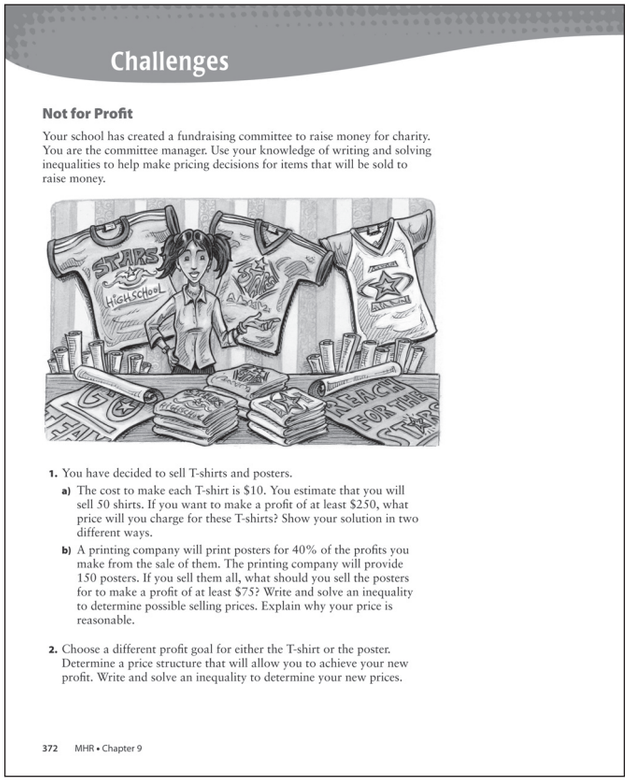

Challenges

Not for Profit

Your school has created a fundraising committee to raise money for charity. You are the committee manager. Use your knowledge of writing and solving inequalities to help make pricing decisions for items that will be sold to raise money.

1. You have decided to sell T-shirts and posters.

a) The cost to make each T-shirt is $10. You estimate that you will sell 50 shirts. If you want to make a profit of at least $250, what price will you charge for these T-shirts? Show your solution in two different ways.

b) A printing company will print posters for 40% of the profits you make from the sale of them. The printing company will provide 150 posters. If you sell them all, what should you sell the posters for to make a profit of at least $75? Write and solve an inequality to determine possible selling prices. Explain why your price is reasonable.

2. Choose a different profit goal for either the T-shirt or the poster. Determine a price structure that will allow you to achieve your new profit. Write and solve an inequality to determine your new prices.

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Suggested Timing
30–40 minutes

Blackline Masters
Master 1 Project Rubric

Mathematical Processes
- ☑ Communication (C)
- ☑ Connections (CN)
- ☑ Mental Mathematics and Estimation (ME)
- ☑ Problem Solving (PS)
- ☑ Reasoning (R)
- ☐ Technology (T)
- ☐ Visualization (V)

Specific Outcomes
PR4 Explain and illustrate strategies to solve single variable linear inequalities with rational coefficients within a problem-solving context.

Planning Notes: Not for Profit

You may wish to use the following steps to introduce and complete this Challenge:

1. Review the definition of cost, selling price, and profit. Ask those students who have jobs in retail to provide examples from their workplace. Alternatively, ask for examples from students who work on the student council, play on a sports team, or belong to a group or organization that raises money for charity or for its own activities.
2. Have the class brainstorm or list various ways in which charities they know raise funds (e.g., seeking private or corporate donations, selling merchandise, or running an event).
3. Read and discuss the Challenge. You may wish to have students use a charity that interests them or create a new charity to give a personal context to #2. If a new charity is used, have students give the charity a name and describe its purpose.
4. Clarify that the task is to
   - provide at least two inequalities for the scenario in #1a)
   - write and solve an inequality for the scenario in #1b)
   - explain why the price in the #1b) inequality is reasonable
   - develop a personal fund-raising goal
   - use inequalities to show the new pricing structure.
5. Review **Master 1 Project Rubric** with students so that they will know what is expected.

