

Student 1

If no human beings are left to kill the cockroaches, how long will it take for cockroaches to cover the state of North Carolina? Explain how you arrived at your estimate.

x	y
0	1
.5	2
1	4
1.5	8

x	y
2	16
2.5	32
3	64
3.5	128

- x is time in years
- y is # of cockroaches
- z is amount of sq. inches covered

x	y	z
0	1	.3333
.5	2	.6666
1	4	1.3333
1.5	8	2.6666
2	16	5.3333
2.5	32	10.6666
3	64	21.3333
3.5	128	42.6666

How long would it take for cockroaches to cover the USA?

Student 2

$$y = 1 \cdot 2^x$$

x	y
0	1
1	2
2	4
3	8
4	16

?

From problem

x	y
0	1
.5	2
1	4
1.5	8
2	16

Student 3

$$y = Pe^{rt}$$

$$y = 1 \cdot e^{rt}$$

After 1 year, 4 bugs

$$4 = 1 \cdot e^{r \cdot 1}$$

$$4 = e^r$$

$$\ln 4 = \ln e^r$$

$$\ln 4 = r \cdot \ln e$$

$$r = \ln 4 \approx 1.38629$$

$$y = 1 \cdot e^{t \cdot \ln 4}$$

NC 53,819 sq. miles
 2.16056×10^{14} sq. inches

$$2.16056 \times 10^{14} \div 3$$

$$= 7.2018\bar{6} \times 10^{13}$$

$$7.2018\bar{6} \times 10^{13} = e^{t \cdot \ln 4}$$

$$\ln(7.20186 \times 10^{13}) = \ln e^{t \cdot \ln 4}$$

$$\ln(7.20186 \times 10^{13}) = t \cdot \ln 4$$

ДАНЬ НА ПОСЛАНИЕ

$$t = 23.0167 \text{ years}$$

Student 4

X	y
1	2
2	4
3	8
4	16
5	32
6	64
7	128

• x is # of
6 month periods
of time

• y is # of
cockroaches

$$y = 2^x$$

year 13

$$13 / .5 = 26 \text{ six month periods}$$

$$y = 2^{26} = 67,108,864 \text{ cockroaches}$$

year 20

$$20 / .5 = 40 \text{ six month periods}$$

$$y = 2^{40} \approx 1.0995 \times 10^{12} \text{ cockroaches}$$

year 40

$$40 / .5 = 80 \text{ six month periods}$$

$$y = 2^{80} \approx 1.2089 \times 10^{24}$$