7.1-7.2 Worksheet

Name:

Below are the 4 formulas used for exponential growth and decay:

1. $y = ab^x$ 2. $A(t) = a(1 \pm r)^t$ 3. $A(t) = P(1 + \frac{r}{n})^{nt}$ 4. $A(t) = Pe^{rt}$

For the following, use the correct formula from above to write an equation that models the situation. Then answer the question asked.

1. A car that cost $20,000 depreciates in value 11.4% each year.
   a. Write a formula that models this situation.
   $A(t) = 20{,}000(1 - .114)^t$
   b. How much value has the car lost after 8 years?
   $A(8) = 20{,}000(1 - .114)^8 = 7594.51$
   $20{,}000 - 7594.51$
   The car lost $12,405.49 in value

2. Elle invests $1250 into a savings account that earns 2.1% interest compounded monthly.
   a. Write a formula that models this situation.
   $A(t) = 1250(1 + \frac{.021}{12})^{12t}$
   b. How much has Elle earned in interest after 3 years?
   $A(t) = 1250(1 + \frac{.021}{12})^{12(3)} = 1331.21$ in bank
   $1331.21 - 1250 =$ Elle earned $81.21 in interest

3. Dan invests $800 into a savings account that earns 8.7% interest compounded continuously.
   a. Write a formula that models this situation.
   $A(t) = 800e^{.087t}$
   b. How much money does Dan have in the bank after 6 months?
   $A(1/2) = 800e^{.087 \cdot 1/2} =$ $835.57

4. 10 bacteria cells on leftover food grow at a rate of 100% each hour. ← t = hours
   a. Write a formula that models this situation.
   $A(t) = 10(1 + 1)^t$
   b. How much bacteria is on the food after 1 days?
   $A(24) = 10(2)^{24}$ ↳ 24 hours
   167,772,160 bacteria cells

5. The 12 Asian carp in Lake Michigan grow at a rate of 250% each year.
   a. Write a formula that models this situation.

$A(t) = 12(1+2.5)^t$

   b. How many Asian Carp will there be in Lake Michigan after 15 months?

$A(1.25) = 12(3.5)^{1.25}$ ↳ $\frac{15}{12} = 1.25$ years

$A(1.25) = 57.44$ ≈ 57 carp

   c. Graph the number of Asian Carp in Lake Michigan over the next 10 years. Make a table with at least 6 data points. Label and number your axes. PUT A TITLE ON YOUR GRAPH.

t	A(t)
0	12
2	147
4	1800.8
6	22059
8	270225
10	3310000

6. You invest $25,000 into a bank account that earns 1.6% interest.
   a. How much will be in your account after 10 years if the interest is compounded annually?

$25000\left(1+\frac{.016}{1}\right)^{(1\cdot 10)} = \$29300.64$

   b. How much will be in your account after 10 years if the interest is compounded monthly?

$25000\left(1+\frac{.016}{12}\right)^{(12\cdot 10)} = \$29334.65$

   c. How much will be in your account after 10 years if the interest is compounded continuously?

$25000e^{.016(10)} = \$29337.77$

7.1 Reteaching- Graphing Exponential Functions

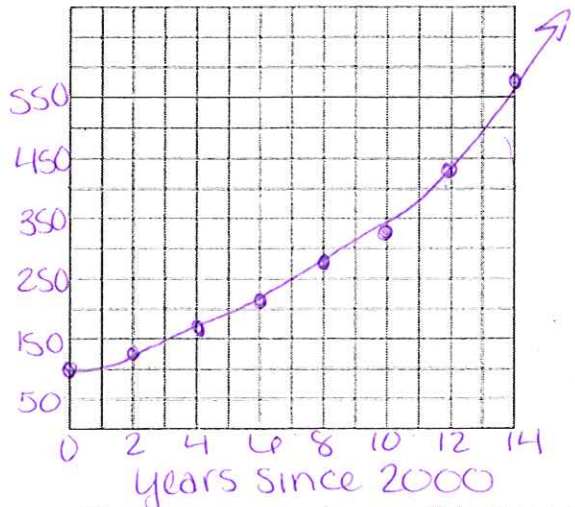
Name: _____

1. An antique vase was worth $100 in 2000. Its value increased 13% each year. Graph the value of the vase from 2000 until today.

