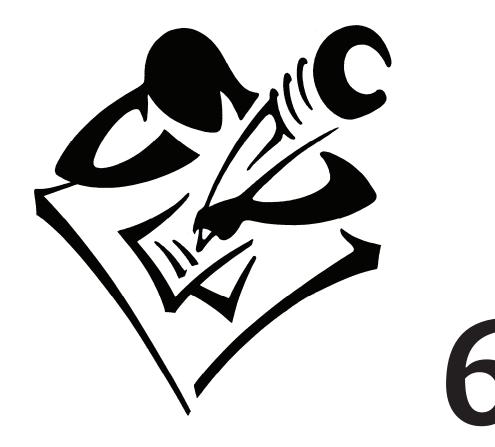
Tennessee Comprehensive Assessment Program

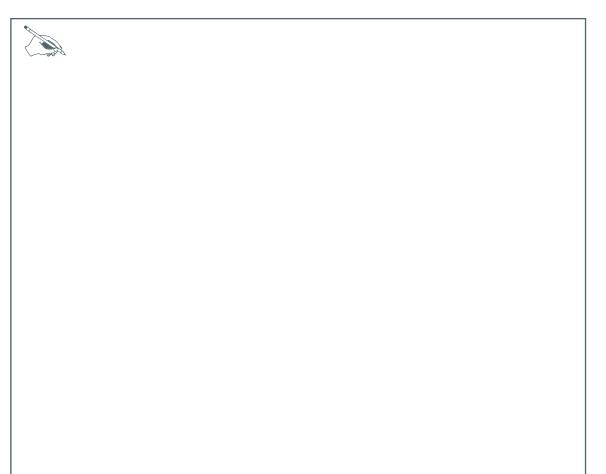
TCAP/CRA 2013



Task 3 Scoring Guide
Water Pumps Task

Pump A			
	Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
Test 1	128	4	
Test 2	96	3	
Test 3	192	6	

Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.



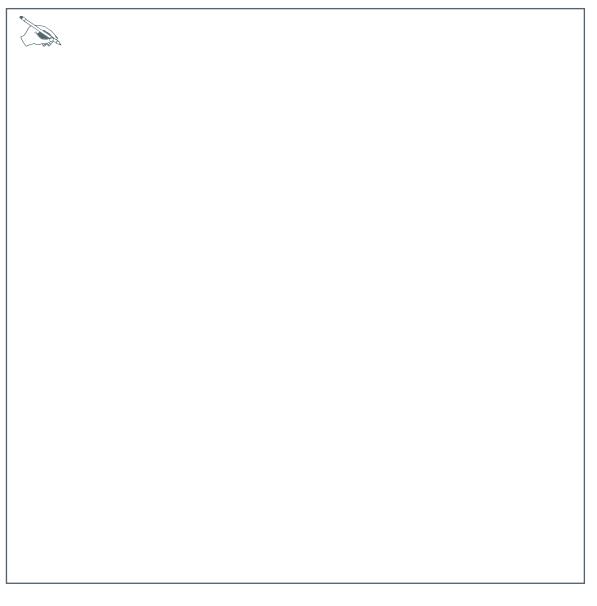


Page 8

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Pump B			
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)	
60	t	15	



Page 9

GO ON TO THE NEXT PAGE.



3. Water Pumps Task Scoring Guide

The CCSS for Mathematical Content (3 points)

6.RP.A.1 Uses ratio language and/or reasoning to describe the relationship between water pumped and time.

(1 Point)

- 6.RP.A.3 Uses rate or ratio reasoning to show that the rates in part a are equivalent. May include minor arithmetic errors, and thus indicate the rates are not equivalent. The student may do this by:
 - scaling all ratios up to a common ratio. May find the ratio of amount of time to amount of water.
 - finding a common unit rate. May find the ratio of amount of time to amount of water.
 - dividing water pumped by time or time by amount of water.
 - describing any of the above in tables or in words; e.g., indicating that all
 ratios of water to time will scale up to the same ratio of 384:12, or scale
 down to 32:1. May use the ratio of time to amount of water.

