

Welcome Back!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: <u>2/26</u> Topic: <u>Exponential Project Due!</u>	0 1 2	
Tuesday Date: <u>2/27</u> Topic: <u>ACT For Juniors</u>	0 1 2	
Wednesday Date: <u>2/28</u> Topic: <u>Finish project - OR- Prop. WS (Improve study guide)</u>	0 1 2	
Thursday Date: <u>3/1</u> Topic: <u>Unit 5 Review (pink WS)</u>	0 1 2	
Friday Date: _____ Topic: _____	0 1 2	

Warm-up:

Using two different properties of exponents, write an expression that equals 100.

$$(4)^0 \left(\frac{10^8}{10^6} \right) = 10^2 = 100$$

$$\left(\frac{10^6}{10^8} \right)^{-1} = 100$$
$$= \frac{10^8}{10^6} = 10^2 = 100$$

$b^m \cdot b^n = b^{m+n}$	$(b^m)^n = b^{m \cdot n}$	$(ab)^n = a^n \cdot b^n$	$b^0 = 1$
$\frac{b^m}{b^n} = b^{m-n}$	$b^{-n} = \frac{1}{b^n}$	$\left(\frac{a}{b} \right)^n = \frac{a^n}{b^n}$	

Warm-up:

One option :)

Using two different properties of exponents, write an expression that equals 100.

$$\left(\frac{10^3}{10^4}\right)^{-2} = \frac{10^{-6}}{10^{-8}} = \frac{10^8}{10^6} = 10^2 = \underline{\underline{100!}}$$

$b^m \cdot b^n = b^{m+n}$	$(b^m)^n = b^{m \cdot n}$	$(ab)^n = a^n \cdot b^n$	$b^0 = 1$
$\frac{b^m}{b^n} = b^{m-n}$	$b^{-n} = \frac{1}{b^n}$	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	

Warm-up:

One option :)

Using two different properties of exponents, write an expression that equals 100.

$$(2^2)^3 + \frac{1}{6^{-2}} = 2^6 + 6^2 = 64 + 36 = 100$$

$b^m \cdot b^n = b^{m+n}$	$(b^m)^n = b^{m \cdot n}$	$(ab)^n = a^n \cdot b^n$	$b^0 = 1$
$\frac{b^m}{b^n} = b^{m-n}$	$b^{-n} = \frac{1}{b^n}$	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	

Class Plan:

1. Homework Questions?

2. Examples

3. Unit Test Review Time

-Use old handouts to practice

-Examine notes (online)

-Redo quiz problems

Recall the Properties of Indices

$b^m \cdot b^n = b^{m+n}$	$(b^m)^n = b^{m \cdot n}$	$(ab)^n = a^n \cdot b^n$	$b^0 = 1$
$\frac{b^m}{b^n} = b^{m-n}$	$b^{-n} = \frac{1}{b^n}$	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	

Recall our Exponential Equation:

a: Starting value $y = a \cdot b^x$

b: Constant multiplier (multiplier is always positive.)

r: Rate of growth/decay, interpreted as a %

Exponential Growth

$$b > 1$$

$$y = a(1 + r)^x$$

Ant Population Example:

$$y = 16(1.5)^x = 1+.5$$

r = 50% growth

Exponential Decay

$$0 < b < 1$$

$$y = a(1 - r)^x$$

Car Value Example:

$$y = 21,700(0.83)^x$$

r = 17% depreciation

Exponential Applications

Credit Card - Mr. Olsen spent \$4590 and needs to pay it off to avoid interest!

Credit Card!

1) Mr. Olsen opened up a credit card while he was injured and out of work. He used the credit card for expenses and some bills for 1 month. The amount on his account is modeled by the equation below:

$$y = 4590(1.095)^t$$



Student Loan - Mrs. Gonzales has student loan for \$3010 & needs to pay to avoid interest.

Student Loan!

1) Mrs. Gonzales took out a student loan for college. The amount of her loan is modeled by the equation below:

$$y = 3010(1.055)^t$$



Credit Card - How much spent 1st month?

$$y = 4590(1.095)^t$$

a) How much did Mr. Olsen spend in the first month while he was out of work?
Explain how you know.



Credit Card - How much spent 1st month?

$$y = 4590(1.095)^t$$

a) How much did Mr. Olsen spend in the first month while he was out of work?