$A(t) = 100(1+.13)^t$

-Make a table
-Label the x and y axis
-Number the x and y axis
-Graph

X	y
0	100
2	127.69
4	163.05
6	208.20
8	265.84
10	339.46
12	433.45
14	553.48

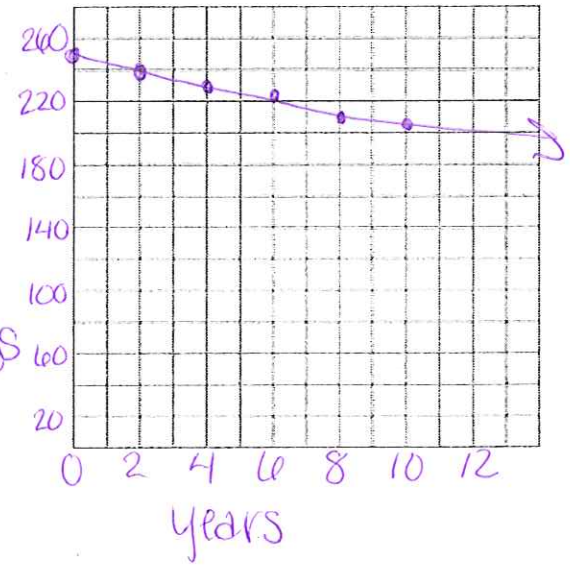


2. You decide to buy a house today for $250,000. Unfortunately, because of the economy, your house will decrease 2% in value for the next 10 years. Graph the value of your house over the next 10 years.

$250000(1-.02)^t$

-Make a table
-Label the x and y axis
-Number the x and y axis
Graph

t	A(t)
0	250000
2	240100
4	230592
6	221461
8	212691
10	204268

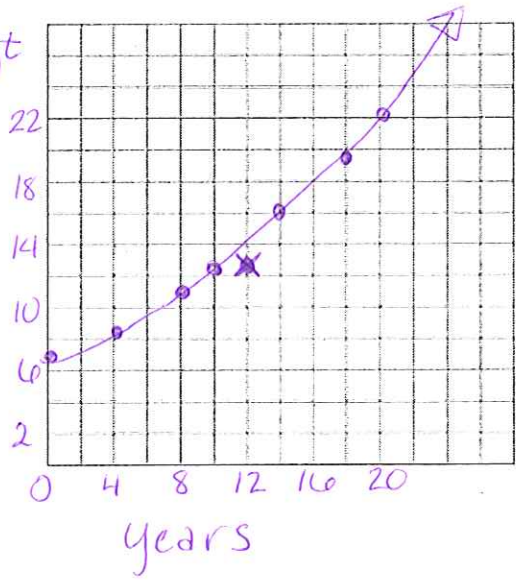


3. College tuition at most community colleges today is $7000 a year for in state residents. However, college tuition increases each year by 6%. Graph the cost of college tuition over the next 20 years.

