

Warm-up: (5 minute reflection & turn in)

*Quietly **reflect** at bottom of assignment sheet

*Done? Turn in up front

	0	1	2
Monday Date: <u>9/11</u> Topic: <u>No Homework</u>			
Tuesday Date: <u>9/12</u> Topic: <u>Gradient Practice</u>			
Wednesday Date: <u>9/13</u> Topic: <u>Equations of a line and Graphing</u>			
Thursday Date: <u>9/14</u> Topic: <u>Equations of a line and Graphing</u>			
Friday Date: <u>9/15</u> Topic: <u>Average Movie Ticket Price Analysis</u>			

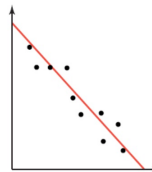
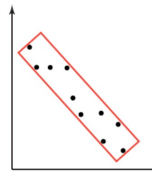
Reflection: My week was ... because...

Next week I will...

Line of Best Fit

Finding a Line of Fit

- Determine the direction of the points.
The longer side of the smallest rectangle that contains most of the points shows the general direction of the line.
- The line should divide the points equally.
Draw the line so that there are about as many points above the line as below the line. The points above the line should not be concentrated at one end, and neither should the points below the line. The line has nearly the same slope as the longer sides of the rectangle.



U.S. Movie Ticket Analysis

(5 Minutes) Individual work

Continue from yesterday

Done? Have teacher check your work



(5 minutes) Partner Work



*Compare & work with your neighbor

Done? Begin solving worksheet.

(10 minutes) Check **EXEMPLAR**

Mathematician Project - MONDAY :)

U.S. Movie Ticket Analysis

*Choose at least 6 pts. *Why these points?*

*Plot points & label x/y axes

*Draw Line of Best Fit. *Why this line?*

*Solve for Gradient. *Interpret meaning*

*Define x/y & write an equation

*Does your equation represent your data well?

*Predict average price in 2025.

*Is your prediction realistic?

Check exemplar
On team isles.



1. Choose atleast 6 pts. & list as ordered pairs.
 Explain reason for choosing these points.

1. Choose and list at least 6 points from the data table.

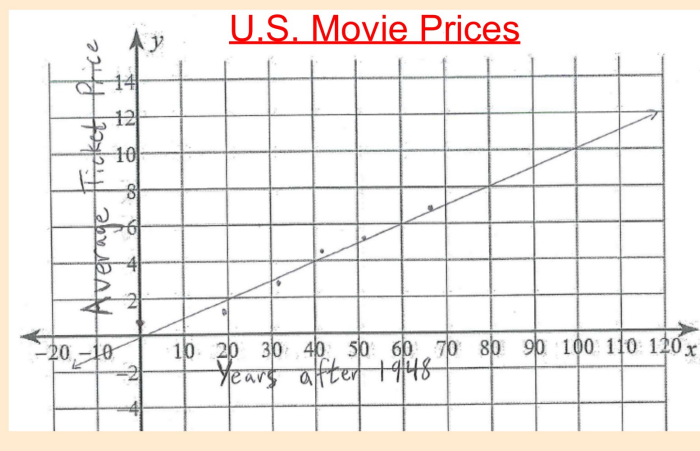
$(0, 0.36)$ $(19, 1.22)$ $(32, 2.69)$
 $(42, 4.22)$ $(52, 5.39)$ $(67, 8.43)$

Why did you choose these points?

Every other datapoint, but I skipped one
 so I could have the first and last
 datapoint.

Year	(after 1948)	Ticket Price (\$)
1948	0	\$0.36
1958	10	\$0.68
1967	19	\$1.22
1974	26	\$1.89
1980	32	\$2.69
1985	37	\$3.55
1990	42	\$4.22
1995	47	\$4.35
2000	52	\$5.39
2005	57	\$6.41
2010	62	\$7.89
2015	67	\$8.43

2. Plot points & label x/y axes
 3. Draw Line of Best Fit.



2. Plot points & label x/y axes

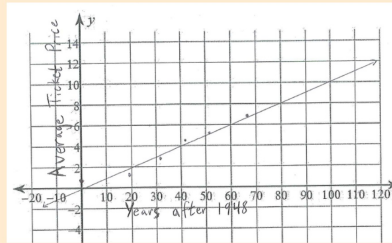
3. Draw Line of Best Fit.

How did you choose this line?

Why is your line a good fit to your graph?

