Zombie Apocalypse

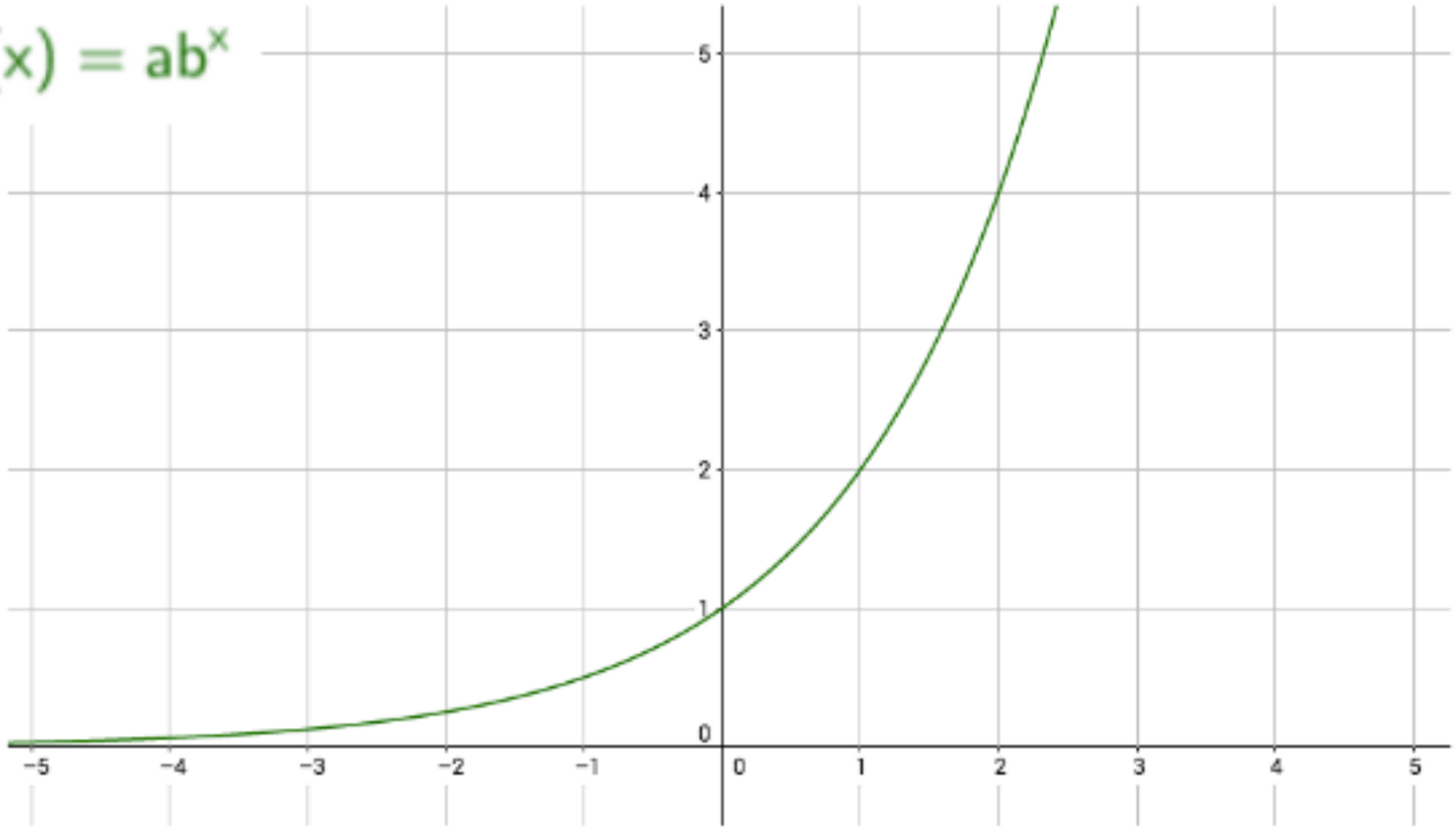
On June 30, 2035, a sleeper cell of zombies executed an evil plan 10 years in the making. Their objective: to "turn" the entire human race into evil zombies! Each zombie can turn 3 humans per day, but they are not sure how long it will take them to completely turn every human on the planet. Complete the table below to show how many total zombies there will be every day for the first 10 days of the attack. The original sleeper cell had only 5 members, but keep in mind that newly turned zombies also have the power (and they will!) to turn other humans.