(1 Point)

6.RP.A.3b Uses unit rate to determine the correct time in part b. The student may do this by:

- scaling the unit rate up, e.g., $\frac{15}{1} = \frac{30}{2} = \frac{60}{4}$.
- setting up and solving a proportion, e.g., $\frac{60}{T} = \frac{15}{1}$.
- dividing; e.g., $60 \div 15 = T$ or $60 \div T = 15$.
- finding the missing factor, e.g., $15 \times T = 60$.

(1 Point)

Total Content Points _____

The CC	SS for Mathematical Practice (2 points)
MP4	Uses ratios, equations, and/or proportions to correctly model the relationships present in either table.
	(1 Point)
	(MP4: Model with mathematics.)
MP6	Accurately determines and communicates that the rate is the same for all three tests; does not provide any incorrect labels.
	(1 Point)
	(MP6: Attend to precision.)
	Total Practice Points
	Total Awarded Points

The CCSS for Mathematical Content Addressed in This Task

Understand ratio concepts and use ratio reasoning to solve problems.

- 6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."
- 6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems; e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
- 6.RP.A.3b Solve unit rate problems, including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?

The CCSS for Mathematical Practice*

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

Students' responses to a mathematical task provide evidence of what they understand and are able to do in relation to the standards and practices. Across tasks, this cumulative evidence shows students' understanding and abilities within a domain. When students do not respond completely to all parts of a task, they provide insufficient evidence of their mathematical understanding and abilities and therefore do not fully demonstrate the expectations of the standards and practices aligned with that task.

^{*}Gray text indicates Mathematical Practices that are not addressed in this task.

Task 3. Water Pumps Task

PumpA ***			
	Water Pumped (in gallons) ::	Timetie Pump vas on (in minutes) 🚁	Rate ((n/gallons-per-minute))
Test 1	128	4	
Test 2	96	3	
Test 3	192	6	

 Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.

	Pump B	
Water Pumped (in gallons)	Time the Pump wa (in minutes)	s on Rate (in gallons per minute)
60	t	15

It took 4 minutes to pump
60 gallons because the ratio 1 min is equal
to 60 gal.
4 min.

15 gallons X¹¹

60 gallons

1 minute x¹¹

1 minute x¹¹

1 minute x¹¹

1 minutes

Guide 1 Litho 682236

Total Content Points: 3 (6.RP.A.1, 6.RP.A.3, 6.RP.A.3b)

Total Practice Points: 2 (MP4, MP6)

In this response, the student uses ratio language in Part A to describe the relationship between the water pumped and time $\left(\frac{128 \text{ gallons of water}}{4 \text{ minutes}}\right)$ is equal to $\frac{32 \text{ gal. of water}}{1 \text{ min.}}\right)$ (6.RP.A.1). This

student finds a common unit rate to prove that the rates are equivalent $\left(\frac{128}{4} = \frac{32}{1}, \frac{96}{3} = \frac{32}{1}, \right)$

 $\frac{192}{6} = \frac{32}{1}$ (6.RP.A.3). In Part B, the student scales up $\frac{15 \text{ gallons}}{1 \text{ minute}}$ to $\frac{60 \text{ gallons}}{t \text{ minutes}}$ to determine

the correct time of 4 minutes (6.RP.A.3b). The ratios shown in Part A and the proportion in Part B correctly model the relationships present in each table (MP4). The student accurately determines and clearly communicates that the rate is the same for all three tests in Part A and provides no incorrect labels (MP6).

Total Awarded Points: 5 out of 5

Task 3. Water Pumps Task

Pump/A			
	WaterPumped M(In gallons)	Time the Pump was on (nominates)	Rate ::::: (lingallonsperminute)
Test 1	128	4	
Test 2	96	3	
Test 3	192	6	

a. Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.

Yes, Pump A was working at the same rate.

