

Mr. Burnside's New Printer

KC: RELATIONSHIPS	RC: Generalization	RC: Model
GC: Globalization and sustainability		Assessments: C, D
Modelling relationships allows us to compare different options in order to minimize our impact on the environment.		
How can we model linear relationships through algebra? How can we solve algebraic equations?	How can we make informed decisions when comparing relationships?	Can humans continue to evolve without negatively impacting the environment?

General guidelines

Define variables, label axes of graphs, use equation editor if using a computer. Keep your work organized and easy to read. Do Not Use Excel for graphs of equations.

Introduction

Mr. Burnside is looking to replace his existing office printer. He is looking to compare at least three different models of similar functionality and determine the cost over time as well as the initial purchase cost.

Aim: You need to recommend the best printer for Mr. Burnside and justify your decision with mathematics.

Mr. Gleeson has suggested three printers for Mr. Burnside to suit his requirement for his office

- Xerox ColorQube 8570dn
- Brother HL-L8350CDW
- Lexmark CS410dtn

Printers	Xerox ColorQube 8570dn	Brother HL-L8350CDW	Lexmark CS410dtn
Printer Speed B&W (ppm)	40	32	32
Printer Speed Color (ppm)	40	32	32
First Page Out Time (sec)	5	15	9
Max Resolution B&W (dpi)	2400 × 600	2400 × 600	1200 × 1200
Max Resolution Color (dpi)	2400 × 600	2400 × 600	2400 × 600
Wireless	YES	YES	NO
Installed Memory	512 MB	128 MB	256 MB
Expandable Memory	2 GB	284 GB	NA
Standard Black Toner Yield (pages)	4300	2500	1000
Duty Cycle (page per month)	85000	60000	75000
Max Power Consumption (watts)	252	420	580
Cost of Toner	\$104.99	\$45.99	\$44.99
Power Consumption (Daily)	\$0.92	\$1.30	\$1.80
Cost	\$1,199.99	\$399.99	\$249.99

<http://www.toptenreviews.com/computers/printers/best-laser-printers/>

All printers have a hidden cost associated to the day to day running of the unit. The most expensive consumable tends to be the cost of replacing ink cartages. All information provided below includes the cost of ink cartages and daily operating expenses excluding power consumption. However, there are other features and cost that can help you make your decision.

Some additional information that may help your decision.

- We expect Mr. Burnside to print between 8 000 to 10 000 page per year.
- The IT department have suggested a replacement printer to be purchased after 4 to 7 years.

Investigate using the information provided to recommend the best printer from the three printers that have been suggested by Mr. Gleeson.

