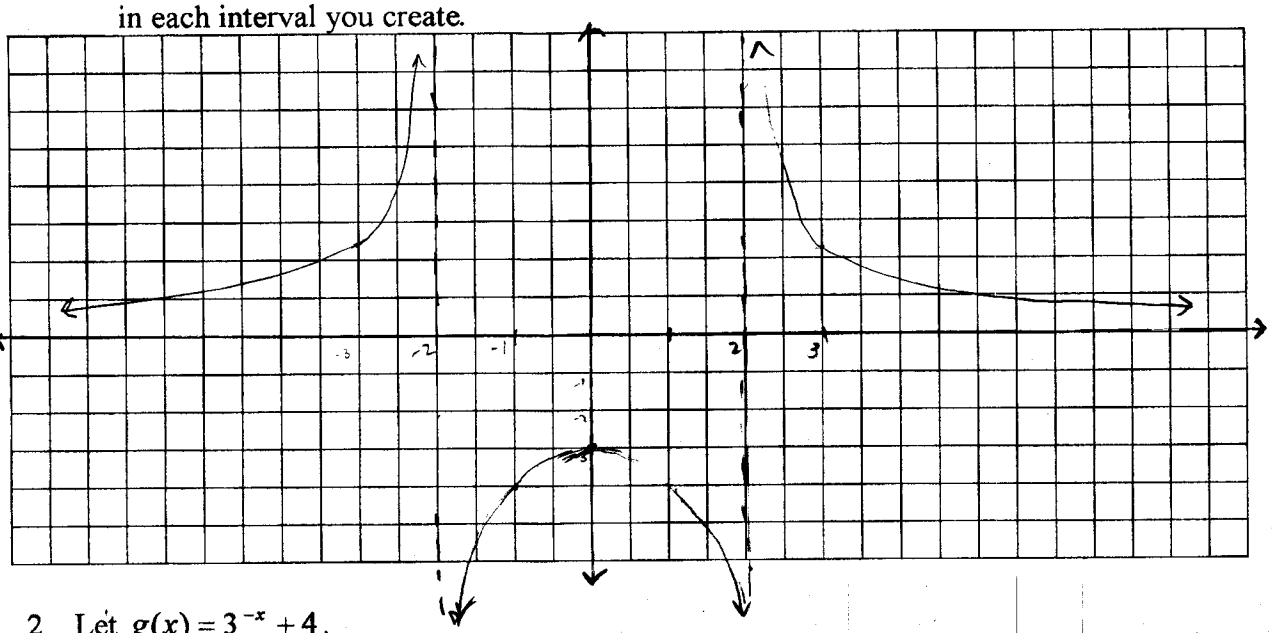
4 pts.

$f(3) =$

$\frac{12}{(-3)^2-4} =$

$\frac{12}{9-4} = \frac{12}{5} = 2\frac{2}{5}$

$f(3) = \frac{12}{9-4} = \frac{12}{5}$



8 pts (1 pt. each)

2. Let $g(x) = 3^{-x} + 4$.

   a) Compared to the graph of $f(x) = 3^x$, $g(x)$ is reflected across the y axis (if any) and shifted up (direction) by 4 units.

   b) Complete the following:

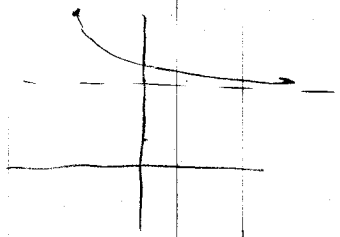
   i) As $x \to +\infty$, $g(x) \to$ 4.

   ii) As $x \to -\infty$, $g(x) \to$ $+\infty$.

   iii) The domain of $g(x)$ is $\mathbb{R}$.

   iv) $g(0) =$ 5 $3^0 + 4 = 5$

   v) $g(1) =$ $4\frac{1}{3}$ $g(1) = 3^{-1} + 4 = \frac{1}{3} + 4$



Math 105, Precalculus
Quiz 7, Sections 3.6 and 4.1

Name ANSWER KEY B
November 19, 2009

Use of calculators is not permitted on this quiz. Please show all work neatly.

