Name: Answer Key Per: _____ Date: 2/23/15
Serafino • Algebra 2E

7ABC Q1–R **Exponential Functions & Equations Quiz Review**

Quiz Review

Exponential Growth & Decay

1. A 50–year–old tree is now 30 ft tall and has been growing in my backyard at a rate of 3% per year. How tall was the tree when it was first planted, 50 years ago?

$30 = a(1.03)^{50}$ $\frac{30}{4.38...} = \frac{a \cdot 4.3839...}{4.3839...}$ **6.84 ft**

2. The population of tigers is declining at a rate of 4.64% per year. If there are 20,0000 now, how many will there be in 100 years?

$20{,}000(1-.0464)^{100}$ = **172 tigers**

3. In 1952, a movie ticket cost \$1.50. Today it is \$12.00.

a) What equation models the exponential growth of the ticket price? $1.5b^{63} = 12$ $b^{63} = 8$ $b^{1/63} = 8^{1/63}$ $b =$ **$y = 1.5(1.0335577)^x$**

b) What is the percent increase per year? **3.356%**

c) What was the average rate of change in price from 1952 to 1962? What about in the last 10 years?

1952: 1.50
1962: 2.09 **\$.059/yr**

2005 8.63
2015 = 12 **\$.337/yr**

d) What will be the price of movie tickets in 50 years, based on your exponential growth model?

$1.5(1.0335577)^{113}$ = **\$62.51**

e) What LINEAR equation could also represent the growth of the ticket price from 1952 to now? What would be the difference in price in 50 years using your linear model?

$y = 0.16667x + 1.5$ or $\left(y = \frac{1}{6}x + 1.5\right)$ → Linear Model Price in 50 yrs \$20.33

\$42.18 difference

Compound vs. Continuous Growth & Decay

4. How much will I have in 10 years if I put \$3,000 in an account that compound 6.5% interest...

a) Annually? **\$5631.41** $3{,}000\left(1+\frac{.065}{1}\right)^{10}$

b) Monthly? **\$5736.55** $3000\left(1+\frac{.065}{12}\right)^{12 \cdot 10}$

c) Continuously? **\$5,746.62** $3000e^{.065(10)}$

Solving Equations with a Common Base

5. Solve the following equations:

a) $8^{2x} = 16$
$2^{2(3x)} = 2^4$
$\frac{6x}{6} = \frac{4}{6}$
$x = \frac{2}{3}$

b) $9^{2x+5} = 27^x$
$3^{2(2x+5)} = 3^{3x}$
$4x + 10 = 3x$
$x = -10$

c) $\left(\frac{1}{8}\right)^{2x} = 4^{-3x}$
$2^{-3(2x)} = 2^{-6x}$
$-6x = -6x$
$x = R$

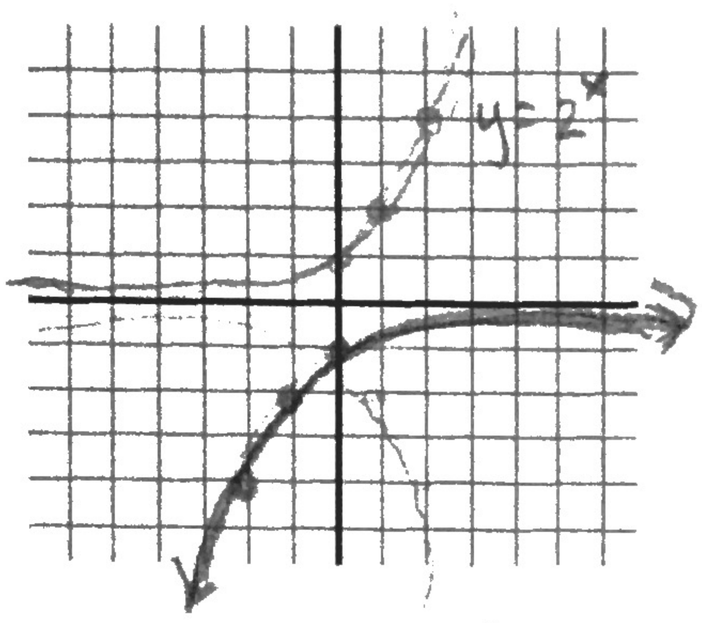
d) $64^{5x} = \frac{1}{16}$
$4^{3(5x)} = 4^{-2}$
$15x = -2$
$x = -2/15$

