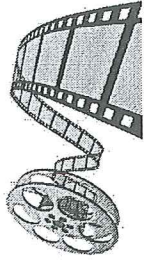


## Average U.S. Movie Ticket Price Analysis



\*\*\*Record all answers in your Exercise Notebook\*\*\*

The table<sup>1</sup> below shows average U.S. movie ticket prices from 1948 to 2015.

1. Choose **at least 6 points** from the table you feel best represents the data. List your points as ordered pairs, and then explain your reason for choosing these points.
2. On graph paper, use a ruler and **plot the points** you chose in #1. Clearly label your axes.
3. Next, **estimate a “line of best fit”** for your data points and draw it on your graph. Explain how you chose this line.

*Definition of “line of best fit”<sup>2</sup>: a line on a graph showing the general direction that a group of points seem to be heading.*

4. Find the **gradient** of your line of best fit. Interpret the meaning of the **gradient**. “What does your gradient represent in this situation? What does it tell you about the data?”

5. Using two points and the gradient, **find an equation** for your line of best fit. Define all parts of your equation. Show your work algebraically.

6. **Verify** your equation by choosing a point to substitute into your equation. Consider solving for year **and** ticket price. “How well does your equation represent your points?”

7. **Use your equation** to estimate the average U.S. movie ticket price in 2025. **Defend** whether this prediction is or is not realistic?

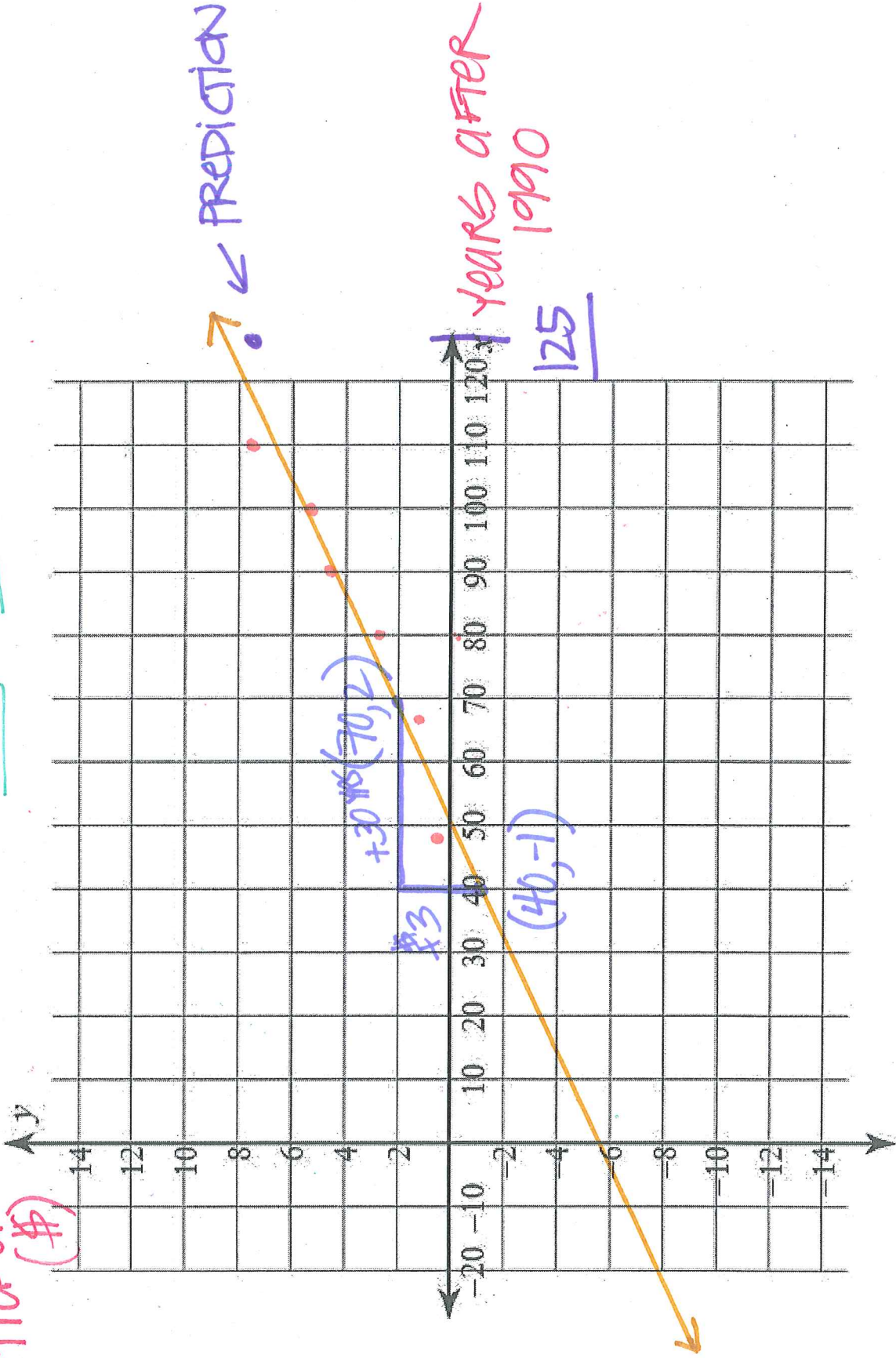
Year	Ticket Price
1948	\$0.36
1958	\$0.68
1967	\$1.22
1974	\$1.89
1980	\$2.69
1985	\$3.55
1990	\$4.22
1995	\$4.35
2000	\$5.39
2005	\$6.41
2010	\$7.89
2015	\$8.43

<sup>1</sup> <http://www.natoonline.org/data/ticket-price/>

<sup>2</sup> <https://www.mathsisfun.com/definitions/line-of-best-fit.htm>

AVERAGE MOVIE PRICE  
TICKET (\$)

MOVIE TICKETS (\$)



← PREDICTION

YEARS AFTER  
1990  
125

+30

\$3

(40, -1)



# "AVERAGE MOVIE TICKET PRICE"

## ① CHOOSE 6 POINTS

YEAR 6 AFTER 1990	TICKET PRICE
'48	\$ .36
'67	\$ 1.22
'80	\$ 2.69
'90	\$ 4.22
100	\$ 5.39
110	\$ 7.89

I CHOSE THESE POINTS BECAUSE I WANTED A LARGER RANGE OF YEARS.

