Sydney Wilborn
Precal Paper #2
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Second Quantitative Reasoning Paper

For this particular paper, we are using quantitative reasoning to find a solution to our question. Our question poses to be: the deer population in a Pennsylvania county was 20,000 in 2003 and increased by 50% by 2007. How long will it take the deer population to reach 100,000? The solution to this question will be determined by using representation, problem solving, reasonableness, and interpretation.

The first step in determining the solution is by using mathematical representation. This will include the steps and the full process of problem solving. For this question, our mathematical representation will be: after four years (2003-2007) our population of deer in a Pennsylvania county has increased by 50%. Next, the variables that are determined are below:

F(X) = number of years after 2003
Y = deer population

These variables represent the population and the number of years because if the years increase (according to our evidence), the deer population (y) will then increase, too. Therefore, the equation we will use in our problem solving problem is: (50/100)x20,000=10,000. So, after four years the population will be 30,000. And based on our evidence and prediction, after eight years it will have risen to 45,000.

The next step is to actually solve the problem. This will include the models and how the work was done. The first step was solving to get our x's and y's which are below:

X	Y
0	20,000
4	30,000
8	40,000

X	Y
0	1
1	1.5
2	2.25

The y values are determined by multiplying each value by 1.5 (y=(1.5)^x). Which is shown by: 20,000x1.5=30,000, 30,000x1.5=40,000. Also as, 30,000/20,000=1.5, 40,000/30,000=1.5. Therefore leaves a representation of y=A^1.5. This equation is used because it determines the deer population that which corresponds with each year.

This leaves us with :

(0, 20,000) **(0, 1)**

(4, 30,000) **(1, 1.5)**
(8, 45,000) **(2, 2.25)**

Then, to find out how many years it takes to have a population of 100,000, we use the equation: f(x)=20,000(1.5)^(x/4). Being worked out, it will be:

f(x)=20,000(1.5)^(x/4)
100,000=20,000(1.5)^(x/4)
(divide 20,000 by both sides)
5=1.5^(x/4)
log1.5(5)=(x/4)
4log1.5(5)=x
4((log5)/(log1.5))=x
4(0.699/0.1761)
4(3.9693)=x
X = 15.8773 years

So, it will take 15.8773 years to reach a deer population of 100,000.

Lastly, we use reasonableness to explain how and why our solution works in determining the population each year. I believe that the equations we used in determining the deer population is accurate because each year, the number of deer grow atleast twice as much from breeding. However, an assumption that I will make is that the deer population will continue to grow if there are not any threats or pushbacks. These pushbacks may include disease, illness, hunting, or any type threat to the population.