

MAT.07.PT.4.SFUND.A.401

Sample Item ID:	MAT.07.PT.4.SFUND.A.401
Title:	School Fundraisers
Grade:	07
Primary Claim:	<p>Claim 4: Modeling and Data Analysis Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.</p>
Secondary Claim(s):	<p>Claim 2: Problem Solving Students can solve a range of complex, well-posed problems in pure and applied mathematics, making productive use of knowledge and problem-solving strategies.</p> <p>Claim 3: Communicating Reasoning Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.</p> <p>Claim 1: Concepts and Procedures Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.</p>
Primary Content Domain:	Expression and Equations
Secondary Content Domain(s):	Ratio and Proportional Relationships Statistics and Probability
Assessment Target(s):	<p>4 A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.</p> <p>4 B: Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.</p> <p>4 E: Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon.</p> <p>3 F: Base arguments on concrete referents such as objects, drawings, diagrams, and actions.</p> <p>2 C: Interpret results in the context of a situation.</p> <p>1 A (GR 6): Understand ratio concepts and use ratio reasoning to solve problems.</p> <p>1 I (GR 6): Develop and understanding of statistics variability.</p>
Standard(s):	7.EE.1, 7.EE.2, 7.EE.3, 7.EE.4, 7.RP.1, 7.RP.2, 7.RP.3, 7.SP.1, 7.SP.4, 6.EE.4, 6.EE.5, 6.EE.6, 6.RP.1, 6.RP.3, 6.SP.1, 6.SP.5
Mathematical Practice(s):	1, 2, 3, 4, 6, 7, 8
DOK:	3
Item Type:	PT

Grade 7 Mathematics Sample PT Form



Score Points:	15
Difficulty:	H
How this task addresses the "sufficient evidence" for this claim:	The student will use the content for the domains of expressions and equations and ratio and proportional relationships to explore the profit for three different fundraising plans. The student will use the content for the domain of statistics and probability and expressions and equations to analyze the validity of claims about the fundraising project.
Target-Specific Attributes (e.g., accessibility issues):	
Stimulus/Source:	
Notes:	Multi-part task
Task Overview:	A school must choose among three plans for a fundraiser to buy new books for the library. The student will evaluate a variety of information, claims, and projections to help choose a plan for the fundraiser. Calculators may be used throughout the task.
Teacher Preparation/Resource Requirements:	Prior to the start of Session 2, the teacher should post and complete the table with the students' responses to a survey question. The teacher is also responsible for reading the survey question and having students enter the correct data in their test booklets or online.
Teacher Responsibilities During Administration:	Monitor individual student work; provide resources as necessary.
Time Requirements:	Total time: 100–120 minutes in two sessions.

Prework: (Prior to the start of **Session 2**)

The teacher will post the following table for the class to view prior to distributing assessments.

Class Survey Results

Plan	Type	Frequency
1	Selling candy bars	
2	Selling flowers	
3	Walkathon	

Teacher says, "Yesterday you investigated 3 different fundraising plans. Which plan would you recommend the principal choose as the fundraiser?"

Teacher will tally the students' responses and complete the "Class Survey Results" table.

Teacher says, "Based on the result of the survey of our class, the majority of the students in our school wants the principal to choose Plan ? for the fundraiser." [The teacher will supply the top response in the blank.]

At the top of the computer screen will be the following:

Survey Question Conclusion: Based on the result of the survey of our class, the majority of the students in our school wants the principal to choose Plan ? for the fundraiser.

Teacher says, "Please write in the blank at the top of the screen Plan (same plan referred to above)."

School Fundraisers

Session 1

A school is going to have a fundraiser to buy new books for the library. The goal is to raise at least \$1000. Three different fundraising plans are being discussed.

Plan 1: Selling candy bars

Plan 2: Selling flowers

Plan 3: Walkathon

In order to evaluate the three plans, you will need to answer the following questions about each plan.

Plan 1: Selling Candy Bars

The school is able to buy 6 boxes of candy bars for \$136.80. Each box contains 24 candy bars. What is the cost per candy bar?