e) $6^{3x} \cdot 6^{2x} = 36$ 6^2
$3x + 2x = 2$
$5x = 2$
$x = 2/5$

Graphing Exponential Functions

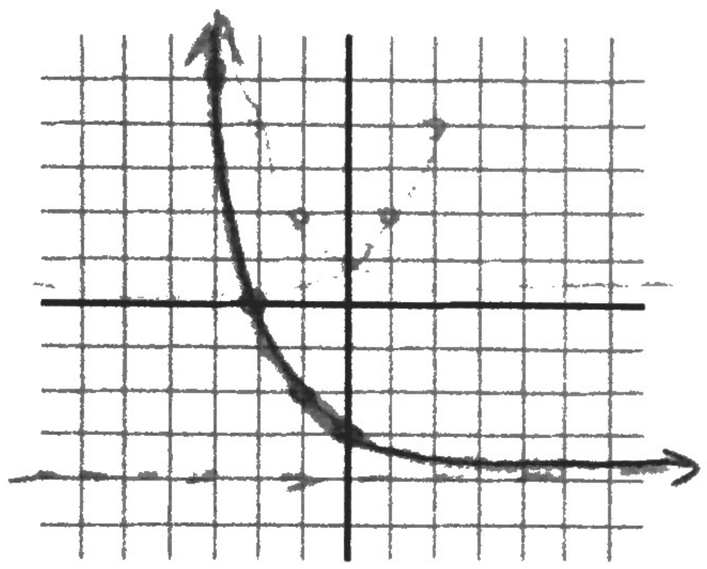
6. Sketch the following, with a dotted line for the asymptote. If it helps, you can draw the guide function without transformations first, then draw f(x) in color. I'm looking for 3clear points.

