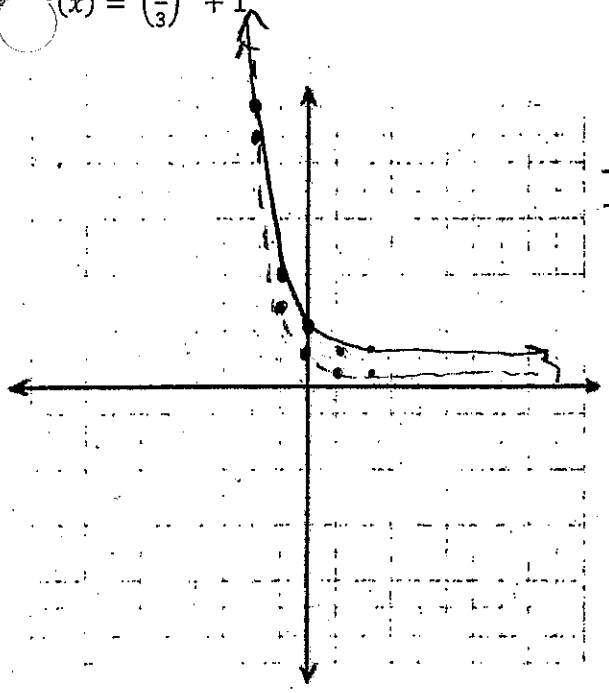
Algebra II Academic
Study Guide - Sections 7.1/7.7 and 7.2

Name _____
Date _____ Period _____

1. $f(x) = \left(\frac{1}{3}\right)^x + 1$



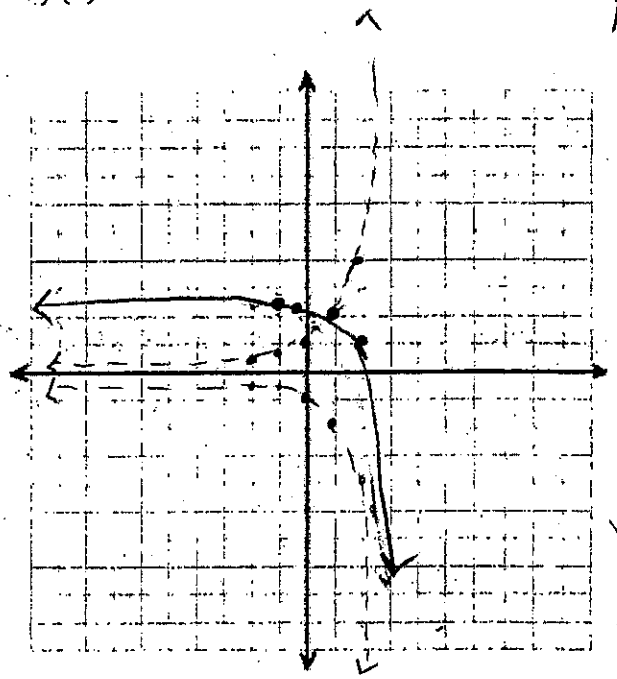
$y = 1/3^x$

X	Y
-2	9
-1	3
0	1
1	1/3
2	1/9

Asymptote: $y = 1$ D: $(-\infty, \infty)$

Intercept: $(0, 2)$ R: $(1, \infty)$

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



$y = 2^x$

X	Y
-2	.25
-1	.5
0	1
1	2
2	4

y-int ($x = 0$)

