1. Simplify. Write your answer with positive exponents only. a -3 ( a3 b -4) -5divided by b -3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | a6 b6 | | |
|  |  | 1 / a6 b6 | | |
|  |  | a18 b17 | | |
|  |  | b23 / a18 | | |
|  | | |  |  | |
|  | | |  |  | |
|  | | |  |  | |
|  | | |  |  | |
|  | | |  |  | |

1. Simplify. √500

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | |  |  | 50 √5 | |  |  | 100 √5 | |  |  | 10 √5 | |  |  |  | |

1. Simplify (– 2a2b3)2 / ( 2a2b)3 (Show all Work)
2. Suppose a population of initial size 100 grows at the rate of 8% per year forever.   
   What is the size of the population at the end of year 1?  
   What is the size of the population at the end of year 2?  
   What is the size of the population at the end of year 3?  
   What is the size of the population at the end of year n (for any integer n)?  
   What algebraic equation would you need to solve to find the number of years x that it would take for our population to reach 200? Use a calculator to solve to x.

(Show all Work)

1. Simplify without negative exponents [ x y 5 / x -4 y 2 ] -2 (Show all Work)

1. Evaluate if possible 3√ - 64 [cube root of  -64] and 3√ 64 [cube root of 64] and √ -64 [sqrt(-64)]  and √ 64 [sqrt(64) ]   (Show all Work)
2. Simplify √ (32x5y2)   that is    sqrt (32x5y2) { Show your work }
3. The Schwarzschild radius describes the critical value to which the radius of a massive body must be reduced for it to become a black hole. (Show all Work)

R = 2 G M / c 2

where

G = gravitational constant 6.7x10 -11

M= mass of the object

C = speed of light 3x10 8

The sun has M = 2x10 30 . What is the Schwarzschild radius for the sun? [Note its true radius is 700,000.]