MeTEOR Performance Task Fifth Grade

Mathematics
Painting Grandma's House

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Performance Task Item: Painting Grandma's House
Grade Level: Fifth Grade

Focus Area: Number and Operations - Fractions & Number and Operations in Base Ten
Essential Question: Can we accomplish everyday situations without fractions and decimals?
Core Ideas:
- Understands how to figure area for real-world problems.
- Understands how to use fractions and decimals.
- Understands how to round numbers to the nearest tenth.

Learning Targets:
- Students will calculate area using a formula to solve problems.
- Students will use computation to solve problems.
- Students will add, subtract, multiply and divide fractions.
- Students will justify mathematical thinking.

STANDARDS
Domain: Number and Operations – Fractions
Content Standards:
- Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
- Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
- Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem
- Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
- Interpret division of a whole number by a unit fraction, and compute such quotients.

Domain: Number and Operations in Base Ten
Content Standards:
- Read, write, and compare decimals to thousandths.
- Use place value understanding to round decimals to any place.
- Fluently multiply multi-digit whole numbers using the standard algorithm.
- Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

- Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Math Practice Standards:
MP 1: Make sense of problems and persevere in solving them.
MP 2: Reason abstractly and quantitatively.
MP 4: Model with mathematics.
MP 5: Use appropriate tools strategically.
MP 8: Look for and express regularity in repeated reasoning.

Materials:
- Performance Task
- Pencil
- Paper
- Calculator

Task/Question 1:

DOK Level 1: Recall & Reproduction

Math Practice Standards:
- MP 1: Make sense of problems and persevere in solving them.
- MP 2: Reason abstractly and quantitatively.
- MP 5: Use appropriate tools strategically.

Your Grandma needs three rooms inside her house painted. You and your brother have volunteered to help paint. Before you begin painting the interior walls, ceiling, woodwork and doors, you need to estimate the amount of paint you'll use. Estimates require specific calculations for each surface you want to paint.

A. To estimate the amount of paint you need to cover the walls of a room, add together the length of all the walls and then multiply the number by the height of the room, from floor to ceiling. The number you get is the room's square footage. Complete the chart below to get the total square footage of each room you need to paint.

Rooms	Length of the walls				Height	Total Square Footage
Living Room	26 feet	26 feet	29.5 feet	29.5 feet	10 feet	
Kitchen	26.75 feet	16 feet	26 feet	16 feet	10 feet	
Bedroom	11 feet	11 feet	23 feet	23 feet	8 feet	

Work Zone:

B. Once you determine the square footage (from Part A) for each room you will be painting, you need to determine how much of that square footage is a paintable surface area. (Note: Since you use a different paint on the doors and windows, you can subtract those areas from the room totals: subtract 20 square feet for *each* door/doorway and 15 square feet for *each* average-sized window in the room. Afterwards, you will end up with a number that is close to the actual wall area you have to cover with paint.)

Complete the chart below.

Rooms	Square Footage (from part A)	Number of Doors or Doorways	Number of Windows	Paintable Surface Area
Living Room		3	4	
Kitchen		2	2	
Bedroom		1	1	

Work Zone:

Task/Question 2:

DOK Level 2: Basic Application of Skills and Concepts

Math Practice Standards:
- MP 1: Make sense of problems and persevere in solving them.
- MP 2: Reason abstractly and quantitatively.
- MP 4: Model with mathematics.
- MP 8: Look for and express regularity in repeated reasoning.

Your Grandma needs to know how much paint she will need to purchase.

A. To determine the correct amount, complete the following:
- Step 1: Determine how many FULL gallons of paint is needed for each room
  - One gallon of paint will cover a paintable surface area of 350 square feet.
- Step 2: After determining the number of FULL gallons of paint, determine if you need an additional 2 quarts or another full gallon to complete the project
  - If your remainder from step 1 was less than .5 gallons, buy 2 extra quarts of paint
  - If your remainder from step 1 was more than .5 gallons, buy an extra gallon

Using the table below and information from Task 1-B and above, find the amount of paint you will need your grandma to buy.