1. Let $f(x) = \dfrac{9}{x^2 - 9}$

   a) Find the following, if they exist. If they do not exist, write "not applicable" and show work to explain why.

   i) x-intercept(s) N/A (none) Because $9 \neq 0$ anywhere. No variables in numerator.

   ii) y-intercept $y = -1$ (or $(0, -1)$) Let $x = 0$. $f(0) = \frac{9}{0-9} = \frac{9}{-9} = -1$

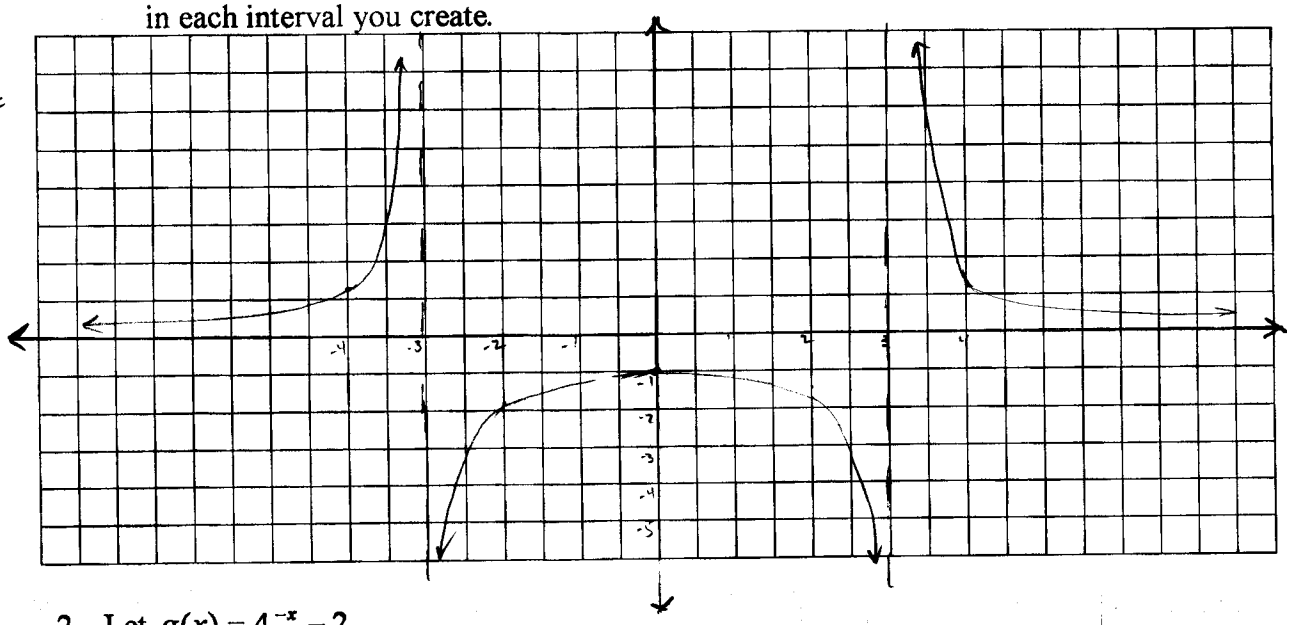
   iii) Vertical asymptote(s) $x = -3, x = 3$ Let $x^2 - 9 = 0$ $(x+3)(x-3) = 0$, $x = -3, x = 3$

   iv) Horizontal asymptote $y = 0$ (degree of denominator > degree of numerator)

   b) Graph the function $f(x)$, checking your work by finding at least one function value in each interval you create.

$f(-4) = \frac{9}{16-9} = \frac{9}{7}$

$f(4) = \frac{9}{16-9} = \frac{9}{7}$



2. Let $g(x) = 4^{-x} - 2$.

   a) Compared to the graph of $f(x) = 4^x$, $g(x)$ is reflected across the y axis (if any) and shifted down (direction) by 2 units.

   b) Complete the following:

   i) As $x \to -\infty$, $g(x) \to +\infty$.

   ii) As $x \to +\infty$, $g(x) \to -2$ (Horiz. Asymptote)

   iii) The domain of $g(x)$ is $\mathbb{R}$.

   iv) $g(1) = -1\frac{3}{4}$ $4^{-1} - 2 = \frac{1}{4} - 2 = -1\frac{3}{4}$

   v) $g(0) = -1$ $4^0 - 2 = 1 - 2 = -1$