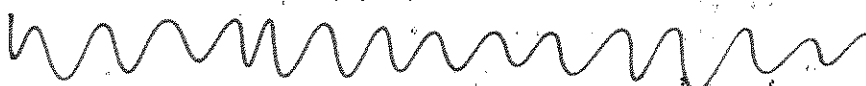


1) Record data in the table below and show work to calculate the constant multiplier.

X:	Y:	Ratio (Constant Multiplier)
0	4879	
1	5536	$5536/4879 \approx 1.13$
2	6280	$6280/5536 \approx 1.13$
3	7116	$7116/6280 \approx 1.19$
4	8029	$8029/7116 \approx 1.13$
5	8622	$8622/8029 \approx 1.07$
6	9373	$9373/8622 \approx 1.09$
7	9885	$9885/9373 \approx 1.05$
8	10634	$10634/9885 \approx 1.08$
9	11287	$11287/10634 \approx 1.06$
10	12203	$12203/11287 \approx 1.08$
11	13022	$13022/12203 \approx 1.07$
12	13459	$13459/13022 \approx 1.03$
13	13618	$13618/13459 \approx 1.01$

2) Find the constant multiplier by averaging the ratios:

$$1.13 + 1.13 + 1.19 + 1.13 + 1.07 + 1.09 + 1.05 + 1.08 + 1.06 + 1.08 + 1.07 + 1.03 + 1.01 / 13 \approx 1.09$$

3) Write the equation for your exponential data: $y = 4879(1.09)^x$

4) Identify the parts of equation. $y = a(1 \pm r)^x$

y: In State tuition + fees for U of M

x: Years since 2000.

a: \$4879 in-state tuition in the year 2000.

r: .09 = 9% growth rate of tuition per year.

5) Verify your equation using data from your original data set.

(Is your equation an accurate model of the data? Why so?)

① In 2005 the in state tuition was \$8,622

$$y = 4879(1.09)^x$$

$$= 4879(1.09)^5$$

$$= 4879(1.5386)$$

$$\approx \$7506.95$$

\$7506.95 is less tuition than the actual data

② In 2012 the in state tuition was \$13,459

$$y = 4879(1.09)^x$$

$$y = 4879(1.09)^{12}$$

$$= 4879(2.81266)$$

$$\approx \$13,722.99$$

\$13,722.99 is more than the actual tuition for 2012

Our equation is a moderately good fit for our data. Because there was no constant multiplier, the rate was averaged. So the values will not be exact.

6) Use your equation to make a prediction regarding your data.

① What will tuition be in 2023?

$$y = 4879 (1.09)^{23}$$

$$y \approx 4879 (7.25787)$$

$$y \approx \$35,411.17$$

This means in 2023, the tuition at U of M for instate students will be \$35,411!

② If the tuition continues to increase, when will it be 50k? (\$50,000)

$$\frac{50,000}{4879} = \frac{4879 (1.09)^x}{4879}$$

$$10.248 \approx 1.09^x$$

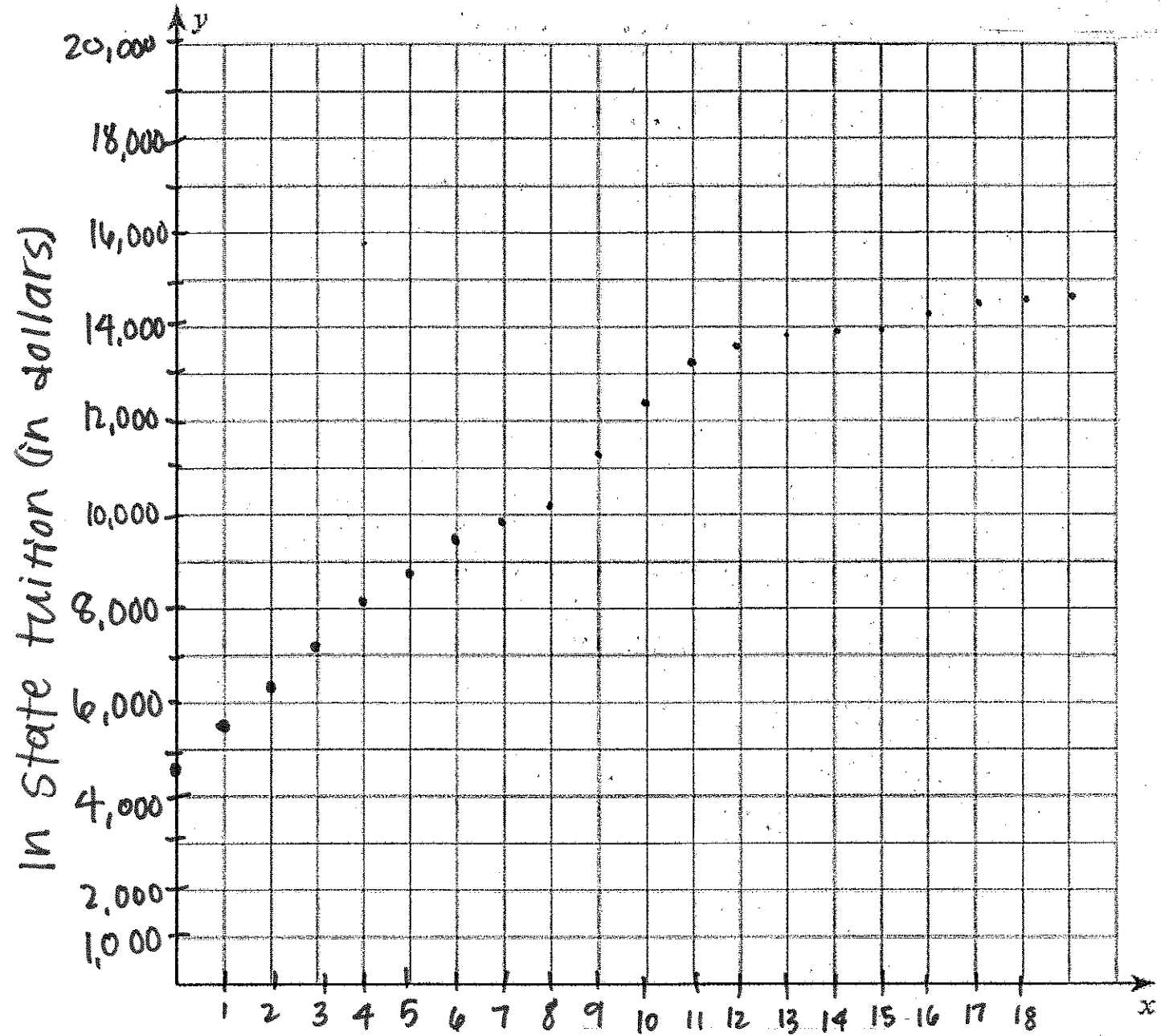
$$x \approx \log_{1.09} (10.248)$$

$$x \approx 27.003$$

$$\approx 27$$

This means in 2027, the instate yearly tuition will be 50k!

7) Graph your data on the graph below.



years since 2000