$7000(1+.06)^t$

-Make a table
-Label the x and y axis
-Number the x and y axis
-Graph

t	A(t)
0	7000
4	8837
8	11157
10	12536
14	15826
18	19980
20	22450



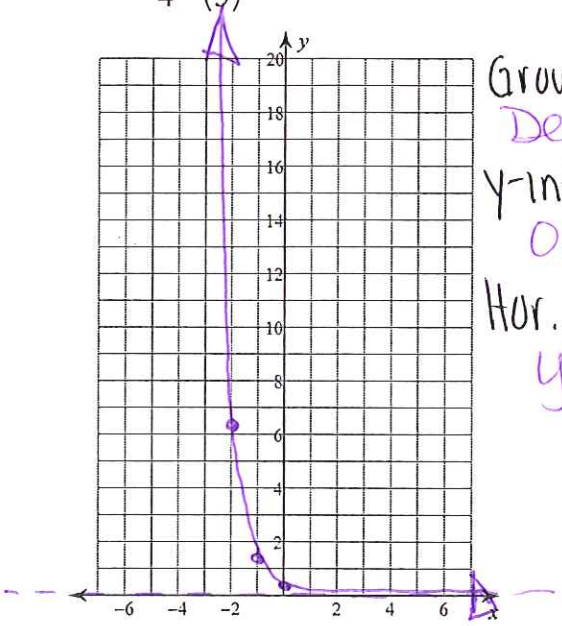
Algebra 2 Name_____ ID: 1

Graphing Exponential Functions

Date_____ Period____

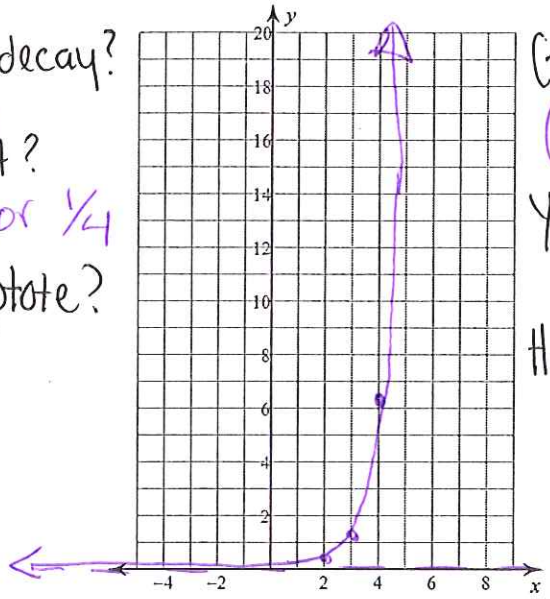
Sketch the graph of each function.

1) $y = \frac{1}{4} \cdot \left(\frac{1}{5}\right)^x$



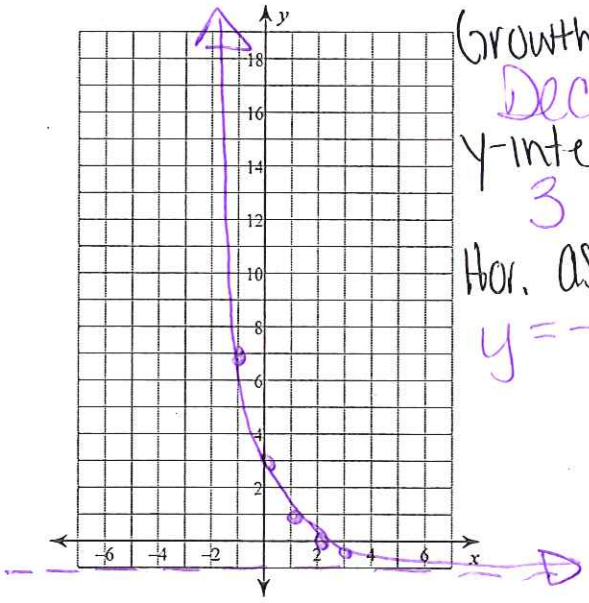
Growth or decay?
Decay
y-intercept?
0.25 or 1/4
Hor. asymptote?
y=0

2) $y = \frac{1}{4} \cdot 5^{x-2}$



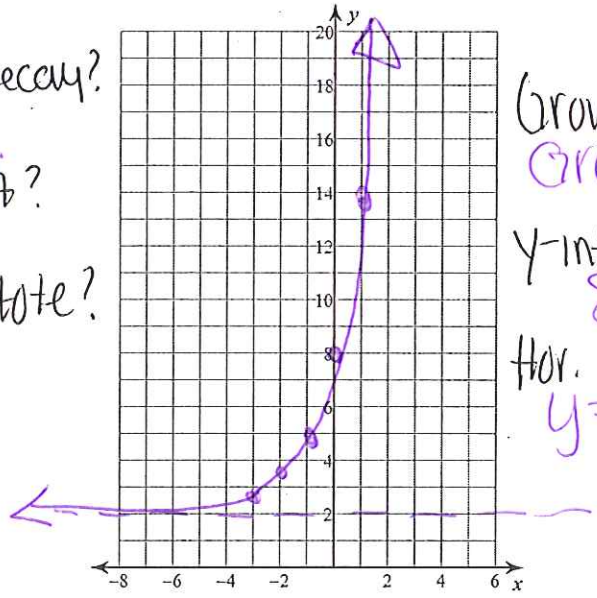
Growth or Decay
Growth
y-intercept?
1/100 or .01
Hor. asymptote?
y=0

3) $y = 4 \cdot \left(\frac{1}{2}\right)^x - 1$



Growth or Decay?
Decay
y-intercept?
3
Hor. asymptote?
y=-1

4) $y = 3 \cdot 2^{x+1} + 2$



Growth or Decay
Growth
y-intercept?
8
Hor. asymptote?
y=2