Rooms	Paintable Surface Area	Gallons of Paint Needed	Quarts of Paint Needed
Living Room			
Kitchen			
Bedroom			

Work Zone:

B. Just when you thought you had it all figured out your Grandma decided she wanted each room to have 2 coats of paint. How does painting two coats affect your totals (from Part A)? Explain your answer in writing.

Task/Question 3:

DOK Level 2: Basic Application of Skills and Concepts

Math Practice Standard:
- MP 1: Make sense of problems and persevere in solving them.

A. Now that you have determined the amount of paint your grandma needs to purchase, you are ready to give Grandma the estimated cost of paint.

The brand of paint you plan to use costs $22.99 a gallon and $14.95 a quart. Based on your answers in Task 2A, what would be the total cost to paint each room? Complete the chart below.

Rooms	Total Cost for Gallons of Paint to be Purchased	Total Cost for Quarts of Paint to be Purchased	Total Cost of Paint for the Room
Living Room			
Kitchen			
Bedroom			

B. What is the total cost for all three rooms rounded to the nearest tenth?

C. Write the cost of paint in word form as if you are writing the check for the paint?

Task/Question 4:

DOK Level 3: Strategic Thinking and Complex Reasoning

Math Practice Standards:
- MP 1: Make sense of problems and persevere in solving them.
- MP 2: Reason abstractly and quantitatively.
- MP 4: Model with mathematics.
- MP 5: Use appropriate tools strategically.
- MP 8: Look for and express regularity in repeated reasoning.

A. Painting takes you 3/4 hour to paint one wall. It takes your brother 1/3 of the time it takes you to paint a wall. How long will it take your brother to paint 4 walls? Explain your mathematical thinking with words and numbers or draw a visual representation showing your answer.

B. The living room, the kitchen and bedroom have a total of 12 walls. You and your brother agreed that each of you will paint 6 walls. How long will it take you and your brother to paint the twelve walls? Don't forget your Grandma wants a second coat on each wall. Show your work.

C. Your Grandma wants to pay you and your brother for painting her house. Develop a plan for the amount you should be paid. Justify your answer with facts and figures.

Complete Performance Task Scoring Rubric
Painting Grandma's House

	Depth of Knowledge Level	Points	Total Possible Points for Task	Total Points Earned by Student
Task 1: A.	1	5	10	

Task 1: A.

Rooms	Total Square Footage
Living Room	1,110
Kitchen	847.5
Bedroom	544

B.

Rooms	Square Footage	Doors/ Doorways	Windows	Paintable surface area
Living Room	1,110	3	4	990
Kitchen	847.5	2	2	777.5
Bedroom	544	1	1	509

(B. Depth of Knowledge Level — Points: 5)

	Depth of Knowledge Level	Points	Total Possible Points for Task	Total Points Earned by Student
Task 2: A.	1	5	10	

Task 2: A.

Rooms	Paintable surface area	Gallons of Paint needed	Quarts of Paint needed
Living Room	990	3	0
Kitchen	777.5	2	2
Bedroom	509	1	2

	Depth of Knowledge Level	Points
B. Individual responses will vary; however, the general response should	2	5

include the amount of paint needed will double.				
Task 3: A.	**1**	**2**	**5**	

Rooms	Cost for Gallons	Cost for Quarts	Total Cost For Room
Living Room	$68.97	0	$68.97
Kitchen	$45.98	$29.90	$75.88
Bedroom	$22.99	$29.90	$52.89

B. $197.74	**1**	**1**		
C. One hundred, ninety-seven dollars and 74/100	**2**	**2**		
Task 4: A. Answers will vary. 5 points for a viable explanation.	**2**	**5**	**15**	
B. 12 hours	**2**	**5**		
C. Answers will vary. 5 points for a viable explanation.	**3**	**5**		
			TOTAL POINTS:	

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