Exponential Growth Functions

A function of the form: $f(x) = ab^x$

Where $a > 0$ and $b > 1$.

a is the initial value, and
b is the growth factor



What were the initial values or initial amounts with our zombie problems?

What were the growth factors?

Exponential Growth Model:

$$y = a(1+r)^t$$

Most real world problems will have percents as the rate of change, so in order for the growth factor to be greater than 1, we add 1 to the percent

In 1996, there were 2573 computer viruses. During the next 7 years, the number of incidents increased by about 92% each year.
What is the exponential growth model giving the number *n* of incidents *t* years after 1996.

a =

r =

About how many incidents were there in 2003?

In 1970, the population of a city in California was about 330,000. From 1970 to 2000, the city population grew at an average annual rate of 2.4%

Write an exponential growth model giving the population p of the city t years after 1970.

a =

r =

How many people lived in this city in 1990?

These have all been applying the rates 1 time per *t* years.

To compound more than once per *t,* we use the Compound Interest formula:

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = Total Amount
P = Principal or Initial Amount
r = annual rate
n = number of times compounded per year
t = number of years

You deposit $4000 in an account that pays 2.92% annual interest. Find the balance after 1 year when the interest is compounded quarterly and daily.

Compound interest formula:

P = r =

n = t =

A =

A = Total Amount
P = Principal or Initial Amount
r = annual rate
n = number of times compounded per year
t = number of years

Quarterly:

Daily:

You deposit $5500 in an account that pays 3.6% annual interest. Find the balance after 2 years when the interest is compounded semiannually and monthly.

Compound interest formula:

P = r =

n = t =

A =

Semiannually: Monthly:

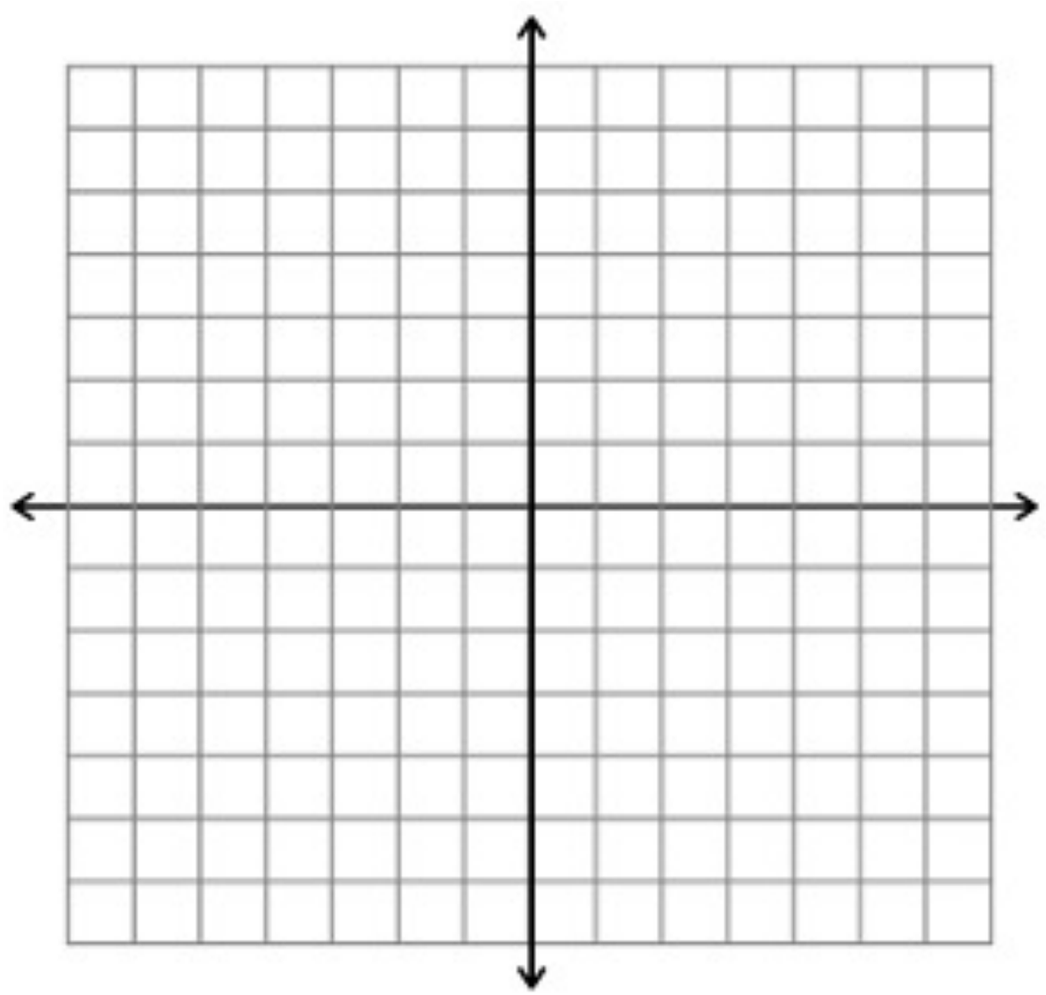
Graphing Exponential Growth Functions

$$f(x)=ab^x$$

Where a > 0 and b > 1

and *a* is the initial value

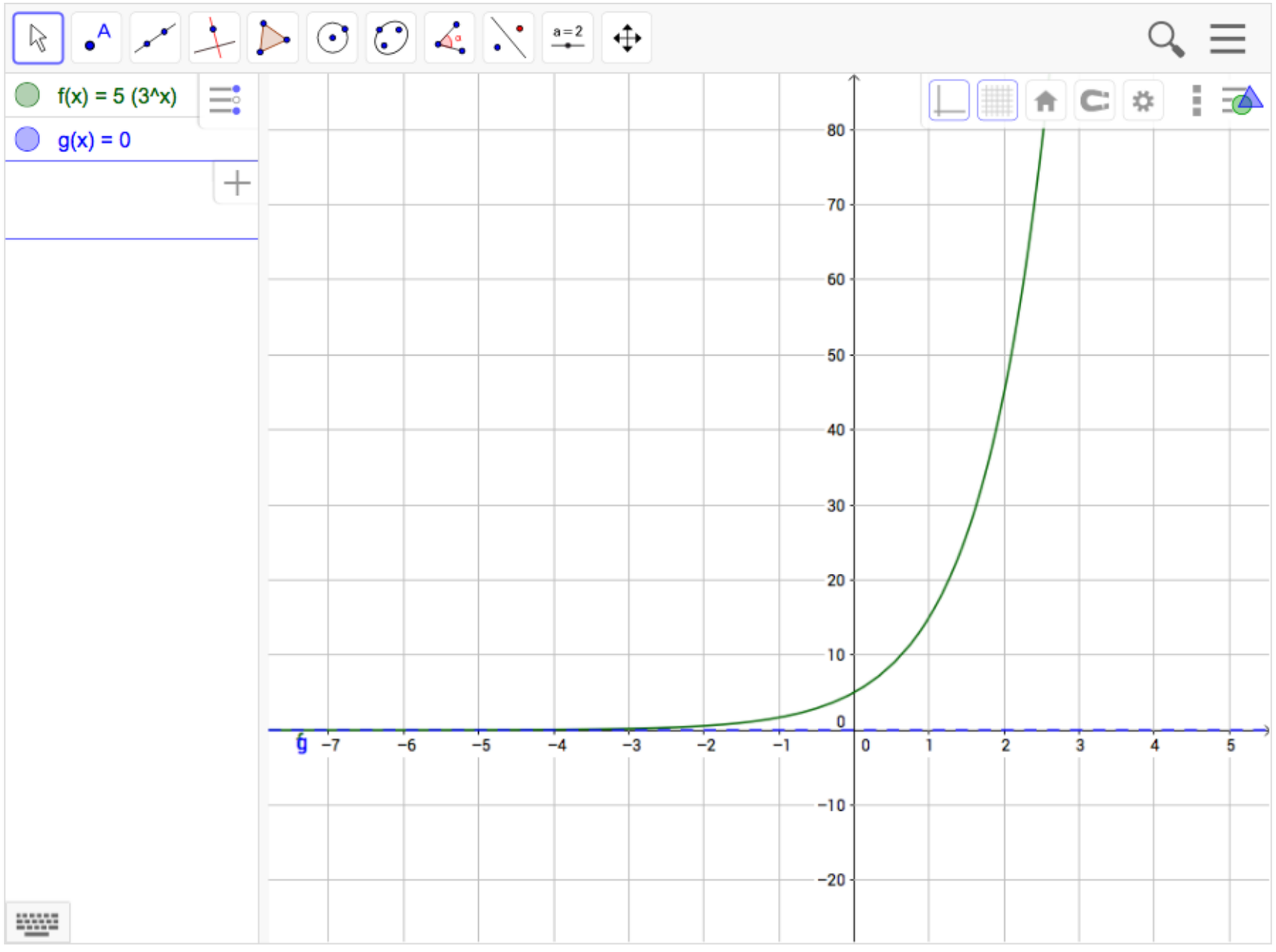
