**Mary Poppins Returns to Grade 8 Math**



I really want to see the movie, Mary Poppins Returns. It opened in theatres on Friday December 21st, 2018. The opening day and the opening day numbers were huge.

Here’s data (from the United States) on some movies that you might have seen. I’ve included the gross amount that they earned on their opening weekend and the gross amount that they have earned since they came out. Since Mary Poppins just came out, I don’t have its long-term gross income.

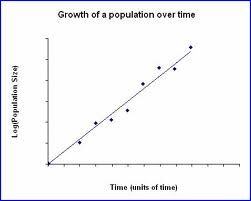
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| --- | --- | --- | --- |
| **Movie Title** | **Opening gross**  **(in millions of dollars)** | **Total Gross**  **(in millions of dollars)** | **Opening date** |
| Disney: Mary Poppins Returns | $23.5 | ? | 19/21/2018 |
| Avengers: Infinity War | $258 | $679 | 4/27/18 |
| Star Wars: The Force Awakens | $248 | $937 | 12/18/2015 |
| Jurassic World | $208.8 | $652 | 06/12/2015 |
| Harry Potter and the Deathly Hallows Part 2 | $169 | $381 | 7/15/2011 |
| Spider-Man 3 | $151 | $337 | 5/4/2007 |
| Furious 7 | $147 | $353 | 4/3/2015 |
| The Twilight Saga: New Moon | $143 | $297 | 11/20/2009 |
| The Twilight Saga: Breaking Dawn Part 1 | $138 | $281 | 11/18/2011 |
| Pirates of the Caribbean: Dead Man's Chest | $136 | $423 | 7/7/2006 |
| Harry Potter and the Deathly Hallows Part 1 | $125 | $296 | 11/19/2010 |
| The Hunger Games: Mocking Jay Part 1 | $122 | $337 | 11/21/2014 |
| Dr. Seuss' The Lorax | $70 | $177 | 3/2/12 |
| The Vow | $41 | $123 | 2/10/12 |
| Fahrenheit 9/11 | $24 | $119 | 6/25/04 |
| Spaceballs | $7 | $38 | 6/26/87 |

I am wondering if you can predict what this movies total gross income will be from studying the opening weekend data? Maybe there is a pattern between the opening weekend data and the final gross total income of the movie. Let’s see if that is true.

I’ve left a few blank lines in the chart above for you to add your favorite movies. You can find the opening weekend and final gross data at www.boxofficemojo.com. Use your computers.

1. On the last page I’ve created a graph for you to use to create a scatter plot. The horizontal axis will represent the Opening weekend income of each film. The vertical axis will be the Final gross income of the movie. Plot the data from above on the next page’s chart.

Make a “Line of Best Fit”.



\*Line of Best Fit: *A straight line drawn through the center of a group*

*of data points plotted on a scatter plot.*

2. Some of the data points do not fit on the Line of Best Fit. Any ideas about why?

3. Is the relationship between Opening weekend income and the film’s final income a linear relationship or something else?

4. Using the graph, can you predict what Mary Poppins Returns will finally earn?

5. Please explain why or why not you think this is an accurate conclusion.

6. Place the top 8 movies on the list in a table of values.

7. Write a rule (equation) that will give a reasonable prediction of the amount of money a movie will gross for any opening weekend total. Please show or explain how you came to your rule.

