Algebra 2 CC
More Exponential Graphs

Name ______________________________

1.) The table below shows the amount of decaying radioactive substance that remained for selected years after 1990.

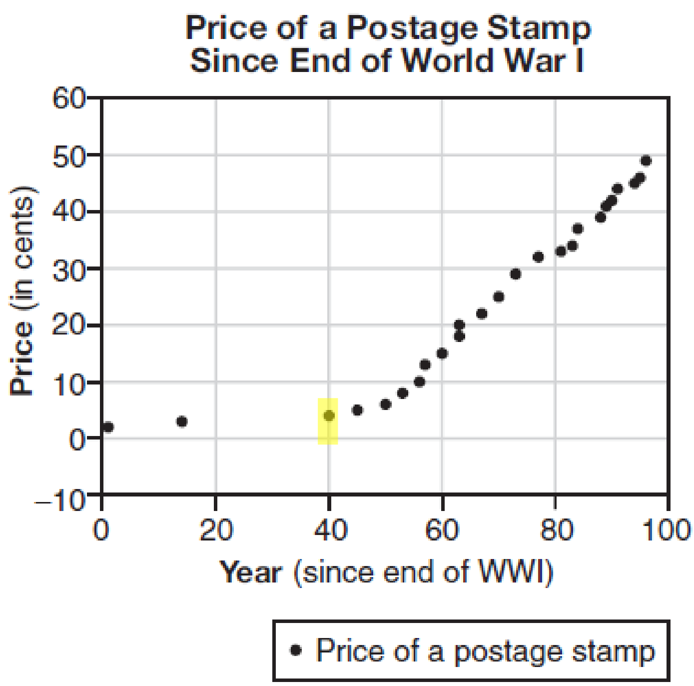
Years After 1990 (x)	0	2	5	9	14	17	19
Amount (y)	750	451	219	84	25	12	8

Write an exponential regression equation for this set of data, rounding all values to the ***nearest thousandth***.

$y = a(b)^x$

$\boxed{y = 733.646(.786)^x}$

2.) The price of a postage stamp in the years since the end of World War I is shown in the scatterplot below.



The equation that best models the price, in cents, of a postage stamp based on these data is

