

Name:

Algebra 1 CC

Period:

Review 7.2 and 7.4

**This will be on the Unit 8 TEST**

- $a^m * a^n = a^{m+n}$  add exponents
- $(a^m)^n = a^{mn}$  multiply exponents
- $(ab)^m = a^m b^m$  distribute exponent.
- $\frac{a^m}{a^n} = a^{m-n}$  subtract exponents

**Simplify the expression.**

1.  $x^9 * x^7$

2.  $b^2 * b^5$

3.  $(c^3)^7$

4.  $(a^3 b^4 c^5)^2$

5.  $\left(\frac{2}{z^9}\right)^9$

6.  $\frac{x^7}{x^3}$

7.  $\frac{y^{32}}{y^{20}}$

8.  $(x^5 y^3 z^1)^2$

Draw the graph, then find the intercepts, and then determine the end behavior

1.  $y = 3^x$

X	-2	-1	0	1	2	3	4
Y							

Intercepts:

End Behavior:

3.  $y = -2^x$

X	-2	-1	0	1	2	3	4
Y							

Intercepts:

End Behavior:

5.  $y = 3^x + 5$

X	-2	-1	0	1	2	3	4
Y							

Intercepts:

End Behavior:

2.  $f(x) = -4^x$

X	-2	-1	0	1	2	3	4
Y							

Intercepts:

End Behavior:

4.  $f(x) = 5^x$

X	-2	-1	0	1	2	3	4
Y							

Intercepts:

End Behavior:

6.  $f(x) = -4^x - 2$

X	-2	-1	0	1	2	3	4
Y							

Intercepts:

End Behavior:

## 8.2 Half-Life!

Sounds different... But not really.

### Warm-Up!

- Determine the factor(Multiplier) from the given information

Increasing by 7%

Decrease by 13%

Raise of 4% each year

6% sales tax

25% off sale

General 10%, and special offer of 15%

### Example 3

- A \$65,000 car depreciates in value by 10% each year. What function represents the value of the car after  $t$  years?

### Example 4

- A \$5,000 car depreciates in value by 2% each year. What function represents the value of the car after  $t$  years?
- Determine the value of the car after 7 years.

### Half Life talk

- What do you think when you hear half?



### Half life problems



- A scientist has 100 grams of radioactive substance. Half of it decays every hour. Write an equation to find how long it takes until 25 grams are left.
- Make a table for all the values

### Half life problems



- An alien radioactive isotope has a half-life of 238 years. If you start with a sample of 8 kg, how much will be left in 714 years?
- Write a function and solve it!

### Half life problems



- Hospitals utilize the radioactive substance iodine-131 in the diagnosis of conditions of the thyroid gland. The half-life of iodine-131 is eight days. Calculate the amount of days it will take to get the hospitals amount of iodine-131 from 2500 grams to less than 20 grams

Half life problems  $^{198}\text{Au}$ 

- Gold-198 has a half-life of 2.7 days. How much of a 96 g sample of gold-198 will be left after 8.1 days?

## Half life problems



- Potassium-42 has a half-life of 12.4 hours. How much of an 848 g sample of potassium-42 will be left after 62.0 hours?

## Half life problems

- If the half-life of iodine-131 is 8.10 days, how long will it take a 50.00 g sample to decay to 6.25 g?

## Half life problems

- The half-life of hafnium-156 is 0.025 s. How long will it take a 560 g sample to decay to one-fourth its original mass?

### Half life problems

- Thallium-208 has a half-life of 3.053 min. How long will it take for 120.0 g to decay to 7.50 g?

## *Half-life Practice Worksheet*

Name \_\_\_\_\_

Period \_\_\_\_\_ Date \_\_\_\_\_

1. The half-life of cobalt-60 is 5.26 years. How many half-lives have passed in 10.52 years?
2. 12.5% of a radioactive sample are left. How many half-lives have passed?
3. After 3 half-lives, how much of a 400 gram sample of radioactive uranium remains?
4. After 4 half-lives 10 grams of uranium remains. How much uranium did you start with?
5. How old is an artifact if four half-lives have occurred and the half-life of carbon-14 is 5730 years?

6. How much time has passed if carbon-14 has a half-life of 5730 years and 2 half-lives have passed?
7. A rock that originally had a mass of 1.00 gram of uranium-238 now has only 0.50 grams. How old is the rock if the half-life of uranium-238 is 4.5 billions of years.
8. The radioisotope radon-222 has a half-life of 3.8 days. How much of a 10 g sample of radon-222 would be left after 15.2 days?
9. A piece of wood found in an ancient burial mound contains only half as much carbon-14 as a piece of wood cut from a living tree growing nearby. If the half-life for carbon-14 is 5730 years, what is the approximate age of the ancient wood?
10. Iodine-131 has a half-life of 8 days. If the amount of iodine-131 in a sample is 8 g, how much iodine-131 will remain after 32 days?

Name:

Homework 8.12

Period

**Write a function and solve it!**

1. An initial investment of \$25,000 grows at 3% per year. What function represents the value of the investment after  $t$  years? How much money would you have after 5 years?
2. A \$32,000 car depreciates in value by 7% each year. What function represents the value of the car after  $t$  years? How much money would the car be worth after 7 years?
3. An initial investment of \$2,000 grows at 5% per year. What function represents the value of the investment after  $t$  years? How much money would you have after 20 years?
4. A new video game costs about \$65. Its value will depreciate over time at a rate of 60% per year. What function represents the value of the car after  $t$  years? How much money would the car be worth after 3 years?
5. An initial investment of \$100 grows at 4% per year. What function represents the value of the investment after  $t$  years? How much money would you have after 50 years?

6. Carbon-14 has a half-life of about 5700 years. If you have 100 grams of Carbon-14 when will it only be 12.5 grams?
- 

7. A certain medicine is broken down by the body so that half of the remaining dose in the system is broken down every 4 hours. If you take 200mg of the medicine in the morning, how many mgs of the medicine are in your body by the next time you take the medicine?

8. Iodine-131 has a half-life of 8 days. If you were to use 500g of Iodine-131. How many days would it take you to have less than 30 grams?

9. A ncaa march madness bracket has a half-life of 2 days. The bracket starts with 64 teams. After how many days will you have your champion?

10. In college, there are 347 schools that have a basketball team. They voted to make the playoffs be a bracket that contained 256 teams. After each day the teams will be cut in half. How many days will it take to get down to 32 teams remaining.