a. $f(x) = -(2)^{-x}$



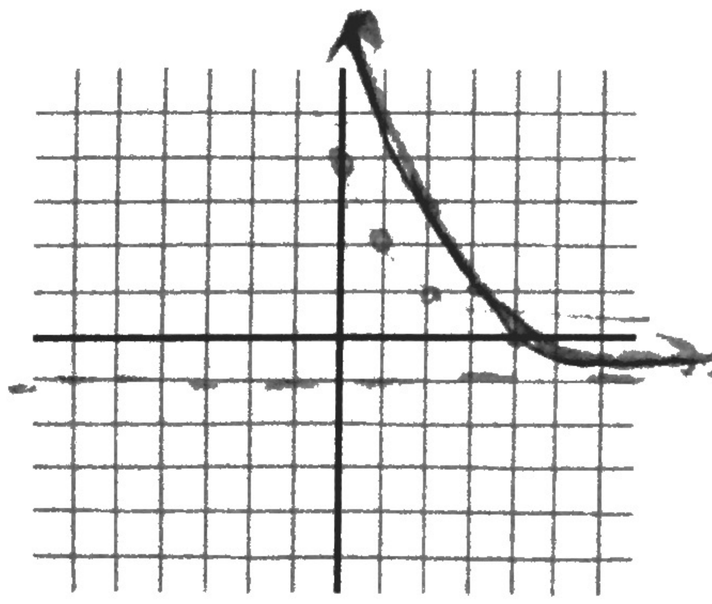
D: $x \in \mathbb{R}$ R: $y < 0$

b. $f(x) = (2)^{-x} - 4$



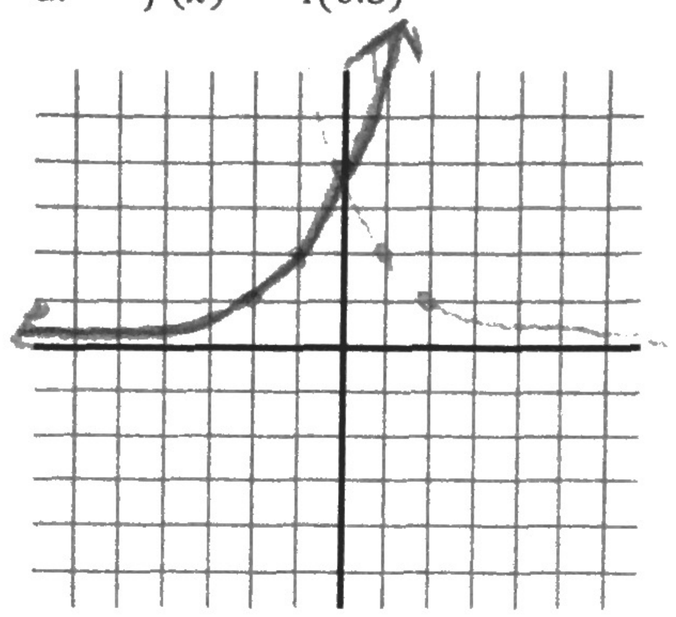
D: $x \in \mathbb{R}$ R: $y > -4$

c. $f(x) = 4(0.5)^{x-2} - 1$



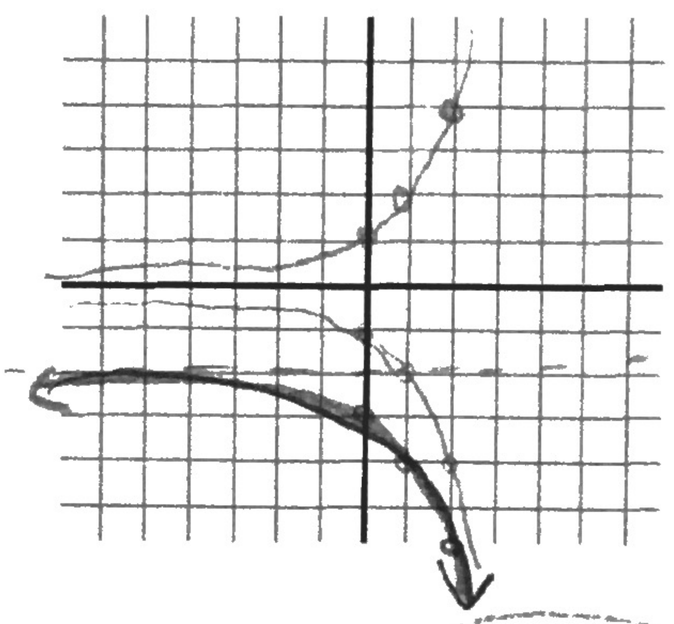
D: $x \in \mathbb{R}$ R: $y > -1$

d. $f(x) = 4(0.5)^{-x}$



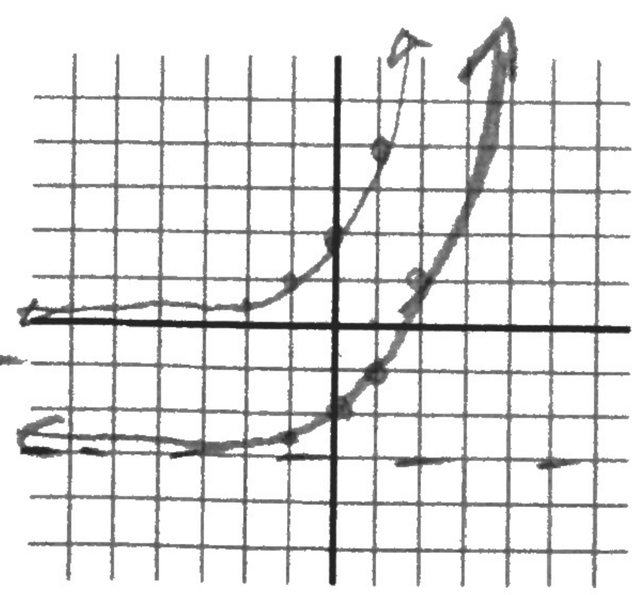
D: $x \in \mathbb{R}$ R: $y > 0$