and *b* is the growth factor



Domain:

Range:

Zombie Attack Formula



Computer Viruses Formula:

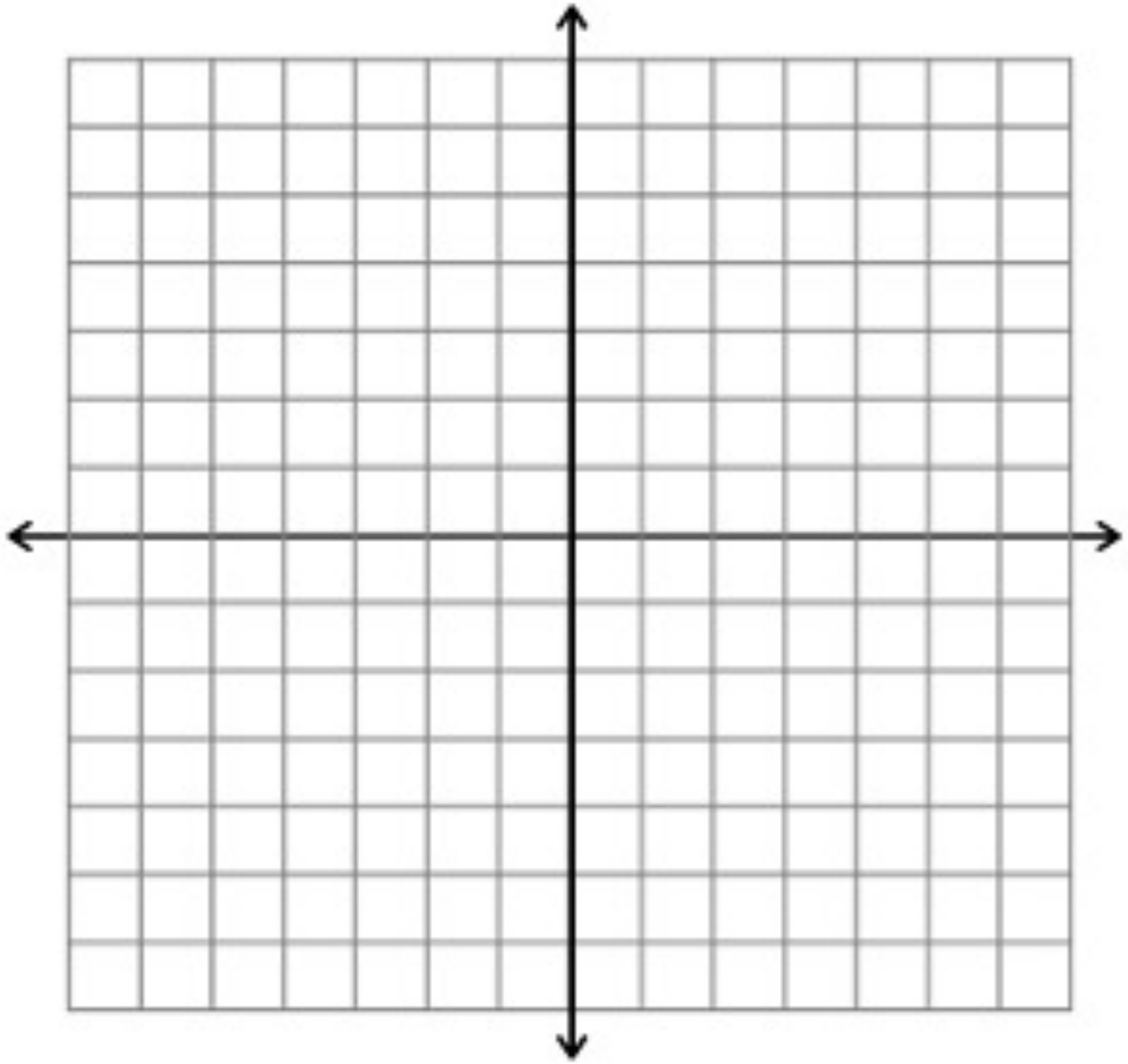
$n=2573(1.92)^t$

Domain:

Range:

Asymptotes:

t	n



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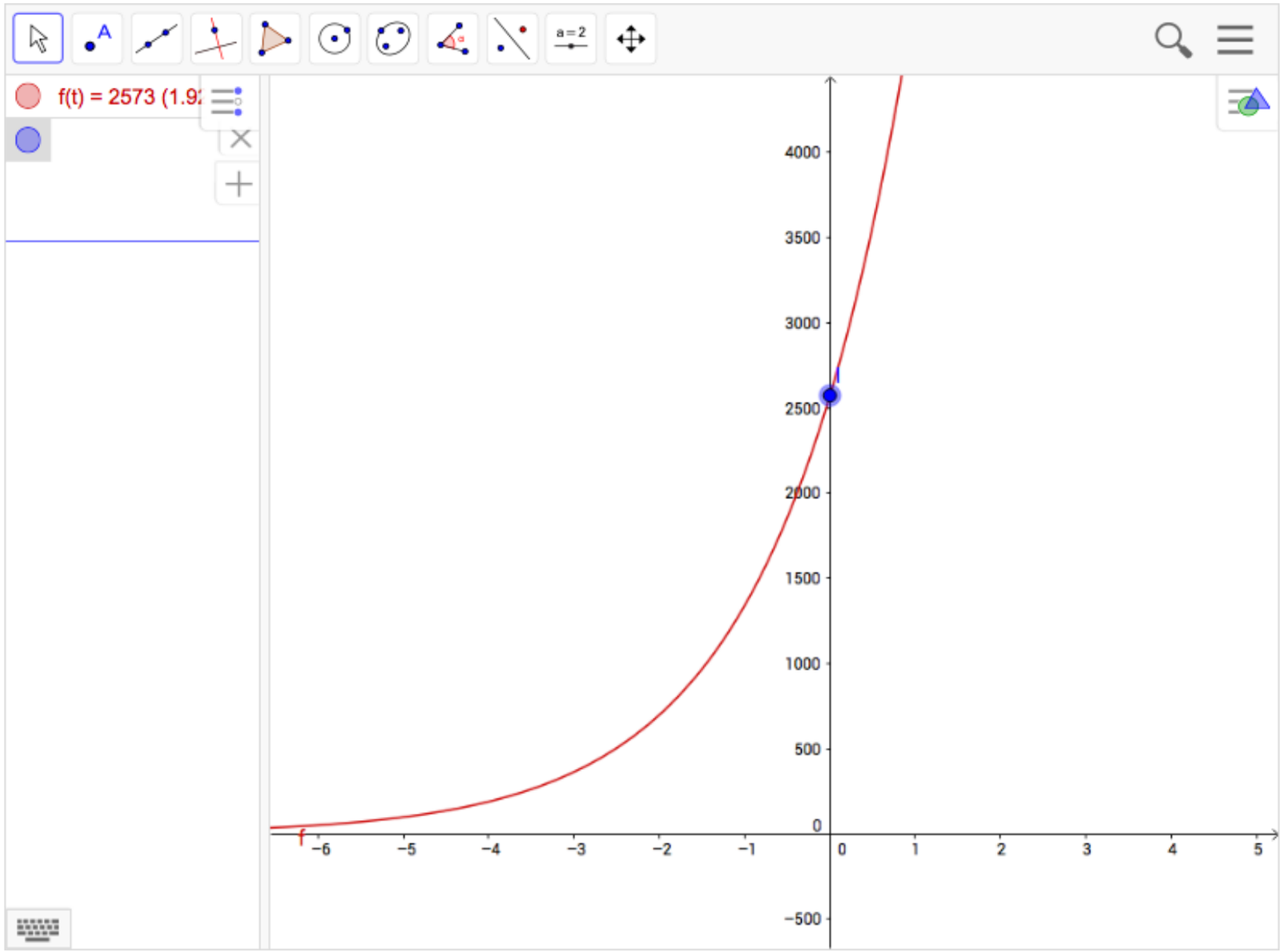