Explain how you know.

\$4590, at zero months, the equation shows: $y = 4590(1.095)^0$

$$y = 4590(1)$$

$$y = \$4590$$



Credit Card - Growth rate (%) ?

$$y = 4590(1.095)^t$$

b) What is the percentage rate of Mr. Olsen's credit card? **Explain how you know.**



Credit Card - Growth rate (%) ?

$$y = 4590(1.095)^t$$

b) What is the percentage rate of Mr. Olsen's credit card? **Explain how you know.**

$$1+r = 1+.095$$

$$r = .095$$

$$r = 9.5\%$$

.095 more
than 1



Credit Card - What does he have to pay if he doesn't pay his bill for 2 more months?

$$y = 4590(1.095)^t$$

c) Suppose Mr. Olsen stopped using the credit card when he went back to work, but he cannot pay his monthly bill, and the interest builds on the account for another 2 months. How much money does he owe the credit card after these **additional 2 months**?



Credit Card - What does he have to pay if he doesn't pay his bill for 2 more months?

$$y = 4590(1.095)^t$$

c) Suppose Mr. Olsen stopped using the credit card when he went back to work, but he cannot pay his monthly bill, and the interest builds on the account for another 2 months. How much money does he owe the credit card after these **additional 2 months**?

$$y = 4590(1.095)^2$$
$$y \approx 4590(1.199)$$
$$y \approx \$5503.52$$



Credit Card - How much interest incurred ?

$$y = 4590(1.095)^t$$

d) How much interest did Mr. Olsen incur during those additional 2 months? **Explain how you know.**



Credit Card - How much interest incurred?

$$y = 4590(1.095)^t$$

d) How much interest did Mr. Olsen incur during those additional 2 months? **Explain how you know.**

Mr. Olsen spent [#]4590 of the [#]5503.52 that he owes his credit card.

$$5503.52 - 4590 = \text{\$}913.52$$

He incurred [#]913.52 in
INTEREST!



Student Loan - How much was the initial loan?

$$y = 3010(1.055)^t$$

a) How much was the loan before Mrs. Gonzales incurred interest?
Explain how you know.



Student Loan - How much was the initial loan?

$$y = 3010(1.055)^t$$

a) How much was the loan before Mrs. Gonzales incurred interest?
Explain how you know.

The loan amount is when the time is zero months. (Before interest is calculated)

$$y = 3010(1.055)^0$$

$$y = 3010(1) \quad \text{\$} \quad y = 3010$$



Student Loan - What is the rate of growth (%)?

$$y = 3010(1.055)^t$$

b) What is the percentage rate of Mrs. Gonzales's loan? **Explain how you know.**



Student Loan - What is the rate of growth (%)?

$$y = 3010(1.055)^t$$

b) What is the percentage rate of Mrs. Gonzales's loan? **Explain how you know.**

$$1 + r = 1.055$$

$$r = .055$$

$$r = 5.5\%$$

5.5% more
than 100%



Student Loan - How much does she own after not paying for 2 months?

$$y = 3010(1.055)^t$$

c) Suppose Mrs. Gonzales cannot pay her monthly bill, and the interest builds on the loan for 2 months. How much money does she owe after not paying the loan for 2 months?



Student Loan - How much does she own after not paying for 2 months?

$$y = 3010(1.055)^t$$

$$t = 2$$

c) Suppose Mrs. Gonzales cannot pay her monthly bill, and the interest builds on the loan for 2 months. How much money does she owe after not paying the loan for 2 months?

$$y = 3010(1.055)^2$$

$$y \approx 3010(1.113)$$

$$y \approx \$3350.21$$



Student Loan - How much interest incurred ?

$$y = 3010(1.055)^t$$

d) How much interest did Mrs. Gonzales incur during those 2 months? **Explain how you know.**



Student Loan - How much interest incurred?

$$y = 3010(1.055)^t$$

d) How much interest did Mrs. Gonzales incur during those 2 months? **Explain how you know.**

Her loan was [#]3010. After 2 months
she owed [#]3350.21.

$$3350.21 - 3010 \approx \text{\$}340.21$$

\\$340.21 in interest



Exercises...

Study!
Unit 5 Exponential Test
Tomorrow!