It approximates the growth of the point.

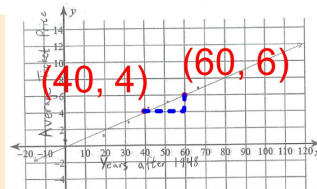
It is as close as possible to each plotted point.



4. Solve for Gradient. 2 points on the line!

4. Find the gradient (slope) of your line. Choose two points **ON THE LINE** and show work.

$$\begin{matrix} (40, 4) & \text{and} & (60, 6) \\ x_1 & x_2 & y_1 & y_2 \end{matrix} \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$m = \frac{6 - 4}{60 - 40} = \frac{2}{20} = \frac{1}{10} \quad m \approx \frac{1}{10}$$



$$\frac{\text{rise}}{\text{run}} \approx \frac{1}{10}$$

(40 years, \$4) (60 years, \$6)

4. What does the gradient tell you? What does it tell you about the data?

a) Interpret the meaning of the gradient by answering questions below:

What does your gradient represent in this situation?

The rise of ticket price as years pass.

What does it tell you about the data?

The price of the average movie ticket rises \$1 every 10 years.

or: The price rises \$1 every 10 years.

"The price of the ticket rises ___ every ___ years"

"The price of the ticket rises \$1 every 10 years"

5-6. Define variables & write an equation

5. Define the x and y-values: x: # of years after 1948 y: Average ticket price

6. Use two points and the gradient to write an equation for your line. Show work.

$(40, 4)$ and $m = \frac{1}{10}$

$$y = mx + c$$

$$4 = \frac{1}{10}(40) + c$$

$$\frac{4}{0} = \frac{4}{0} + c$$

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

$$\frac{1}{10}(40) = \frac{40}{10} = \frac{4(10)}{10} = 4$$

x: Number of years after 1948
y: Average ticket price

5-6. Define variables & write an equation

$$m = \frac{1}{10} \quad (40, 4) \quad y = mx + b$$
$$4 = \frac{1}{10}(40) + b$$
$$4 = 4 + b$$
$$\begin{array}{r} -4 \quad -4 \\ \hline 0 = b \end{array}$$
$$y = \frac{1}{10}x$$

x: Number of years after 1948
y: Average ticket price

7. Does your equation represent your data well?

7. Verify your equation by choosing a point to substitute into your equation. Consider solving for year *and* ticket price.

Chosen point: (32, 2.69)

$$\$2.69 \approx \$3.20$$

$$y = \frac{1}{10}(32)$$

$$y = \frac{32}{10}$$

$$y = 3.2$$

\$3.20

"How well does your equation represent your points?"

Fairly well. ~~My~~ My equation gave me a different value than the original data provided, but the numbers are still reasonably close.

8. Estimate cost in 2025.

8. Use your equation to estimate the average U.S. movie ticket price in 2025. ($x=77$)

$$y = \frac{1}{10}(77)$$

$$y = \frac{77}{10}$$

$$\boxed{y = 7.7} \quad \$7.70$$

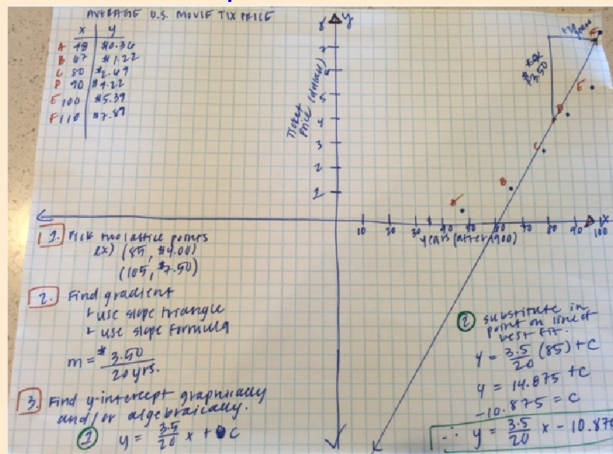
By my equation, I predict that the average U.S. movie ticket will cost \$7.70 in 2025.

9. Is your prediction realistic?

9. Defend whether this prediction is or is not realistic?

It is not realistic. The average price in 2015 was \$8.43. The data does not go down, only up. So I would not expect the price to be \$7.70 in 2025.

Additional Exemplar...