8. Based on your rule, how much gross would you expect movies to make if they had opening weekends of:

$60 million

$80 million

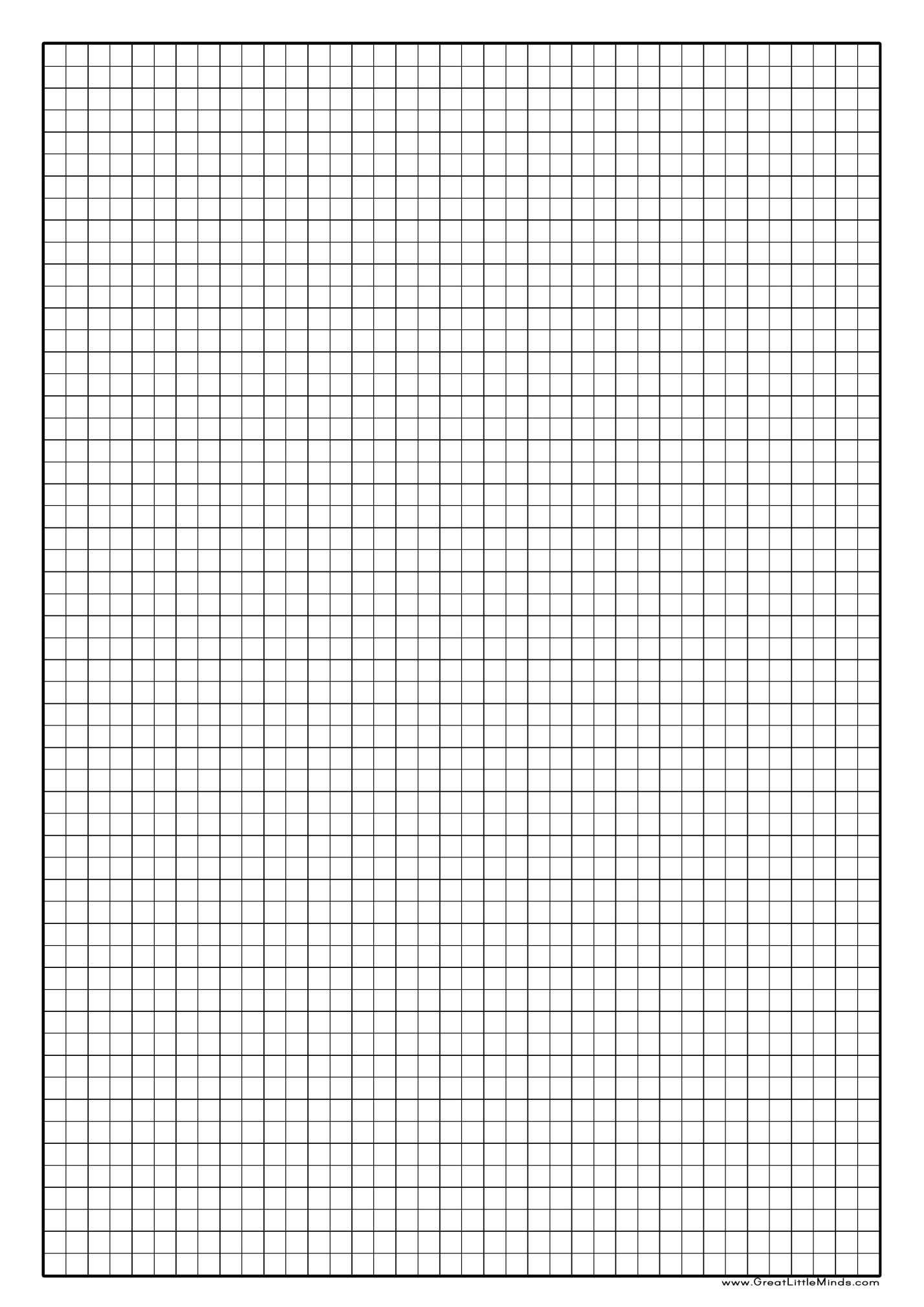
$150 million

$250 million

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| **Criterion B: Investigating Patterns** | | | | |
| **(0)** | **Beginning (1-2)** | **Developing (3-4)** | **Accomplished (5-6)** | **Exemplary (7-8)** |
| *I have not achieved a standard described by any of the descriptors to the right*. | *I am able to:*  **apply**, with teacher support, mathematical problem-solving techniques to discover simple patterns  **state** predictions consistent with patterns. | *I am able to:*  **apply** mathematical problem-solving techniques to discover simple patterns  **suggest** relationships and/or general rules consistent with findings. | *I am able to:*  **select** and apply mathematical problem-solving techniques to discover complex patterns  **describe** patterns as relationships and/or general rules consistent with findings  **verify** these relationships and/or general rules. | *I am able to:*  **select** and apply mathematical problem-solving techniques to discover complex patterns  **describe** patterns as relationships and/or general rules consistent with correct findings  **verify** and **justify** these relationships and/or general rules. |

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| **Criterion D: Applying Mathematics in Real-Life Contexts** | | | | |
| **(0)** | **Beginning (1-2)** | **Developing (3-4)** | **Accomplished (5-6)** | **Exemplary (7-8)** |
| *I have not achieved a standard described by any of the descriptors to the right*. | *I am able to:*  **identify** some of the elements of the authentic real-life situation  **apply** mathematical strategies to find a solution to the authentic real-life situation, with limited success. | *I am able to:*  **identify** the relevant elements of the authentic real-life situation  **select**, with some success, adequate mathematical strategies to model the authentic real-life situation  **apply** mathematical strategies to reach a solution to the authentic real-life situation  **describe** whether the solution makes sense in the context of the authentic real-life situation. | *I am able to:*  **identify** the relevant elements of the authentic real-life situation  **select** adequate mathematical strategies to model the authentic real-life situation  **apply** the selected mathematical strategies to reach a valid solution to the authentic real-life situation  **describe** the degree of accuracy of the solution  **discuss** whether the solution makes sense in the context of the authentic real-life situation. | *I am able to:*  **identify** the relevant elements of the authentic real-life situation  **select** appropriate mathematical strategies to model the authentic real-life situation  **apply** the selected mathematical strategies to reach a correct solution  **explain** the degree of accuracy of the solution  **explain** whether the solution makes sense in the context of the authentic real-life situation. |

**A Comparison Between a Movie’s Opening Weekend Sales vs Total Gross Profit**



Gross Earnings in millions of US dollars

Opening Weekend in millions of US dollars