(a) $y = 0.59x - 14.82$ (b) $y = 1.04(1.43)^x$ $y = 1.04(1.43)^{40}$

(c) $y = 1.43(1.04)^x$ (d) $y = 24\sin(14x) + 25$ $y = 1,700,101$

$y = 6.87$

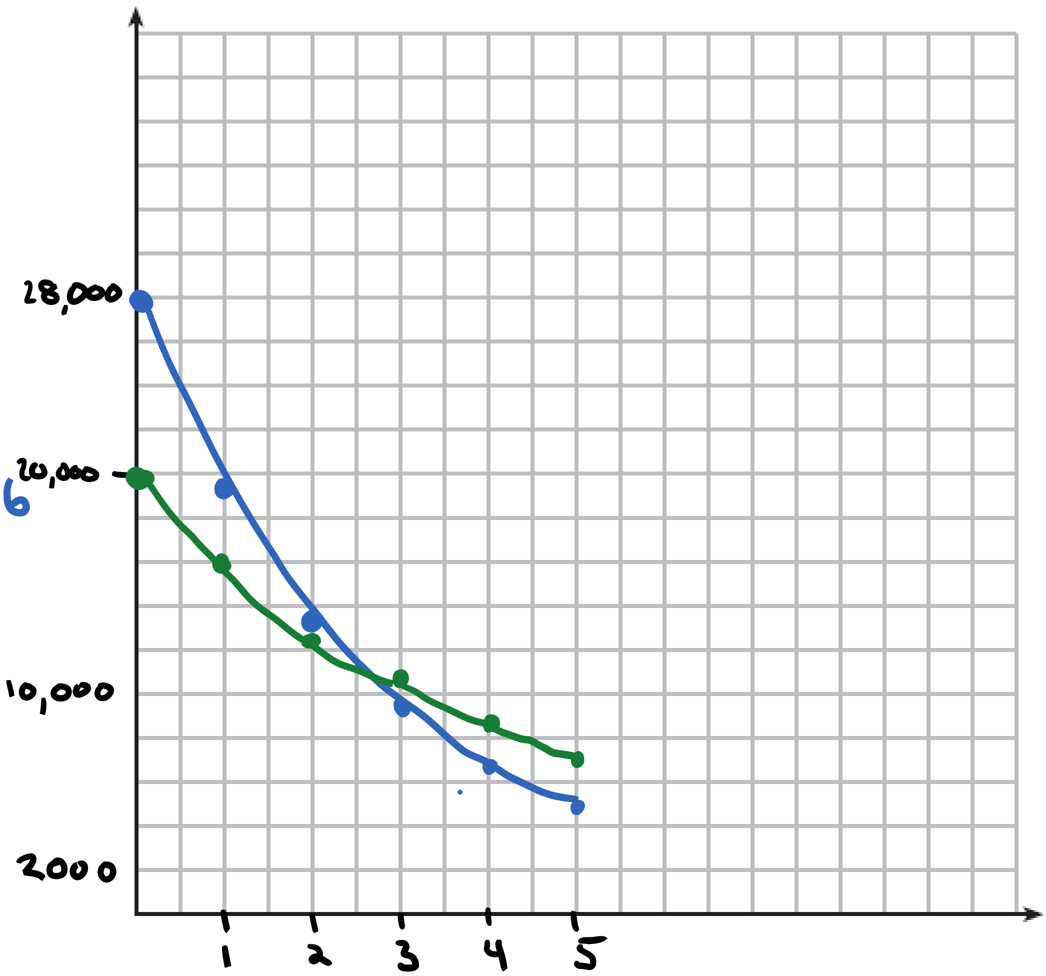
3.) The value of a certain small passenger car based on its use in years is modeled by $V(t) = 28{,}000(0.7)^t$, where $V(t)$ is the value in dollars and t is the time in years.

Zach had to take out a loan to purchase the small passenger car.
The function $L(t) = 20{,}000(0.8)^t$, where $L(t)$ is measured in dollars, and t is the time in years, models the unpaid amount of Zach's loan over time.

a. Graph $V(t)$ and $L(t)$ over the interval $0 \le t \le 5$, on the set of axes below.

$V(t)$

x	y
0	28,000
1	19,600
2	13,720
3	9604
4	6722.8
5	4705.96



$L(t)$

x	y
0	20,000
1	16,000
2	12,800
3	10,240
4	8192
5	6553.6

b. State when $V(t) = L(t)$, *to the nearest hundredth*, and **interpret** its meaning in the context of the problem.

Intersection $(2.52, 11{,}398.20)$

After 2.52 years the value of the car is \$11,398.20 which is the same as the loan amount.

c. Zach takes out an insurance policy that requires him to pay a \$5000 deductible in case of a collision. Zach will cancel the collision policy when the **value** of his car equals his deductible.

To the nearest tenth of a year, how long will it be until Zach will cancel his collision policy? **Justify your answer.**

Intersection

$(4.8, 5000)$

$\boxed{\text{4.8 years}}$

4.) Pedro and Bobby each own an ant farm. Pedro starts with 100 ants and says his farm is growing exponentially at a rate of 15% per month. Bobby starts with 350 ants and says his farm is steadily decreasing by 5 ants per month.

Assuming both boys are accurate in describing the population of their ant farms, after how many months will they both have approximately the same number of ants?

(a) 7 (b) 8 (c) 13 (d) 36

Pedro

$y = a(b)^x$

$y = 100(1.15)^x$

Bobby

$y = mx + b$

$y = -5x + 350$

Intersection

$(8, 310)$