

3. (16 points) The following table gives the approximate number of cell-phone subscribers, N , in millions worldwide in 1995, 1996, and 1997.

Year	1995	1996	1997
Subscribers	91	138	210

a. Show that this data can be modeled using an exponential function. What is the annual growth rate in the number of cell-phone subscribers?

The ratio is $\frac{138}{91} = 1.51$

$\frac{210}{138} = 1.51$

* The ratio is constant, therefore it can be exponential

The annual growth is ~~51%~~ 1.51, 51%

* check with two points has 1.52

b. Find a formula for the number N of cell-phone subscribers assuming exponential growth. Measure time, t , in years since 1995.

$$N = 91 (1.51)^t$$

c. Use your formula to solve for the time it will take for the number of cell-phone subscribers to exceed the current world population, approximately 7 billion. Based upon this result, what can you conclude about this model?

$$N = 91 (1.51)^t = 7 \text{ billion}$$

$$N = (1.51)^t = 7692.307$$

$$+ \log(1.51) = \log(7692.307)$$

$$\log(1.51)$$

$$\log(1.51)$$

$$t = 21.712 \text{ years}$$

conclusion

The cell phone subscribers will reach 7 billion in 21.712 years

4