	Pump B	
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
60	t	15

15 gal,	<u>60</u> gal.
Imin.	4 min.
60-15=4	
	•

Guide 2 Litho 682278

Total Content Points: 3 (6.RP.A.1, 6.RP.A.3, 6.RP.A.3b)

Total Practice Points: 2 (MP4, MP6)

In this response, the student uses ratio language to describe the relationship between the water pumped and time in Part A $\left(\text{e.g.,} \frac{128 \text{ gal.}}{4 \text{ min.}} \rightarrow \frac{32 \text{ gal.}}{1 \text{ min.}}\right)$ and also in Part B $\left(\frac{60 \text{ gal.}}{4 \text{ min.}}, \frac{15 \text{ gal.}}{1 \text{ min.}}\right)$

(6.RP.A.1). In Part A, the student uses rate reasoning by scaling all the ratios to $\frac{32 \text{ gal.}}{1 \text{ min.}}$

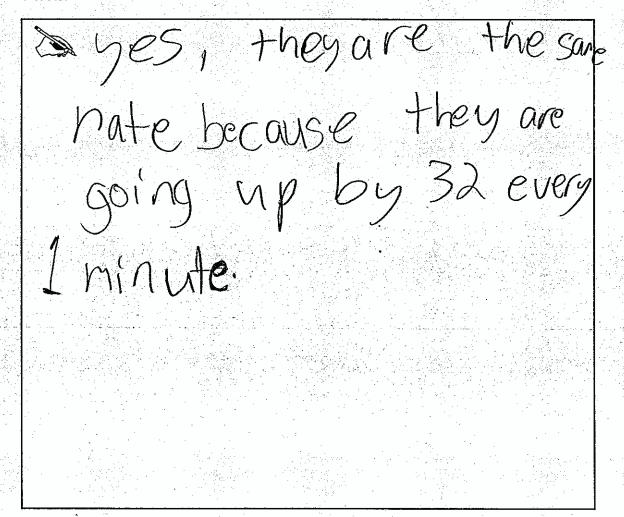
(6.RP.A.3). In Part B, the student uses unit rate to determine the correct time $(60 \div 15 = 4)$ (6.RP.A.3b). The ratios in Part A and Part B correctly model the relationship present in each table (MP4). The student accurately determines and clearly communicates that the rate is the same for all three tests in Part A and provides no incorrect labels (MP6).

Total Awarded Points: 5 out of 5

Task 3. Water Pumps Task

		With RumpA 1988	
	Water Pumped (in gallons)	Timethe Rump was on: (in minutes)	Rate (in gallons per minute)
Test 1	128	4	
Test 2	96	3	
Test 3	192	6	

a. Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.



Pump B				
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)		
60	t	15		

took four minutes pump 60 gallonsin

Guide 3 Litho 686641

Total Content Points: 2 (6.RP.A.1, 6.RP.A.3b)

Total Practice Points: 2 (MP4, MP6)

In this response, the student uses ratio language in Part A ("going up by 32 every 1 minute") (6.RP.A.1). However, the student provides insufficient evidence of rate/ratio reasoning to show why the test rates for the pump are equivalent (no credit for 6.RP.A.3). The student uses unit rate

to determine the correct time in Part B $\left(\frac{60}{15} = 4\right)$ (6.RP.A.3b). This work in Part B also models

the relationship between water pumped, time, and rate (MP4). Although work is not shown in Part A, the student accurately determines that the rate is the same for all three tests and does not provide any incorrect labels (MP6).