$y = -2^{0-1} + 3$

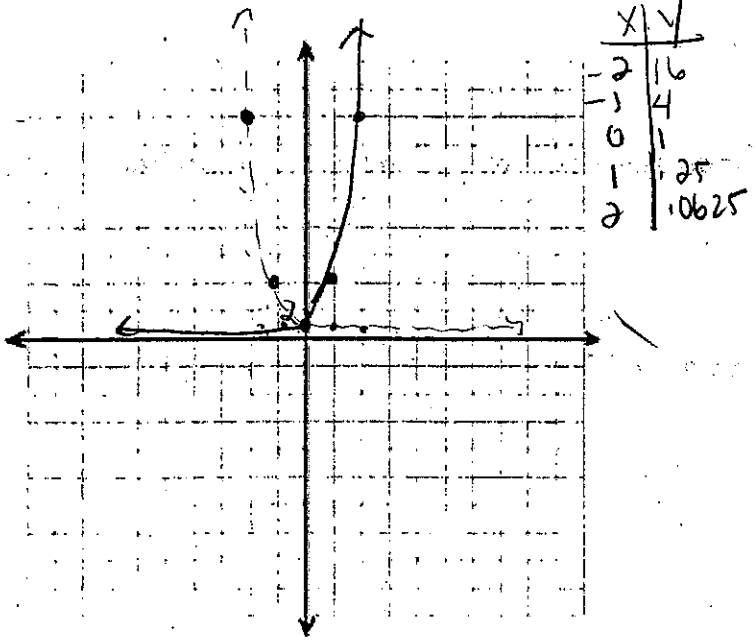
$= -2^{-1} + 3$

$y = 2.5$

Asymptote: $y = 3$ D: $(-\infty, \infty)$

Y-Intercept: $(0, 2.5)$ R: $(-\infty, 3]$

3. $y = \left(\frac{1}{4}\right)^{-x}$



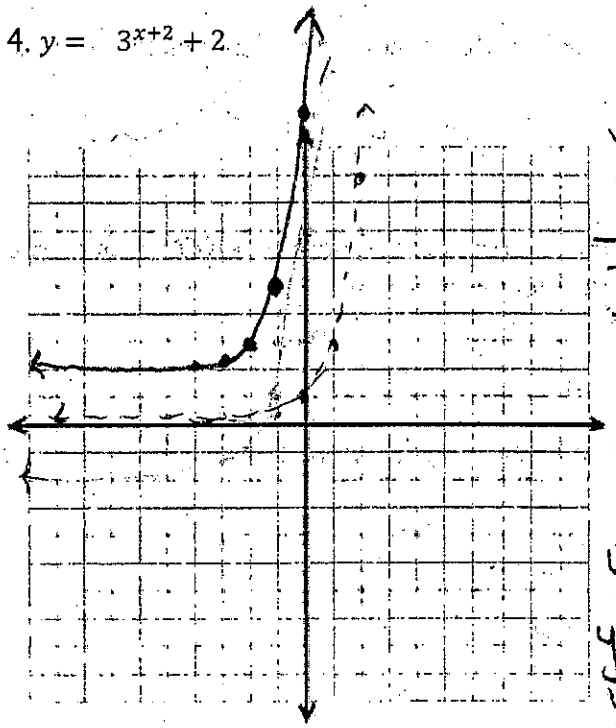
$y = (1/4)^x$

X	Y
-2	16
-1	4
0	1
1	.25
2	.0625

Asymptote: $y = 0$ D: $(-\infty, \infty)$

Y-Intercept: $(0, 1)$ R: $(0, \infty)$

4. $y = 3^{x+2} + 2$



$y = 3^x$

X	Y
-2	1/9
-1	1/3
0	1
1	3
2	9

$y = 3^{0+2} + 2$

$y = 3^2 + 2$

$y = 9 + 2$

$y = 11$

Asymptote: $y = 2$ D: $(-\infty, \infty)$

Y-Intercept: $(0, 11)$ R: $(2, \infty)$

In #5-10, use inverse operations to write the inverse of each function.

5. $f(x) = x + 3$

$x = y + 3$
$-3 \quad -3$

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

6. $f(x) = 5x - 1$

$x = 5y - 1$
$+1 \quad +1$

$\frac{x+1}{5} = \frac{5y}{5}$

$f^{-1}(x) = \frac{1}{5}x + \frac{1}{5}$

7. $f(x) = 3 - \frac{1}{2}x$

$x = 3 - \frac{1}{2}y$
$-3 \quad -3$

$\cdot -2 \quad x - 3 = -\frac{1}{2}y \cdot -2$

$f^{-1}(x) = -2(x - 3)$
$f^{-1}(x) = -2x + 6$ or

8. $f(x) = \frac{1}{2}(3 - 3x)$

$x = \frac{1}{2}(3 - 3y) \cdot 2$

$2x = 3 - 3y$
$-3 \quad -3$

$\frac{2x-3}{3} = \frac{-3y}{3}$

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

9. $f(x) = \frac{3x-5}{2}$

$x = \frac{3y-5}{2}$

$2x = 3y - 5$
$+5 \quad +5$

$\frac{2x+5}{3} = \frac{3y}{3}$

$f^{-1}(x) = \frac{2}{3}x + \frac{5}{3}$

10. $f(x) = \frac{1}{5}x + 12$

$x = \frac{1}{5}y + 12$
$-12 \quad -12$

$5 \cdot x - 12 = \frac{1}{5}y \cdot 5$

$f^{-1}(x) = 5(x - 12)$
$f^{-1}(x) = 5x - 60$

11. In 1981, the Australian humpback whale population was 350 and has increased at a rate of 14% each year since then. Write an exponential function to model the population growth.

$P(t) = 350(1.14)^t$

Based on your model, predict the Australian humpback whale population in 1992.

≈ 1479 humpback whales

12. A motor scooter purchased for $1000 depreciates at an annual rate of 15%. Write an exponential function to model the decay.

$V(t) = 1000(.85)^t$

Based on your model, predict when the scooter will fall below $100.

after 14 years

13. You win $13,575 gambling at the casino. You want to deposit the money and you are comparing interest rates for the banks listed below. At the end of 5 years you want to have the greatest possible balance.

Which bank should you choose?

Bank	Interest Rate		Compounding
PNC Bank	.015	1.50%	Monthly
Dollar Bank	.023	2.30%	Annually
Citizens Bank	.0345	3.45%	Quarterly
Bank of America	.0215	2.15%	Continuously

$A = P\left(1 + \frac{r}{n}\right)^{nt}$

$A = Pe^{rt}$

PNC Bank → $A = 13{,}575\left(1 + \frac{.015}{12}\right)^{(12)(5)} \approx 14631.59$

Dollar Bank → $A = 13{,}575\left(1 + \frac{.023}{1}\right)^{(1)(5)} \approx \$15{,}209.61$

Citizens Bank → $A = 13{,}575\left(1 + \frac{.0345}{4}\right)^{(4)(5)} \approx \$16{,}118.86$

Bank of America → $A = 13{,}575e^{(.0215)(5)} = \$15{,}115.64$

Greatest balance will occur at: Citizens Bank