\$

Each candy bar will be sold for \$2.00. What is the minimum number of candy bars that must be sold to meet the goal of raising at least \$1000? [Amount raised = Earnings minus costs]

Number of Candy Bars:

Explain or show your reasoning. You may use a combination of diagrams, drawings, expressions/equations, and words.

The goal is to have 150 students in the school sell candy bars for the fundraiser. On average, how many candy bars must be sold per student to meet the goal?

A teacher claims there is a proportional relationship between the amount of money raised and the number of candy bars sold. Do you agree or disagree?

Click on one: AGREE DISAGREE

[By clicking on either "Agree" or "Disagree," the response will be highlighted.]

Explain or show your reasoning. You may use a combination of diagrams, drawings, expressions/equations, and words.

Plan 2: Selling Flowers

The school is able to buy a dozen roses for \$9.36. For the fundraiser, the roses will be sold with a 150% markup. For what price will the school sell 1 dozen roses?

\$

The school will be charged a one-time shipping fee of \$32.95 for the flowers. For each flower sold, the school will earn \$1.17 for the fundraiser.

Can both of these inequalities be used to determine the number of roses the students need to sell to meet the goal of \$1000?

- $1.17n - 32.95 \geq 1000$, where n represents the number of roses sold
- $1.17(12d) - 32.95 \geq 1000$, where d represents the number of dozens of roses sold

Click on one: YES NO

[By clicking on either "Yes" or "No," the response will be highlighted.]

Explain or show your reasoning. You may use a combination of diagrams, drawings, expressions/equations, and words.

Use the following inequality to determine n , the minimum number of roses the students need to sell to meet the goal.

$$1.17n - 32.95 \geq 1000$$

roses

The goal is to have 150 students sell roses for the fundraiser. If each student sells the same number of roses, approximately how many roses will each student sell?

roses

Plan 3: Walkathon

The third possible fundraiser is a walkathon. Each lap around a track is $\frac{1}{4}$ of a mile. Students will receive a donation for each lap they walk around the track.

The principal expects each student to walk 1 lap in $\frac{1}{5}$ of an hour.

To meet the principal's expectation, at what speed must the student walk? Make sure you include the units of measure.

The fundraiser will require the students to walk 6 complete laps. If a student meets the principal's expectation, how many hours will it take to walk 6 complete laps?

hours

Each student will receive \$2.75 per lap. If each student completes exactly 6 laps, what is the minimum number of students that will be needed to meet the goal of raising at least \$1000?

students

Conclusion: In your opinion, which fundraising plan would you recommend the school use? Use mathematics to support your answer.

End of Session 1

Session 2

Today you will be asked to do two things. First, you will be asked to look at some data and decide if it helps to make a decision on which fundraising plan should be used. Second, you will be asked to evaluate some goals for student participation in the fundraiser.

Your teacher will display the following table in the classroom prior to the start of this session.

Class Survey Results

Plan	Type	Frequency
1	Selling candy bars	
2	Selling flowers	
3	Walkathon	

[Teacher says, "Yesterday you investigated 3 different fundraising plans. Which plan would you recommend the principal choose as the fundraiser?"]

Teacher will tally the students' responses and complete the "Class Survey Results" table.

Teacher says, "Based on the result of the survey of our class, the majority of the students in our school wants the principal to choose Plan ? for the fundraiser." [The teacher will supply the top response in the blank.]

At the top of the computer screen will be the following:

Survey Question Conclusion: Based on the result of the survey of our class, the majority of the students in our school wants the principal to choose Plan ? for the fundraiser.

Teacher says, "Please write in the blank at the top of the screen Plan (same plan referred to above)."

Part A

Explain why the conclusion at the top of the screen is **not** a valid conclusion.

Based on the data from the survey, write a conclusion that is valid.

Last year, 5 seventh-grade classes in the school sold candy bars for a fundraiser that met its goal. The table below summarizes the results of that fundraiser.