Exercises...Choose 2 levels where you feel confident and challenged :)

Level 1

Level 2

Level 3

$$4) -19 = \frac{b}{10}$$

$$6) 1 = \frac{k+3}{20}$$

$$8) \begin{aligned} f(x) &= 2x - 5 \\ g(x) &= x^2 - 5x \\ \text{Find } f(-9) + g(-9) \end{aligned}$$

Solutions are on back ...
help each other!

or....Finish movie prices analysis

Exercises...Choose 2 levels where you feel confident and challenged :)

Level 1

$$1) 15 + b = -1$$

$$2) -2 + k = -9$$

$$3) 21 = -7k$$

$$4) -19 = \frac{b}{10}$$

$$5) -33 = x - 16$$

$$6) 132 = 12x$$

Exercises...Choose 2 levels where you feel confident and challenged :)

Level 1

7) $\frac{-3+n}{4} = 4$

8) $2 = \frac{x}{10} + 4$

9) $16 - 8x + 5x = x - 4$

10) $-15 + 5n - 7n = n + 3$

Exercises...Choose 2 levels where you feel confident and challenged :)

Level 2

Solve each equation.

1) $10 = -9 + n$

2) $-12r = -24$

3) $-6 = \frac{x}{2}$

4) $b - 15 = -22$

5) $-101 = 9r + 7$

6) $1 = \frac{k+3}{20}$

Exercises...Choose 2 levels where you feel confident and challenged :)

Level 2

5) $-101 = 9r + 7$

6) $1 = \frac{k+3}{20}$

7) $-4 + 3x = 1 + 3x$

8) $-3 + 8n - 8 - 3n = 7n - 5$

Solve each proportion.

9) $\frac{x+4}{2} = \frac{7}{4}$

10) $\frac{4}{b+5} = \frac{9}{b}$

Exercises...Choose 2 levels where you feel confident and challenged :)

Level 3

Directions: Solve each equation.

1) $v - 3 = -10 + 2v$

2) $16 - n = n + 4$

3) $90 = 6(7 - 2n)$

4) $-288 = -6(-8 + 8r)$

5) $7(2m + 8) - 6m = -4(m - 8)$

6) $-4(n - 8) - 4n = -3(n - 4) - n$

Exercises...Choose 2 levels where you feel confident and challenged :)

Level 3

7) $f(x) = 3x - 1$
 $g(x) = -2x^2 - 3x$
Find $(f + g)(2)$

8) $f(x) = 2x - 5$
 $g(x) = x^2 - 5x$
Find $f(-9) + g(-9)$

9) If $f(x)$ is a linear function, $f(3) + f(4) = 10$, and $f(5) + f(6) = 18$, then what's $f(7)$?

Level 1 Solutions

- | | | | |
|--------------|--------------|-------------|---------------|
| 1) $\{-16\}$ | 2) $\{-7\}$ | 3) $\{-3\}$ | 4) $\{-190\}$ |
| 5) $\{-17\}$ | 6) $\{11\}$ | 7) $\{19\}$ | 8) $\{-20\}$ |
| 9) $\{5\}$ | 10) $\{-6\}$ | | |

Level 2 Solutions

- | | | | |
|---------------|--------------|-----------------|-------------|
| 1) $\{19\}$ | 2) $\{2\}$ | 3) $\{-12\}$ | 4) $\{-7\}$ |
| 5) $\{-12\}$ | 6) $\{17\}$ | 7) No solution. | 8) $\{-3\}$ |
| 9) $\{-0.5\}$ | 10) $\{-9\}$ | | |

Level 3 Solutions

1) {7}
5) {-2}

2) {6}
6) {5}

3) {-4}
7) -9

4) {7}
8) 103

9) If $f(x)$ is a linear function, $f(3) + f(4) = 10$, and $f(5) + f(6) = 18$, then what's $f(7)$?

$$3m + b + 4m + b = 10$$

$$7m + 2b = 10$$

$$5m + b + 6m + b = 18$$

$$11m + 2b = 18$$

$$f(x) = -2x + 12$$

$$f(7) = -2(7) + 12$$

$$f(7) = -14 + 12$$

$$f(7) = -2$$

Solve System

$$\begin{cases} 7m + 2b = 10 \\ 11m + 2b = 18 \end{cases}$$

$$-4m = 8$$

$$m = -2$$

$$7(-2) + 2b = 10$$

$$-14 + 2b = 10$$

$$2b = 24$$

$$b = 12$$

Using Elimination