1. In 1984, Maggie bought a house worth $ 220 000 but did no maintenance on it.
   As a result, the value of the house **depreciated** by 4.5% every year since the time she bought it.
   How much is the house worth in 2016?

$x = $ years $\dfrac{\overset{2016}{-1984}}{32}$

$y = $ value

$a = 220\,000$

$c = 100 - 4.5 = \dfrac{95.5}{100} = 0.955$

$y = ac^x$

$y = 220\,000\,(0.955)^{32}$

$y = 50\,411.6^1$ / 3 pts

The house is worth $ ___50 411.61___

2. **Three** mutant dogs are created in a lab and escape containment.
   If the population of mutant dogs **doubles** every day, **how many mutant dogs will exist after two weeks?**

$x = $ days (14)

$y = $ dogs

$a = 3$

$c = 2$

$y = ac^x$

$y = 3\,(2)^{14}$

$y = 49\,152$ / 3 pts

There will be ___49 152___ mutant dogs

3. The ultimate 'rock-paper-scissors' competition has drawn **8192 players** from across the world.
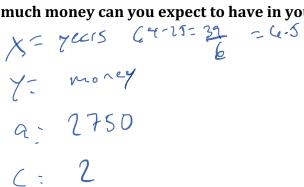   After each round, **half** of the players are eliminated.
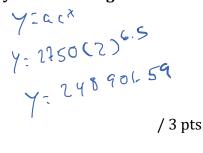   **How many players will be left after the 12th round?**

$x = $ rounds (12)

$y = $ players

$a = 8192$

$c = 100 - 50 = \dfrac{50}{100} = 0.5$

$y = ac^x$

$y = 8192\,(0.5)^{12}$

$y = 2$ / 3 pts

There will be ___2___ players left after the 12th round

4. You open an investment account at the **age of 25** with a deposit of **2750 $**.
   Your investment adviser tells you your money will **double every 6 years**.
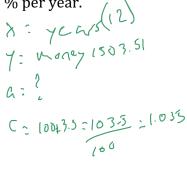   **How much money can you expect to have in your account when you retire at age 64?**

$$X = \text{years} \quad 64-25 = \frac{39}{6} = 6.5$$

$$Y = \text{money}$$

$$a = 2750$$

$$c = 2$$

$$y = ac^x$$

$$y = 2750(2)^{6.5}$$

$$Y = 248\,906.59$$

/ 3 pts

You can expect to have $ ___248 901.59___ in the account

5. I have $ 1503.51 in my account after 12 years investing at 3.5 % per year.
   How much money did I start investing with?

$$Y = ac^x$$

$$1503.51 = a(1.035)^{12}$$

$$1503.51 = a(1.511068865734)$$

$$\frac{1503.51}{1.511068865734} = \frac{a(1.511068865734)}{1.511068865734}$$

$$995 = a$$

$$x = \text{years} (12)$$

$$Y = \text{money } 1503.51$$

$$a = ?$$

$$C = 100+3.5 = 103.5 = 1.035$$
$$ \frac{}{100}$$

/ 4 pts

I started investing with $ ___995___

6. A painting was purchased in 2016 for 1.0 million dollars.
   The value of the painting **increases by 6.5 % every year** from the date of purchase.
   In what year will the value of the painting triple in value?

$$X = \text{years}$$

$$Y = 3 \text{ million}$$

$$a = 1 \text{ million}$$

$$C = 1.065$$

$$y = ac^x$$

$$3 = 1(1.065)^x$$

X	Y
8	1.65
20	3.52
17	2.91
18	3.10

/ 4 pts

$$\begin{array}{r} 2016 \\ + 18 \\ \hline 2034 \end{array}$$

The painting will triple in value in the year ___2034___

7. Jess and Sam both started investing at the same time.

Jess started with 1200 $ and her investment grew by 5% every year.
Sam started with 1600 $ and her investment grew by 4% every year.

$100 + 5 = \frac{105}{100} = 1.05$

$100 + 4 = \frac{104}{100} = 1.04$

After a number of years, Jess' investment was worth 1772.95$
How much profit did Sam make from her investment?

Hint: $Profit = final\ money - initial\ money$

Jess

$y = ac^x$

$1772.95 = 1200(1.05)^x$

x	y
5	1531.53
8	1772.95

Sam

$y = ac^x$

$y = 1600(1.04)^8$

$y = 2189.71$

/5

$2189.71 - 1600 = 589.71$

Answer: Sam made a profit of $ _____ 589.71 _____ from her investment.