Xerox ColorQube 8570dn

Pages	500	1000	1500	2000
Total Cost	1,209.99	1219.99	1229.99	1239.99

**Costs above ignores power consumption*

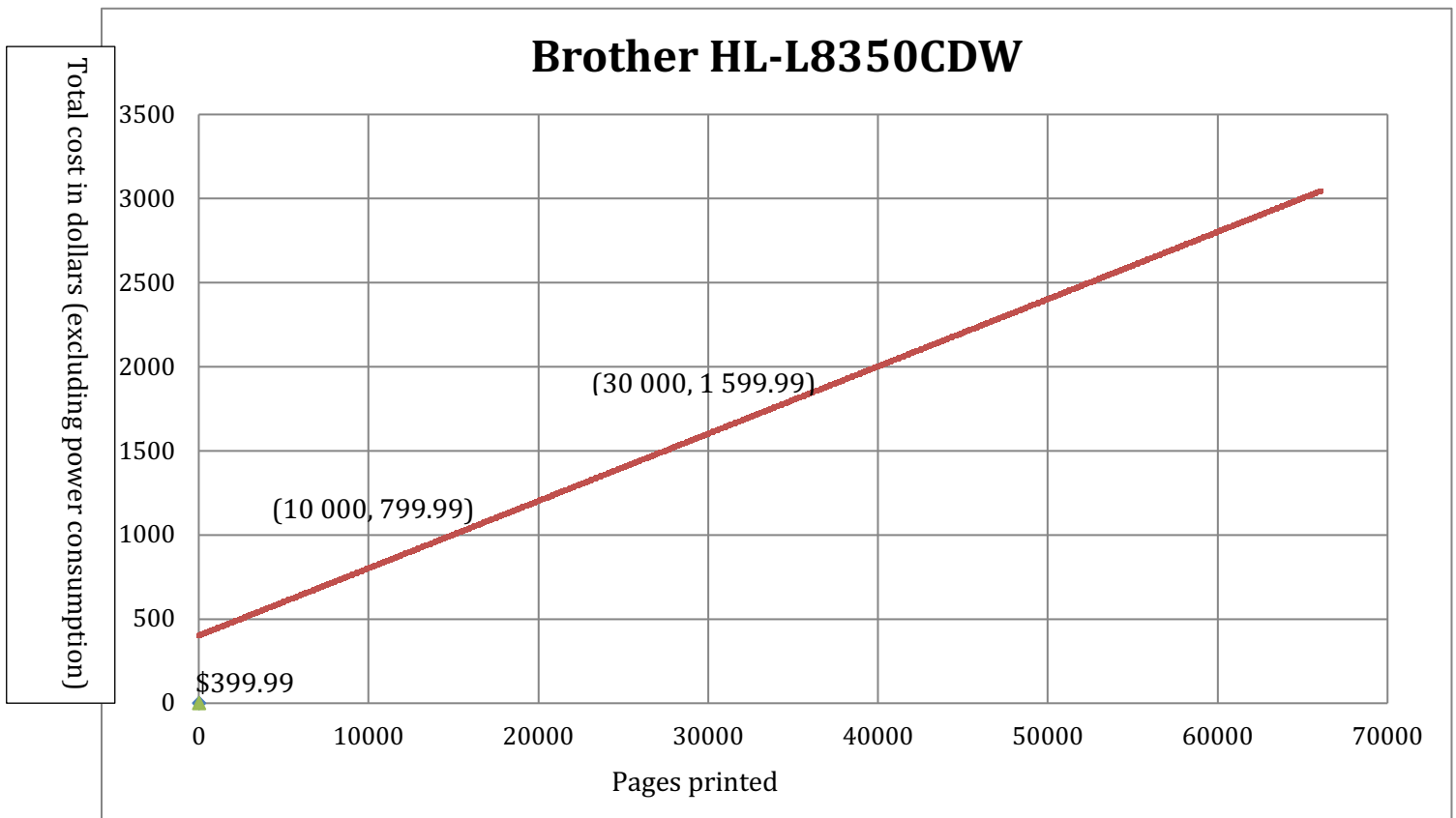
Lexmark CS410dtn

The cost of the Lexmark CS410dtn can be represented by the following equation,

$$\text{Cost} = 0.05p + 249.99$$

where p represents the number of pages printed and Cost represents the total cost excluding power consumption.

Brother HL-L8350CDW



Criterion C: Communicating

Achievement Level	Level Descriptor	Task Descriptor
0	The student meets none of the above.	
1-2	The student is able to: i. use limited mathematical language ii. use limited forms of mathematical representation to present information iii. communicate through lines of reasoning that are difficult to understand.	
3-4	The student is able to: i. use some appropriate mathematical language ii. use appropriate forms of mathematical representation to present information adequately iii. communicate through lines of reasoning that are able to be understood, although these are not always coherent iv. adequately organize information using a logical structure.	
5-6	The student is able to: i. usually use appropriate mathematical language ii. usually use appropriate forms of mathematical representation to present information correctly iii. communicate through lines of reasoning that are usually coherent iv. present work that is usually organized using a logical structure.	
7-8	The student is able to: i. consistently use appropriate mathematical language ii. consistently use appropriate forms of mathematical representation to present information correctly iii. communicate clearly through coherent lines of reasoning iv. present work that is consistently organized using a logical structure.	

Criterion D: Applying Math in Real Life

Achievement Level	Level Descriptor	Task Descriptor
0	The student meets none of the above.	
1-2	The student is able to: i. identify some of the elements of the authentic real-life situation ii. apply mathematical strategies to find a solution to the authentic real-life situation, with limited success.	
3-4	The student is able to: i. identify the relevant elements of the authentic real-life situation ii. apply mathematical strategies to reach a solution to the authentic real-life situation iii. state , but not always correctly, whether the solution makes sense in the context of the authentic real-life situation.	
5-6	The student is able to: i. identify the relevant elements of the authentic real-life situation ii. select adequate mathematical strategies to model the authentic real-life situation iii. apply the selected mathematical strategies to reach a valid solution to the authentic real-life situation iv. describe the degree of accuracy of the solution v. state correctly whether the solution makes sense in the context of the authentic real-life situation.	
7-8	The student is able to: i. identify the relevant elements of the authentic real-life situation ii. select adequate mathematical strategies to model the authentic real-life situation iii. apply the selected mathematical strategies to reach a correct solution to the authentic real-life situation iv. explain the degree of accuracy of the solution v. describe correctly whether the solution makes sense in the context of the authentic real-life situation.	