I MAY HAVE A MORE ACCURATE RATE OF CHANGE IF I LOOKED AT THE MOST RECENT 6 DATA POINTS.

## ② PLOT & LABEL

## ③ LINE OF BEST FIT

MY LINE OF BEST FIT FOLLOWS THE GENERAL TREND OF THE DATA. THE DATA IS RELATIVELY CLOSE TO THE LINE. ~~THE DATA IS RELATIVELY CLOSE TO THE LINE.~~ TWO POINTS ARE ALMOST ON THE LINE, TWO ARE BELOW, TWO ARE ABOVE.

## ④ GRADIENT (SLOPE)

$$\begin{matrix} x_1 & y_1 & x_2 & y_2 \\ (40, -1) & & (70, 2) & \end{matrix}$$

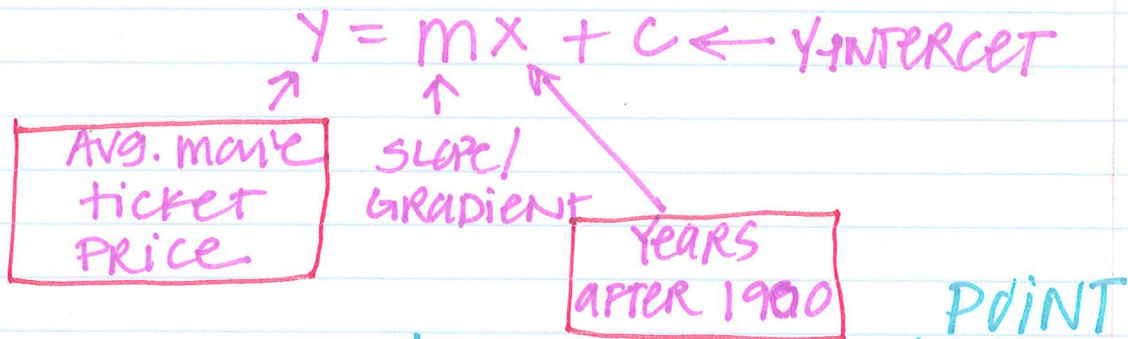
$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - (-1)}{70 - 40} = \frac{\$3}{30 \text{ YRS}} = \frac{\$1}{10 \text{ YRS}}$$

\* THE MOVIE TICKET PRICE IS INCREASING AVERAGE

BY \$1 EVERY 10 YEARS. THIS TELLS ME THE PRICE IS GOING UP GRADUALLY OVER TIME.

THE PRICE INCREASE MAY MAKE PEOPLE MAD! I KNOW I DON'T GO TO MOVIES OFTEN BECAUSE OF HOW EXPENSIVE IT CAN BE ... NOT TO MENTION IF YOU GET FOOD! ☺

⑤ WRITE AN EQUATION



$$Y = \frac{1}{10}x + c$$

$$2 = \frac{1}{10}(70) + c$$

$$\begin{array}{r} 2 = 7 + c \\ -7 \quad -7 \\ \hline -5 = c \end{array}$$

$$Y = \frac{1}{10}x - 5$$

#1 PRICE INCREASE EVERY 10 YEARS

AT  $x=0$  (YEAR 1900) movie tickets were  $-\$5$



⑥ VERIFY

↳ IS THE EQUATION AN  
ACCURATE

REPRESENTATION OF THE DATA?

$$y = \frac{1}{10}x - 5$$

POINT ON TABLE:  $(\overset{x}{90}, \overset{y}{4.22})$

$$4.22 \stackrel{?}{=} \frac{1}{10}(90) - 5$$

$$4.22 = 9 - 5$$

$$4.22 \approx 4$$

THE EQUATION OF MY LINE OF BEST FIT DID NOT GENERATE THE EXACT VALUE OF THE TABLE. HOWEVER, THE VALUE WAS A FAIR APPROXIMATION. IT IS A LINE OF BEST FIT - NOT PERFECT.

⑦ PREDICT

↳ PRICE IN 2025?  
 $x = 125$

$$y = \frac{1}{10}(125) - 5$$

$$y = 12.5 - 5$$

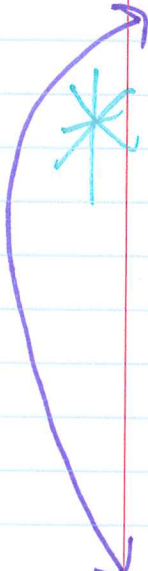
$$y = \$7.50$$

IN YEAR 2025, MY LINE PREDICTED AN AVG. MOVIE PRICE OF \$7.50

I believe this may be slightly unrealistic - possibly too low.

However, there are afternoon prices and senior citizen prices that may bring the average price down.

I could've possibly drawn a slightly steeper line of best fit.



Overall, fairly realistic, movie ticket prices are gradually increasing over time.

Looking back at the table, \$7.50 is lower than the price in 2015!  
~~My line is not steep enough.~~  
My line is not steep enough.