

Grade 7 Mathematics

Ratio and Proportional Relationships

Objectives

- ✚ Students will compute unit rates associated with ratios of fractions.
- ✚ Students will recognize and represent proportional relationships between quantities.
- ✚ Students will decide whether two quantities are in a proportional relationship by testing for equivalent ratios.
- ✚ Students will use proportional relationships to solve multistep ratio and percent problems.

Standards

- ✚ **7.RP.1** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.*
- ✚ **7.RP.2** Recognize and represent proportional relationships between quantities. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

Task # 1 (NJSLA 7.D.1)

Mr. Johnston’s class is having an ice cream party. Each student will be given an equal amount of ice cream.

It takes $\frac{1}{2}$ gallon ice cream to feed $\frac{1}{4}$ of the class.

- Complete the ratio table. Drag and drop the correct selections into the table.

ice cream (gallon)	class
0	0
$\frac{1}{2}$	<input type="text"/>
1	<input type="text"/>
$1\frac{1}{2}$	<input type="text"/>
<input type="text"/>	1

1

$\frac{1}{2}$

$\frac{1}{4}$

$\frac{3}{4}$

$\frac{1}{8}$

2

- How many gallons of ice cream would be needed for 3 classes?
 - Explain how you determined your answer.
- Enter your answer and your explanation in the space provided.

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▼ Math symbols

+ - × ÷

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$\sqrt{\quad}$ $\sqrt[n]{\quad}$ π

() ° |·|

▼ Relations

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▼ Geometry

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Task #2 (NJSLA 7.C.6.1; 7.C.7.1)

Mr. Johnston's class is having an ice cream party. Each student will be given an equal amount of ice cream.

It takes $\frac{1}{2}$ gallon ice cream to feed $\frac{1}{4}$ of the class

PART A

Find the unit rate of ice cream to class. Explain your reasoning.

Enter your answer and explanation in the space provided.

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Math symbols

+ - × ÷

± · /

= ≠ $\frac{1}{2}$ $\frac{1}{4}$

x^x $\sqrt{\quad}$ $\sqrt[\quad]{\quad}$ π

(-)^o |·|

Relations

= ≠ ~ ≈

< > <= >=

<= >= ≅ ≠

Geometry

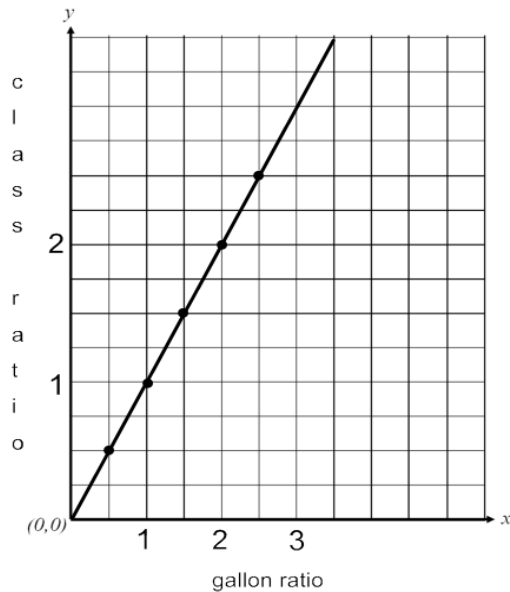
→ ↔ - ||

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PART B

Josh solved the problem and he created this graph to represent the proportionality of the ice cream to the class.



- Does the graph represent the same constant of proportionality as indicated by the unit rate?
- Explain your reasoning.
Enter your answer and explanation in the space provided.

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Math symbols			
+	-	×	÷
±	°	·	/
=	≠	≅	≡
x^y	$\sqrt{\quad}$	$\sqrt[3]{\quad}$	π
()	°		
Relations			
=	≠	~	≅
<	>	≈	≠
≤	≥	≅	≠
Geometry			
→	↔	—	
⊥	∠	∠	∠
□	⊙		△

ANSWER KEY

1

Score	Description												
3	<p>Student response includes each of the following 3 elements:</p> <ul style="list-style-type: none">• Correct table of values• Correct answer, 6 gallons• Valid explanation to support answer <p>Sample Student Response:</p> <ul style="list-style-type: none">• <table border="1" style="margin-left: auto; margin-right: auto;"><thead><tr><th>ice cream (gallon)</th><th>class</th></tr></thead><tbody><tr><td style="text-align: center;">0</td><td style="text-align: center;">0</td></tr><tr><td style="text-align: center;">$\frac{1}{2}$</td><td style="text-align: center;">$\frac{1}{4}$</td></tr><tr><td style="text-align: center;">1</td><td style="text-align: center;">$\frac{1}{2}$</td></tr><tr><td style="text-align: center;">$1\frac{1}{2}$</td><td style="text-align: center;">$\frac{3}{4}$</td></tr><tr><td style="text-align: center;">2</td><td style="text-align: center;">1</td></tr></tbody></table> <ul style="list-style-type: none">• 6 gallons of ice cream would be needed for 3 classes.• The unit rate of ice cream to classes is $\frac{2}{1}$ so the equivalent ratio for 3 classes is $\frac{6}{3}$ because $\frac{2}{1} = \frac{6}{3}$	ice cream (gallon)	class	0	0	$\frac{1}{2}$	$\frac{1}{4}$	1	$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$	2	1
ice cream (gallon)	class												
0	0												
$\frac{1}{2}$	$\frac{1}{4}$												
1	$\frac{1}{2}$												
$1\frac{1}{2}$	$\frac{3}{4}$												
2	1												
2	Student Response includes 2 of the 3 elements.												
1	Student Response includes 1 of the 3 elements.												
0	Student Response is incorrect or irrelevant.												

2 Part A

Score	Description
2	<p>Student response includes each of the following 2 elements:</p> <ul style="list-style-type: none"> • Correct answer, unit rate of $\frac{2}{1}$ • Valid explanation which demonstrates understanding of ratio reasoning in determining the answer <p>Sample Student Response:</p> <ul style="list-style-type: none"> • The unit rate of ice cream, in gallons, to number of classes is $\frac{2}{1}$ • $\frac{1}{2}$ gallon is needed for $\frac{1}{4}$ of the class. That is a ratio of $\frac{1}{2} / \frac{1}{4}$. To express this ratio as an equivalent unit rate, I multiplied the numerator and denominator by 4. $\frac{1}{2}(4) = 2$ and $\frac{1}{4}(4) = 1$
1	Student Response includes 1 of the 2 elements.
0	Student Response is incorrect or irrelevant.

2 Part B

Score	Description
2	<p>Student response includes each of the following 2 elements:</p> <ul style="list-style-type: none"> • Correct answer, the graph does not indicate the same constant proportionality as indicated by the unit rate • Valid explanation indicating understanding of ratio reasoning <p>Sample Student Response:</p> <ul style="list-style-type: none"> • No, the graph does not indicate the same constant proportionality as indicated by the unit rate. • The constant of proportionality represented in the graph is 1 gallon per class. The correct unit rate is 2 gallons per class.
1	Student Response includes 1 of the 2 elements.
0	Student Response is incorrect or irrelevant.