Quiz 7A

Name:

UAlbany Email: Solution

Closed book/notes. No calculators allowed. Show all your work to receive full credit.

1. (4 Points) The graph of the function $y = \log_2(x^2 - 9)$ has two vertical asymptotes. One is at $x = \underline{\quad -3 \quad}$ and the other at $x = \underline{\quad 3 \quad}$.

   Set $\quad x^2 - 9 = 0 \implies \boxed{x = \pm 3}$

2. (6 Points) Find a formula for the exponential function passing through the points $\left(-3, \dfrac{2}{27}\right)$ and $(3, 54)$. Simplify your final answer. *Hint: To simplify your final answer use the fact that* $27 = 3^3$ *and* $54 = 2 \cdot 3^3$.

$$\left(-3, \tfrac{2}{27}\right) \implies \frac{2}{27} = a b^{-3} \implies a = \frac{2}{27} b^3$$

$$(3, 54) \implies 54 = a b^3 \quad \longleftarrow \text{substitute } a$$

$$54 = \left(\frac{2}{27} b^3\right) b^3$$

$$54 = \frac{2}{27} b^6$$

$$54 \cdot \frac{27}{2} = b^6$$

$$\cancel{2} \cdot 3^3 \cdot \frac{3^3}{\cancel{2}} = b^6$$

$$3^6 = b^6$$

$$\boxed{b = 3}$$

sub. for b

$$a = \frac{2}{27} 3^3$$

$$\boxed{a = 2}$$

$$y = a b^x$$

$$\boxed{y = 2 \cdot 3^x}$$

Grade: /10

1