Name: Homework
Date: _____

Exponential Functions – 03

$y = ac^x$

x = years
y = money

a = 250
c = 4.5

1. **You start a bank account with $250.**
   The annual interest rate is 4.5%. $100 + 4.5 = 104.5$, $\frac{104.5}{100} = 1.045$
   How much money will be in the account after 8 years?

$y = ac^x$

$y = 250(1.045)^8$

$y = 355.53$

2. **In 1995, there were 305 cell phone subscribers in the city of Dorion.**
   The number of subscribers increased by 25% per year after 1995.
   How many cell phone subscribers are in Dorion in 2016?

x = years
y = subscribers
a = 305
c = 25%

2016 − 1995 = 21

$y = ac^x$

$c = 25 + 100 = 125$, $\frac{125}{100} = 1.25$

$y = 305(1.25)^{21}$

$y = 33\,068$ subscribers

3. **Bacteria can multiply at an alarming rate when each bacteria splits into two new cells.**
   If we start with 6 bacteria, which can double every 2 hours, how many bacteria will we have by the end of one day (*hint: first figure out how many times they double***)?**

x = hours $\frac{24}{2} = 12$
y = bacteria
a = 6
c = double

$y = ac^x$

$y = 6(2)^{12}$

$y = 24\,576$ bacteria

4. **Each year, the city of Saint-Anne-de-Bellevue sponsors a tennis tournament.**
Play starts with 128 participants.
During each round, half of the players are eliminated.
How many players remain after 6 rounds?

x = rounds
y = participants
a = 128
c = 100 − 50 = $\frac{50}{100}$ = 0.5

$y = ac^x$
$y = 128(0.5)^6$
$y = 2$

5. **The population of Vaudreuil can be modeled by $P = 6191(1.04)^x$, where x is the number of years since 2014.**

x = years
y = population
a = 6191
c = 4%

a) What was the population in 2014?

a) 6191

b) By what percent should the population increase by each year?

b) 1.04(100) = 104 − 100 = 4
4%

c) What might the population of Vaudreuil be in 2020?

c) $6191(1.04)^6$
7833

2020
−2014
6

6. **You have inherited land that was purchased for $30,000 in 1960.**
The value of the land increased by approximately 4.5% per year.
What is the approximate value of the land in the year 2016?

x = years
y = value
a = 30 000
c = 100 + 4.5 = $\frac{104.5}{100}$ = 1.045

2016
−1960
56

$y = ac^x$
$y = 30000(1.045)^{56}$
$y = 352\,885.26$

x = years
y = value
a = 950
c = 100 − 21 = 79 = 0.79
100

7. **Nia buys a cell phone for $ 950.00 in 2016**
   The phone loses 21 percent of its value every year.

   a) **After how many years will the value of Nia's phone first drop below $200?**

   b) **What year will it be?**

X	Y
5	292
7	182.44
6	230.93

$y = 950(0.79)^5$
$y = 292$

$y = 950(0.79)^7$
182.44

$y = 950(0.79)^6$

a = 7 years
b = 2016 + 7 = 2023

8. **The foundation of a house has about 1,200 termites.**
   The termite population grows at a rate of about 2.4% per day.
   How long will it take for the number of termites to double?

1200 x 2 = 2400

x = days
y = termites
a = 1200
$c = 100 + 2.4 = \frac{102.4}{100} = 1.024$

$y = 1200(1.024)^5$
1351

$y = 1200(1.024)^{50}$
3928

$y = 1200(1.024)^{30}$
2444

$y = 1200(1.024)^{29}$
2387

30 years