Summary of Fundraiser

Class	Number of Participants	Number of Candy Bars Sold per Student
A	5	20
B	10	6
C	15	4
D	6	4
E	4	9

What is the mean number of candy bars sold per student for last year's fundraiser?

It has been determined that each of the 150 students who will participate in the fundraiser will need to sell about 6 candy bars to meet the goal of raising \$1000. Does the data from last year's fundraiser provide useful information that will help determine whether this year's fundraiser will meet the goal? Provide **two** justifications for your answer.

Click on one: YES NO

[By clicking on either "Yes" or "No," the response will be highlighted.]

Justifications:

Part B

The school has three grade levels. The table below shows the number of students in each of these grade levels. It also shows the goals for participation of sixth-grade students and eighth-grade students in the fundraiser.

Participation Goals

Grade Level	Part of Class Participating	Total Number of Students in Grade
Sixth	0.4	125
Seventh	?	160
Eighth	$\frac{1}{3}$	180

If selling candy bars or flowers is chosen as a fundraiser, the goal is to have a total of 150 students participate in the fundraiser. If the sixth-grade class and eighth-grade class exactly meet their goals for participation, what percent of the seventh-grade students will need to participate for the school to meet its goal? Explain or show your reasoning. You may use a combination of diagrams, drawings, expressions/equations, and words.

seventh-grade students

If the walkathon is chosen as the fundraiser, 61 students will need to walk 6 laps each to reach the goal of raising over \$1000. The student will raise \$2.75 for each completed lap. Together, the sixth-grade and eighth-grade students expect to raise \$600.

George wrote and solved the following inequality to determine x , the number of seventh-grade students who will need to walk in the walkathon.

$$2.75x \geq 600$$

$$x \geq 218$$

Do you think that George correctly determined the number of seventh-grade students who will need to walk in the walkathon?

If your answer is "YES," provide justification. If your answer is "NO," provide justification by writing and solving an inequality.

Click on one: YES NO

[By clicking on either "Yes" or "No," the response will be highlighted.]

Justification:

Sample Top-Score Response:

Session 1

Plan 1:

The cost per candy bar is \$0.95. $136.80 \div (6 \times 24)$

The minimum number of candy bars is 953. I simplified $1000 \div (2.00 - 0.95)$. My answer was 952.38, so I rounded up.

The rate is 7 candy bars per student. $953 \div 150 \approx 6.4$, so I rounded up.

I agree that it is a proportional relationship. The equation I used to solve this problem, $1.05x = 1000$, is proportional. The graph of this equation passes through the origin.

Plan 2:

The marked-up price for 1 dozen roses is \$23.40.

Yes, both inequalities can be used. Since 1 dozen = 12, I can substitute 12 in for n and 1 in for d , and I will get the same number:

$$1.17(12) - 32.95 = 1.17(12 \times 1) - 32.95$$

$$1.17(12) - 32.95 = 1.17(12) - 32.95.$$

This will be true for any equivalent values I put in, such as $d = 2$ and $n = 24$.

The minimum number of roses is 883.

The rate is 6 flowers per student. [This response will not be scored.]

Plan 3:

1.25 miles per hour

1.2 hours

61 students

Conclusion: Response will not be scored. The response will be used for Session 2.

Session 2

Part A

Because the sample is of only 1 class, it is not representative of all the students in the school. A valid conclusion should be based on a representative sample.

The majority of the students in **my** class wants the principal to choose Plan ?.

Grade 7 Mathematics Sample PT Form

7 candy bars

No. The data reflected only a few seventh-grade classes, whereas this year's data is for the whole school. The mean of 7 is not a great predictor because the two classes with the fewest number of students sold the greatest number of candy bars per student. So the mean for the 31 out of 40 students is much lower (4.6).