Total Awarded Points: 4 out of 5

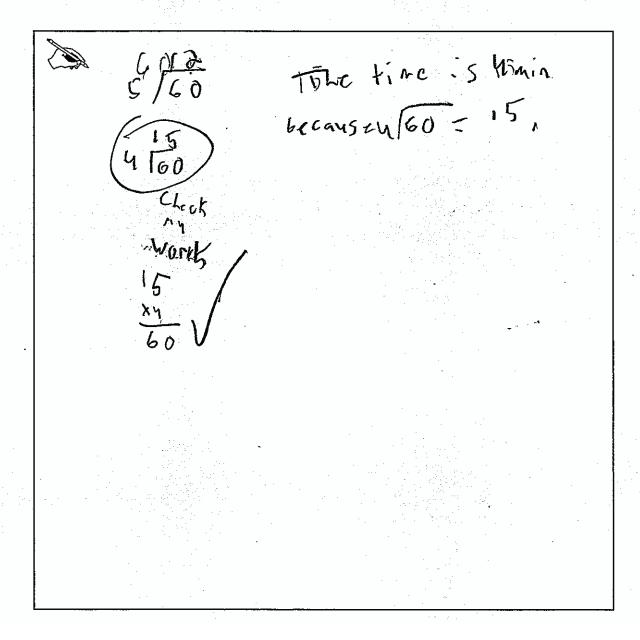
Task 3. Water Pumps Task

A Pump A 72			
to Calor	:Water Pumped (in gallons)	Timethe Pumpwason (in minutes):	Rate (in;gallons per minute)
Test 1	128	4	
Test 2	96	3	
Test 3	192	6	

a. Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.

24/126 = 32	all 3 test. Where working on the same rate
3195 = 32	on the same rate
6[14] = 32	b-cause 4 1178 = 321
	3 [96 = 32, and
	6 TIRA = 37 TIL
	6 Trad=37 they
	그러면 사용하는 얼마 아이를 가게 되었다.
	sene Rele per monute

	Pump B	
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
60	t	15



Guide 4 Litho 688361

Total Content Points: 2 (6.RP.A.3, 6.RP.A.3b)

Total Practice Points: 2 (MP4, MP6)

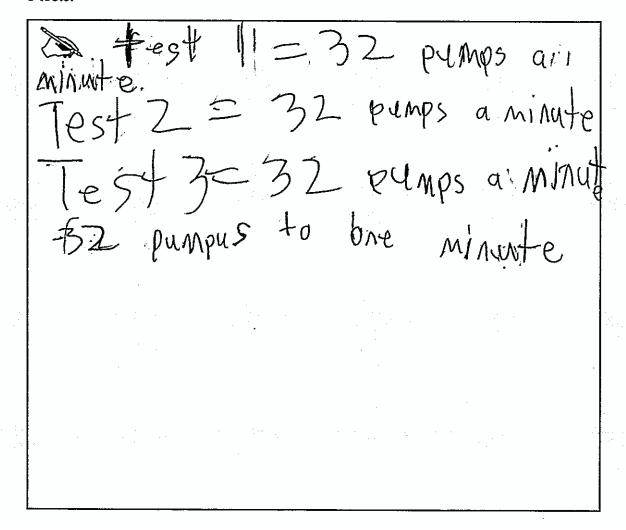
In this response, the student uses ratio reasoning by finding a common unit rate ($128 \div 4 = 32$, $96 \div 3 = 32$, $192 \div 6 = 32$) to show that the rates are equivalent in Part A (6.RP.A.3); however, the student does not use clear labeling to indicate that the quotient 32 describes the relationship between water pumped and time (i.e., same rate per minute) (no credit for 6.RP.A.1). The student uses rate reasoning to show that the rates in Part A are equivalent, dividing water pumped by time for each test (6.RP.A.3). In Part B, the student determines the correct time of 4 minutes (6.RP.A.3b). The student uses equations in Part A to model the relationship of water to time and the equations in Part B to model the relationship of water to rate (MP4). The student accurately determines and communicates that the rate is the same for all three tests and provides no incorrect labels (MP6).