Meeting Student Needs

- Before students try #1a), you may wish to walk them through a similar scenario with slightly different numbers. Get them to show their understanding, and then discuss how this could be developed into an inequality. For example, it costs \$5 to buy a T-shirt from the manufacturer. You have 20 T-shirts and want to make \$100. How much should you sell the T-shirts for? Ask:
  – To make a total of \$100, how much profit do you need from each T-shirt? ($100 \div 20 = 5$; \$5)
  – At this rate, how much does the T-shirt have to sell for? ($5 + 5 = 10$; \$10)
  – How can you develop an inequality to show this? (Example: $20(10) - 20(5) \geq 100$ or $20(10 - 5) \geq 100$)
- For #1b), you may wish to revise the challenge so that students work with a simpler percent, such as 50% or 25%.

Answers

Not for Profit

1. Example:

a) Let t = selling price of a T-shirt.

$$50(t - 10) \geq 250$$
$$t \geq 15$$

The minimum price for each T-shirt is \$15.

b) Let p = selling price of a poster.

$$150p - 0.4(150p) \geq 75$$
$$150p - 60p \geq 75$$
$$p \geq 0.83\overline{}$$

Example: To achieve the profit target, the minimum price that can be charged per poster is \$0.84. For convenience, \$1 per poster should be charged. This price is still a reasonable price for a poster; it is also easy to make change for. This price will help us achieve or exceed the profit goal, even if we don't sell all of the posters.

This Challenge can be used for either Assessment *for* Learning or Assessment *of* Learning.

Assessment	Supporting Learning
Assessment *for* Learning	
Not for Profit Discuss the challenge as a class. Have students provide individual responses.	• Consider allowing students to work with a partner and then write individual responses.
Assessment *of* Learning	
Not for Profit Introduce the challenge to the class. Have students provide individual responses.	• **Master 1 Project Rubric** provides a holistic descriptor that will assist you in assessing student work on this challenge. Page 507 provides notes on how to use the rubric for this challenge. • To view student exemplars, go to www.mathlinks9.ca, access the Teacher Centre on the Online Learning Centre, go to Assessment, and then follow the links.

The chart below shows the **Master 1 Project Rubric** for tasks such as this Challenge, Not for Profit, and provides notes that specify how to identify the level of specific answers for this project.

Score/Level	Holistic Descriptor	Specific Question Notes
5 **(Standard of Excellence)**	❑ Applies/develops **thorough** strategies and mathematical processes making **significant** comparisons/connections that demonstrate a **comprehensive** understanding of how to develop a complete solution ❑ Procedures are **efficient and effective** and may contain a **minor mathematical error** that does not affect understanding ❑ Uses **significant** mathematical language to explain their understanding and provides **in-depth** support for their conclusion	• provides a complete and correct solution
4 **(Above Acceptable)**	❑ Applies/develops **thorough** strategies and mathematical processes for making **reasonable** comparisons/connections that demonstrate a **clear** understanding ❑ Procedures are **reasonable** and may contain a **minor mathematical error** that may hinder the understanding in one part of a complete solution ❑ Uses **appropriate** mathematical language to explain their understanding and provides **clear** support for their conclusion	Demonstrates one of the following: • provides a complete response with weak justification in #1b) or 2 • provides a complete response with a calculation error in one of the inequalities • provides a complete response, but the goal and resulting price in #2 may not be reasonable for the items being sold; the math is correct • provides a correct and complete response without using an inequality
3 **(Meets Acceptable)**	❑ Applies/develops **relevant** strategies and mathematical processes making **some** comparisons/connections that demonstrate a **basic** understanding ❑ Procedures are **basic** and may contain a **major error or omission** ❑ Uses **common** language to explain their understanding and provides **minimal** support for their conclusion	Demonstrates one of the following: • correctly completes #1a) and writes a correct inequality for 1b), but has errors in its solution • provides a complete and correct response to #1a) or 1b) and a significant start to one other part • provides a correct and complete response to #2, with a significant start to 1 • provides inequalities and answers only, without justification
2 **(Below Acceptable)**	❑ Applies/develops **some relevant** mathematical processes making **minimal** comparisons/connections that lead to a **partial solution** ❑ Procedures are **basic** and may contain **several major mathematical errors** ❑ Communication is **weak**	Demonstrates one of the following: • correctly derives two inequalities for #1a) • provides a correct inequality and solution for #1b), but without any justification
1 **(Beginning)**	❑ Applies/develops an **initial start** that may be **partially correct** or could have led to a correct solution ❑ Communication is **weak or absent**	Demonstrates one of the following: • provides a correct response to either #1 or 2 • provides an initial start that could have led to a correct step

For student exemplars, go to www.mathlinks9.ca and follow the links.