Part B

25% of the seventh-grade students will need to participate.

$$\text{Sixth-grade: } 0.4 \times 125 = 50$$

$$\text{Eighth-grade: } \frac{1}{3} \times 180 = 60$$

$$\text{Seventh-grade: } \frac{150 - (50 + 60)}{160} = \frac{1}{4} = 25\%$$

George's answer is not reasonable. We know that 61 students are needed, but his solution says over 218. He should have solved the following inequality:

$$16.5x \geq 1000 - 600$$

$$16.5 \geq 400$$

$$x \geq 24.24$$

So, approximately 25 seventh-grade students will need to participate.

Scoring Notes:

Each scored portion of the task is evaluated individually. The total number of points is determined by the points assigned for each task.

Session 1

Plan 1: Students are not required to round answers to receive full credit. If a student has an incorrect response to the second question but correctly applies this answer to the third question, then the student may receive full credit for the third question.

Plan 2: The last question for Plan 2 will not be scored. It is the same concept as for Plan 1. It is not scored to prevent the student from being penalized twice for an incorrect answer.

Scoring Rubric for Session 1:

Plan 1

3 points: Thorough understanding of solving real-world problems involving rational numbers. Thorough understanding of determining a unit rate. Thorough understanding of how to determine if a relationship is proportional. The student correctly calculates 0.95, 953, 6.4, and provides a correct justification for agreeing that the relationship is proportional.

2 points: Thorough understanding of determining a unit rate. Thorough understanding of how to determine if a relationship is proportional. Only partial understanding of solving real-world problems involving rational numbers. **OR** Thorough understanding of solving real-world problems involving rational numbers. Thorough understanding of how to determine if a relationship is proportional. But limited understanding of determining a unit rate. The student incorrectly calculates the unit rate of candy bars. **OR** Thorough understanding of

solving real-world problems involving rational numbers. Thorough understanding of determining a unit rate. Only partial or limited understanding of how to determine if a relationship is proportional. The student answers "AGREES" but does not provide an adequate justification.

1 point: Limited understanding of solving real-world problems involving rational numbers. But limited or no understanding of determining a unit rate or how to determine if a relationship is proportional. The student makes two or more errors in determining the charge per candy bar or the minimum number of candy bars. **OR** Thorough understanding of determining a unit rate. But limited or no understanding of solving real-world problems involving rational numbers or how to determine if a relationship is proportional. The student makes an error in determining the cost per candy bar but provides explanation of work that shows conceptual understanding. **OR** Thorough understanding of how to determine if a relationship is proportional. But limited or no understanding of solving real-world problems involving rational numbers or determining a unit rate. The student provides correct justification that the relationship is proportional.

0 points: Limited or no understanding of solving real-world problems involving rational numbers, determining a unit rate, or how to determine if a relationship is proportional.

Plan 2:

3 points: Thorough understanding of applying proportional relationships to real-world problems. Thorough understanding of the validity of different models to represent the same real-world problem. Thorough understanding of solving inequalities. The student correctly calculates \$23.40 and 827 roses and provides a correct explanation for why both inequalities can be used.

2 points: Thorough understanding of applying proportional relationships to real-world problems. Thorough understanding of solving inequalities. Only partial or inconsistent understanding of the validity of different models to represent the same real-world problem. The student answers "YES" but cannot provide a valid explanation. **OR** Thorough understanding of the validity of different models to represent the same real-world problem. Thorough understanding of solving inequalities. Only partial understanding of applying proportional relationships to real-world problems. The student provides an incorrect markup price, a correct explanation, and 827 roses. **OR** Thorough understanding of the validity of different models to represent the same real-world problem. Thorough understanding of applying proportional relationships to real-world problems. Only partial understanding of solving inequalities. The student provides an incorrect response for the number of roses.

1 point: Limited understanding of applying proportional relationships to real-world problems. Limited understanding of the validity of different models to represent the same real-world problem. Limited understanding of solving inequalities. The student correctly completes 1 of the following: (\$23.40, 827 roses, or correct explanation).

0 points: Limited or no understanding of applying proportional relationships to real-world problems, multiplying rational numbers, the validity of different models to represent the same real-world problem, or solving inequalities. The student does not complete any of the parts correctly.