Total Awarded Points: 4 out of 5

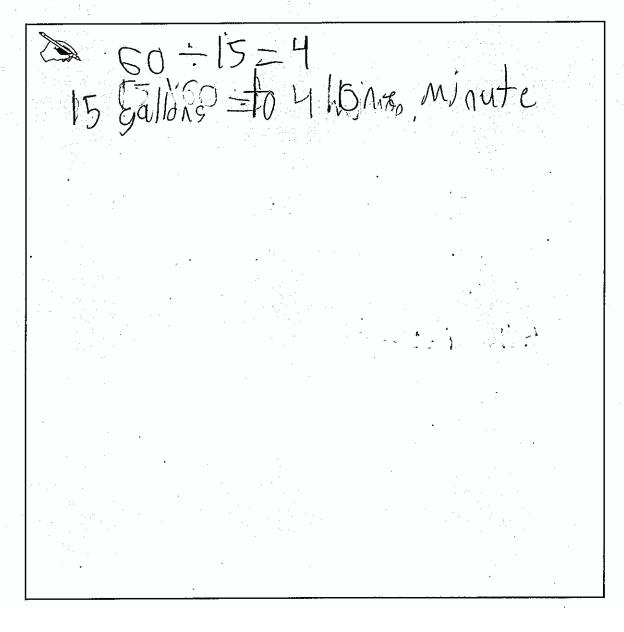
Task 3. Water Pumps Task

PumpA				
i e e e e e e e e e e e e e e e e e e e	Water Pumped (in gallons)	Timethe Pump was on **: ((in minutes): I	Rate : (in gallons per minute)	
Test 1	128	4	32	
Test 2	96	3		
Test 3	192	6		

 Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.



	Pump B	
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
60	t	15



Guide 5 Litho 681779

Total Content Points: 2 (6.RP.A.1, 6.RP.A.3b)

Total Practice Points: 1 (MP4)

In this response, the student uses ratio language in Part A ("32 pumps to one minute") (6.RP.A.1). The student does not provide any evidence of rate/ratio reasoning to show how the rates of the tests are equivalent (no credit for 6.RP.A.3). The student does use unit rate to determine the correct time in Part B ($60 \div 15 = 4$) (6.RP.A.3b). The work in Part B models the relationship between water pumped and rate ($60 \div 15 = 4$) (MP4). Although work is not shown in Part A, the student accurately determines that the rate is the same for all three tests, but incorrectly labels the quotient 32 as "pumps a minute" instead of gallons per minute (no credit for MP6).

Total Awarded Points: 3 out of 5

Task 3. Water Pumps Task

Pump A				
	Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)	
Test 1	128	4		
Test 2	96	3		
Test 3	192	6		

a. Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.

132 yesberouse all of the numbers
232 + by The Time The Pump was on they
3,37 all erval 32 gallons of water dumped

	Pump B	
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
60	t	15



Guide 6 Litho 647390

Total Content Points: 2 (6.RP.A.3, 6.RP.A.3b)

Total Practice Points 1 (MP4)

In this response, the student does not use ratio language to describe the relationship between water pumped and time (no credit for 6.RP.A.1). The student gives evidence of ratio reasoning by explaining how the rates of the pump are equivalent in Part A ("all the numbers \div by the time the pump was on") (6.RP.A.3). In Part B, the student correctly uses unit rate in the equation $60 \div 15 = 4$ to determine the correct time (6.RP.A.3b). The student work models the relationship between water pumped and rate in Part B ($60 \div 15 = 4$) (MP4). Although work is not shown in Part A, the student determines that the rate is the same for all three tests; however, the student imprecisely labels the answer "32 gallons of water pumped," excluding the rate "per minute" (no credit for MP6).

