Name Key Your score _____ Percent _____%

Chapter 3 Pre-Test (adv. Math) Possible points _____ Grade _____
Melott

Show Work on ALL Problems

Simplify the expression.

1) $5a-2(3a-4)-(-4a)-1$

$5a-6a+8+4a-1$

$3a+7$

Determine the value of *n* to make the statement true. you need the same base

2) $(-2)^{-n}\times\frac{1}{-32}=(-2)^3$

$(-2)^{-n}\cdot(-2)^{-5}=(-2)^3$ → $-n+(-5)=3$

$+5\quad+5$

$-n=8$

$n=-8$

Simplify completely. Express all answers as fractions in simplest form. Choose 4 problems from 3–6.

even exponents turn neg. into positive if you see parentheses

3) $(-.04)^{-2}$

$\left(\frac{-4}{100}\right)^{-2}$ or $\left(\frac{100}{-4}\right)^2=\left(\frac{25}{-1}\right)^2$

$=+625$

$+\frac{10,000}{16}$

4) $\left[\frac{-4}{7}\right]^{-2}$

$\left[\frac{7}{-4}\right]^2=+\frac{49}{16}$

5) $\left[7(x+3)^3\right]^{-3}$

$\frac{1}{(x+3)^{+9}}$

6) $\frac{16xy^{-3}z^4}{-4xy^9z^6}$

-4

$y^{+12}\ z^{+2}$

$\frac{16}{-4}=-4$

$\frac{x^1}{x^1}=x^{1-1}=x^0=1$

$y^{-3-9}=y^{-12}=\frac{1}{y^{12}}$

$z^{+6}=z^{-2}=\frac{1}{z^2}$

How many different 3–letter words are possible using the letters from the word **awesome** ? Each letter can only be used once.

$7 \cdot 6 \cdot 5 = 210$

What is the probability that a randomly chosen set of 3 letters from the word **awesome** taken in order would result in the word **was** ?

$7 \cdot 6 \cdot 5 = \rightarrow \frac{1}{210}$

8) The population of a colony of crickets t days from now is modeled by the equation $y = 100 \times 1.7^{t/8}$. What will the population of crickets be in 5 days?

$y = 100 * 1.7^{(5/8)}$ 139.325489

$y = 139.33$ crickets

9) The fish population in a certain lake in year t is approximated by the following model

$$y = \frac{700}{2+197e^{-.585t}}$$

a) What is the population now?
b) What will the population be in 10 years?
c) There is a limit to how many fish can live in a certain area. Approximately, what is the limit?

a) $y = \frac{700}{2+197e^{(-.585 * 0)}}$ (0 = initial)

$y = \frac{700}{199}$

$y = 3.5$ fish

b) $y = \frac{700}{2+197e^{(-.585 \cdot 10)}}$

$y = \frac{700}{2.567340134}$

$y = 272.66$ fish

c) Yes, there's a limit. Plugin different #'s for t until you begin to obtain the same result over & over.

30 years

349.999

$t = 25$; 349.9846504

An initial count of the number of lizards in a colony puts the number of lizards at 800. Four days later, the count was 2,500. Assume that the lizards grow exponentially.

a) Find the equation that models the data.
b) What is the growth factor per day?
c) How many lizards are there after 3 weeks?

a) $y = y_0 b^t$

b) $\frac{2500}{800} = \frac{800 \cdot b^{(4-0)}}{800}$

$\sqrt[4]{3.125} = \sqrt[4]{b^4}$

$1.33 = b$ growth rate

$y = 800 * 1.33^t$ ★★★

c) $y = 800 * 1.33^{21}$ (21)

$y = 319135.01$

11) A daily study of the ant population at the "Ant House", an ant farm in Texas, gained the following results. At day 4, there were 500 ants and by the 7th day, there were 3,800 ants. If they cannot control the growth of the ants, the Environmental Protection Agency (EPA) will shut down the ant farm. The EPA said that if they have more than 25,000 ants by the end of the week, day 7, then they will shut them down.

a) How many ants do they have on the 7th day?
b) Will the EPA shut the ant farm down?

(4, 500) and (7, 3800)

a) $y = y_0 b^t$

$3800 = 500 \cdot b^{(7-4)}$

$\frac{3800}{500} = \frac{500 \cdot b^3}{500}$

$\sqrt[3]{7.6} = \sqrt[3]{b^3}$

$1.97 = b$ growth rate

a) continued $y = y_0 b^t$

$3800 = y_0 (1.97)^7$

$3800 = y_0 \cdot 115.1499048$

$\frac{3800}{115.1499048} = \frac{y_0 \cdot 115.1499048}{115.1499048}$

$33.00 = y_0$ ants

$y = y_0 \cdot b^t$

$y = 33 \cdot 1.97^7$ (7)

$y = 3799.95$

No, the EPA will not shut down the farm 3799.95 < 25,000