Plan 3:

3 points: Thorough understanding of computing unit rates. Thorough understanding of

using proportional relationships to solve real-world problems. Thorough understanding of solving real-world problems involving inequalities. The student correctly calculates 1.25 miles/hour, 1.2 hours, and 61 students.

2 points: Thorough understanding of computing unit rates. Thorough understanding of using proportional relationships to solve real-world problems. Only partial understanding of solving real-world problems involving inequalities. The student completely answers two questions (1.25 miles per hours and 1.2 hours). **OR** Thorough understanding of computing unit rates. Only partial understanding of solving real-world problems involving inequalities. The student correctly calculates 1.25 miles/hour and 61 students. **OR** Thorough understanding of using proportional relationships to solve real-world problems. Thorough understanding of solving real-world problems involving inequalities. Only partial understanding of computing unit rates. The student completely answers two questions (1.2 hours or answer consistent with unit rate and 61 students).

1 point: Limited understanding of computing unit rates. Limited understanding of using proportional relationships to solve real-world problems. Limited understanding of solving real-world problems involving inequalities. The student completes one task correctly.

0 points: Limited or no understanding of computing unit rates, using proportional relationships to solve real-world problems, or solving real-world problems involving inequalities. The student does not complete any of the parts correctly.

Scoring Rubric for Session 2

Part A

3 points: Thorough understanding of using random samples to make conclusions about a population. Thorough understanding of computing the mean. Thorough understanding of drawing inferences about two populations. The student completes all sections with correct answers and provides correct explanations as requested.

2 points: Thorough understanding of using random samples to make conclusions about a population. Thorough understanding of computing the mean. Only partial understanding of drawing inferences about two populations. The student completes the first 3 questions with correct answers but states it is useful to use last year's data with justification. **OR** Thorough understanding of using random samples to make conclusions about a population. Only partial understanding of computing the mean. Thorough understanding of drawing inferences about two populations. The student incorrectly finds the mean and uses this value in evaluating the conclusion. **OR** Thorough understanding of computing the mean. Thorough understanding of drawing inferences about two populations. Only partial understanding of using random samples to make conclusions about a population. The student is able to provide only one justification to support his or her opinion that the mean should not be used.

1 point: Thorough understanding of one of the following and only partial or limited understanding of two of the following: using random samples to make conclusions about a population, computing the mean, or drawing inferences about two populations. The student is able to completely answer only one of the questions. **OR** Partial or limited understanding of two of the following: using random samples to make conclusions about a population, computing the mean, or drawing inferences about two populations. The student provides partial answers to two or three of the questions.

0 points: Limited or no understanding of using random samples to make conclusions about a population, computing the mean, or drawing inferences about two populations.

Part B

3 points: Thorough understanding of solving real-world problems using numerical expressions. Thorough understanding of interpreting results in the context of a situation. Thorough understanding of solving real-world problems using inequalities. The student correctly calculates 25% with explanation and answers "NO" with proper justification.

2 points: Thorough understanding of solving real-world problems using numerical expressions. Only partial or inconsistent understanding of interpreting results in the context of a situation and solving real-world problems using inequalities. The student describes the answer as unreasonable, but justifies by writing an incorrect inequality. **OR** Thorough understanding of interpreting results in the context of a situation and solving real-world problems using inequalities. Only partial understanding of solving real-world problems using numerical expressions. The student determines that 40 participants are necessary, but calculates an incorrect percent. The student determines an incorrect number of participants, but calculates a correct percent by applying his or her answer.

1 point: Limited understanding of solving real-world problems using numerical expressions. Limited understanding of interpreting results in the context of a situation. Limited understanding of solving real-world problems using inequalities. The student correctly completes only 1 section of *Part B* or is missing the explanation or justification.

0 points: No understanding of solving real-world problems using numerical expressions. No understanding of interpreting results in the context of a situation. No understanding of solving real-world problems using inequalities. The student does not correctly complete any part of the tasks in *Part B*.