e. $f(x) = -(2)^{x} - 2$



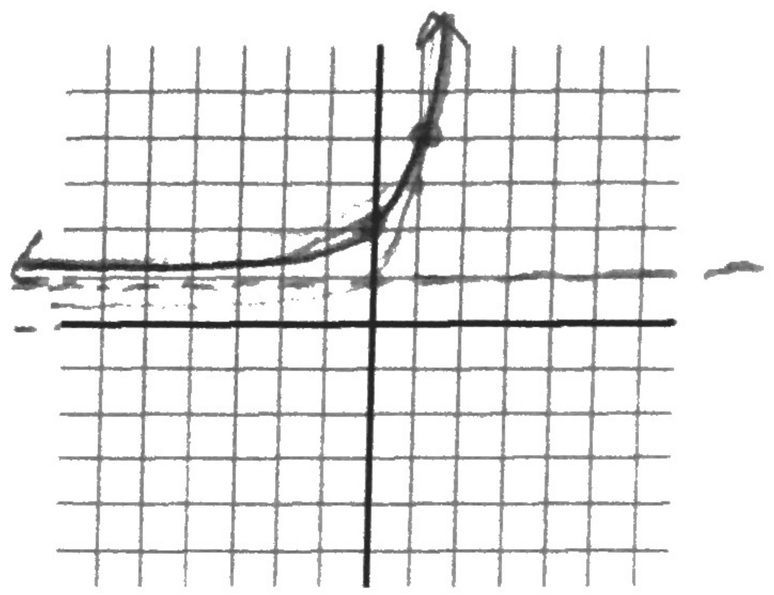
D: $x \in \mathbb{R}$ R: $y < -2$

f. $f(x) = 2(2)^{x-1} - 3$



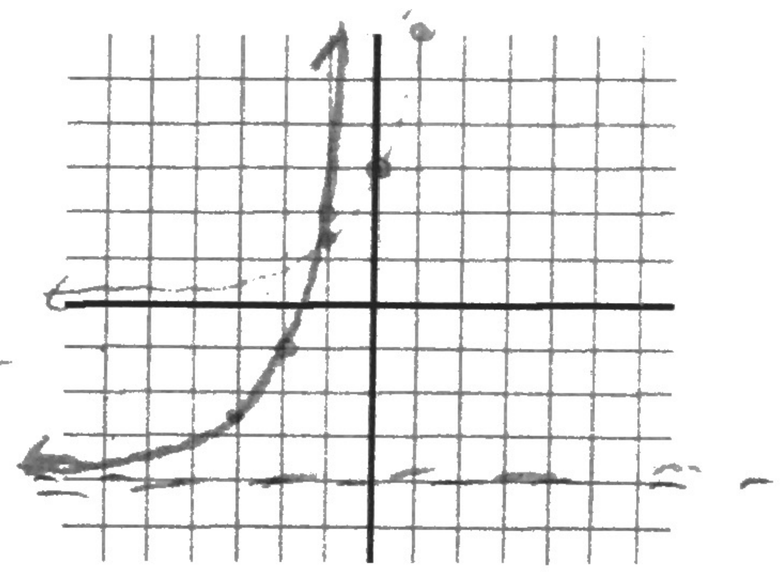
D: $x \in \mathbb{R}$ R: $y > -3$

g. $f(x) = (3)^{x} + 1$



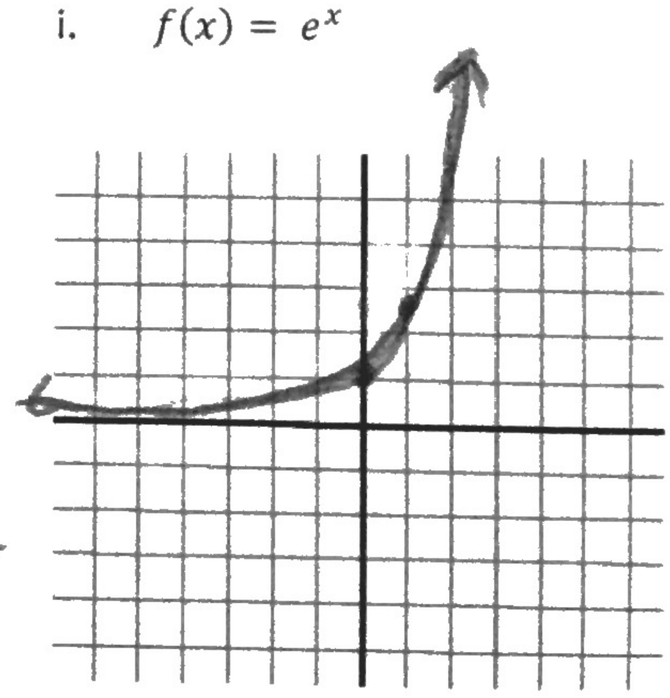
D: $x \in \mathbb{R}$ R: $y > 1$

h. $f(x) = 3(2)^{x+2} - 4$



D: $x \in \mathbb{R}$ R: $y > -4$

i. $f(x) = e^{x}$



D: $x \in \mathbb{R}$ R: $y > 0$