California City Population:

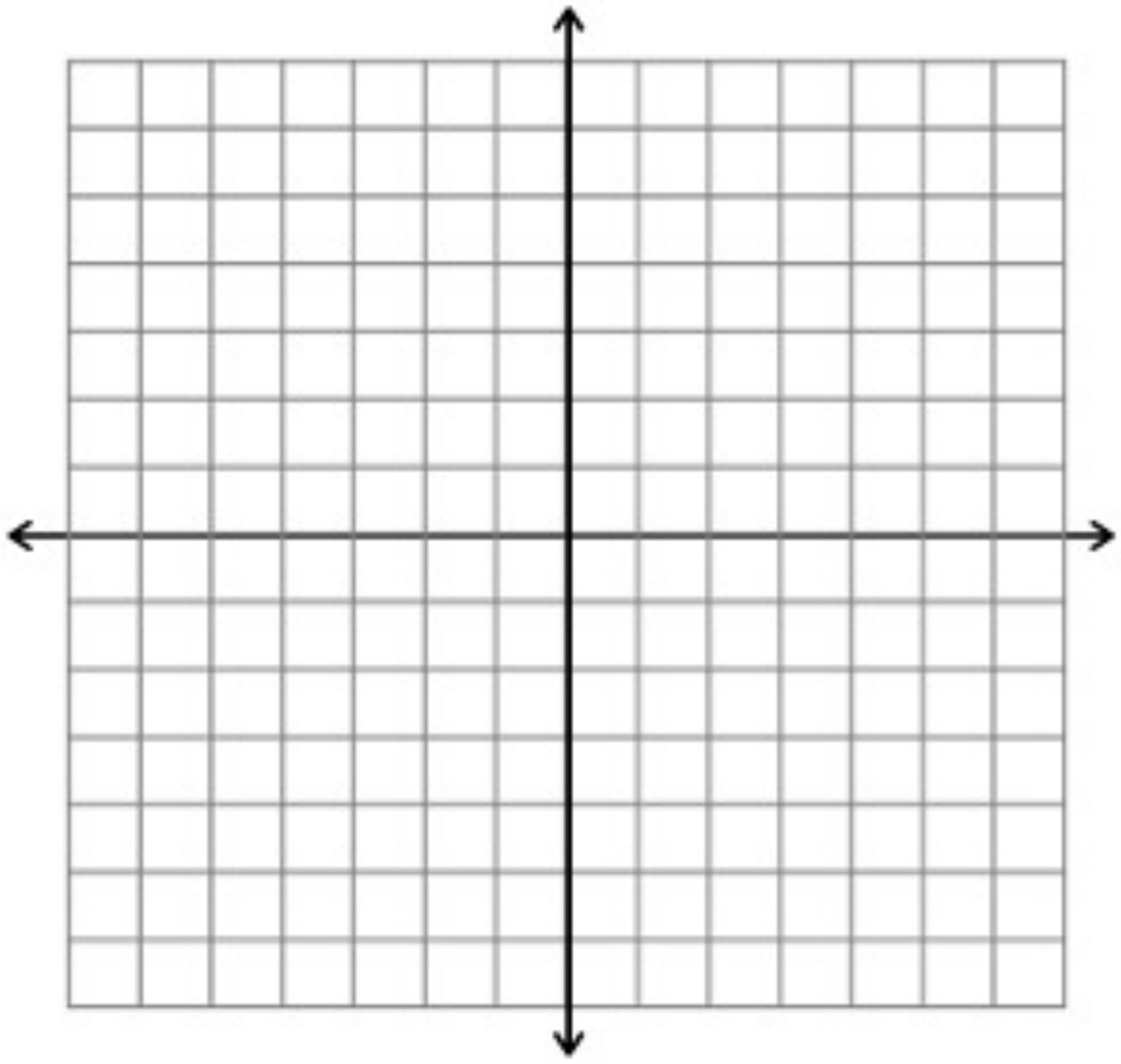
$p=330{,}000(1.024)^t$

Domain:

Range:

Asymptotes:

t	p



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$p=330{,}000(1.024)^t$