*** same steps we used for polynomial regression**

7.3 – Modelling Data Using Exponential Functions

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We can use technology to determine a curve of best fit to summarize exponential data.

Example: Brett deposited $3000 into a savings account that was compounding annually when he first began working. The data table below shows the value of the account in five year intervals. If Brett is to retire in 10 years, how much money can Brett reasonably expect from this account? Create a scatter plot and find the exponential regression function for the data. Estimate when Brett would have reached $100,000 in the account.

STAT CALC 0: ExpReg

Number of Years (x)	Amount (y)
0	3000
5	4210
10	5831
15	7717
20	10471
25	14485
30	19943
35 (now)	27995
45 (10 years)	?
?	100 000

$y = 3032.086(1.065)^x$

find VALUE when $x = 45$ → $y = \$51,559.86$ in ten years

plot $y = 100\,000$ and find intersection

$x = 55.5$ → about 20.5 years from now

Example: The radiactive isotope carbon-14 has a half-life of 5700 years. This means every 5700 years, half of the sample has deteriorated. The table below relates the number of half-lives to the measured amount of carbon-14 found in a skeletal sample. Create a scatter plot and find the exponential regression function for this data. When would there be exactly 100 grams remaining of the material? How much carbon-14 would remain after 10 half-lives? How many years is this?

Number of Half-Lives	Amount
0	454.2 g
1	224.1 g
2	116.4 g
3	56.8 g
4	28.5 g
5	14.1 g
6	7.1 g
7	3.6 g

$y = 454.076(0.500)^x$

plot $y = 100$ and find intersection

$x = 2.185...$ → 100g left after 2.2 half-lives

VALUE when $x = 10$, $y = 0.44...$ → 0.45g left

$10 \times 5700 = 57,000$ years