Total Awarded Points: 3 out of 5

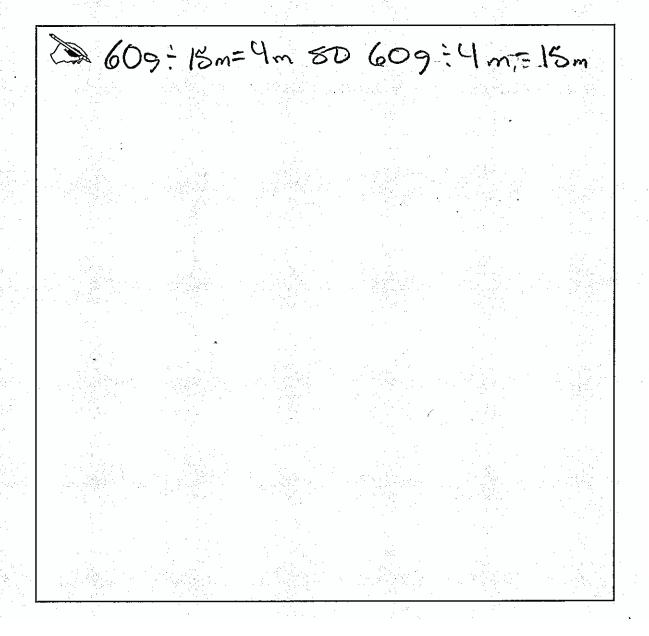
Task 3. Water Pumps Task

			Pump:A	
i.		Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
	Test 1	128	4 7 7	
٠.	Test 2	96	3	
	Test 3	192	6	·

 Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.

Jes becaues, 1	28:4=	32,96	-3=32	
192-6=32.	出一点	3-	1 6	1_
	128 32	, 76	32, 142	- 32.

	Pump B	
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
60		15



Guide 7 Litho 647192

Total Content Points: 2 (6.RP.A.3, 6.RP.A.3b)

Total Practice Points: 1 (MP4)

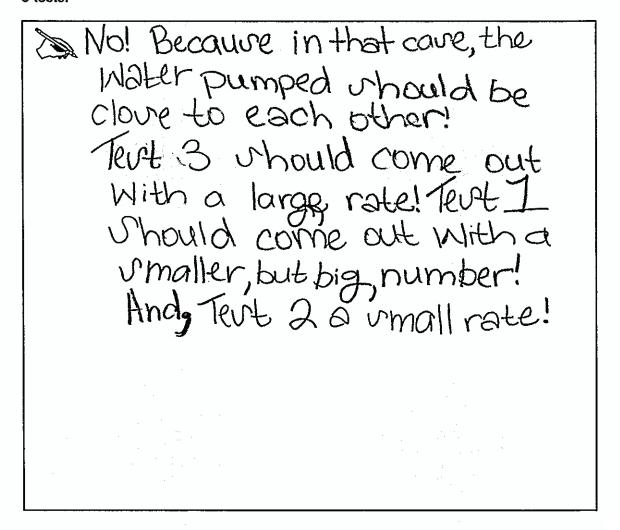
In this response, although the student includes proportions, no labels are provided in the proportions, and no explanation of the numbers is given in words; thus the student does not use ratio language to describe the relationship between water pumped and time (no credit for 6.RP.A.1). The student does show evidence of ratio reasoning to show how the rates of the pump are equivalent in Part A ($128 \div 4 = 32$, $96 \div 3 = 32$, $192 \div 6 = 32$) (6.RP.A.3). The unit rate given in the table is used to determine the correct time in Part B ($60g \div 15m = 4m$) (6.RP.A.3b); this work models the relationship between water pumped and rate (MP4). The student accurately determines and clearly communicates that the rate is 32 for all three tests in Part A, but omits the label "gallons" for the unit rate ("15m") in Part B (no credit for MP6).

Total Points Awarded: 3 out of 5

Task 3. Water Pumps Task

de la	RumpA				
	Water Pumpedi (in gallons) ₩	Time(he)Pumpwason (homnyles)	Rate (in gallons per minute)		
Test 1	128	4			
Test 2	96	3			
Test 3	192	6			

 Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.



	Pump B	
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
60	t t	15

Guide 8 Litho 657945

Total Content Points: 1 (6.RP.A.3b)

Total Practice Points: 1 (MP4)

In this response, the student does not use ratio language to describe the relationship between water pumped and time (no credit for 6.RP.A.1); also, the student does not use rate or ratio reasoning to show how the rates of the three tests are equivalent in Part A (no credit for 6.RP.A.3). The student does use unit rate to determine the correct time in Part B $(15 \times 4 = 60)$ (6.RP.A.3b, MP4). The student does not determine that the rate is the same for all three tests in Part A, and Part B shows an imprecise unit label for the value 60, "water pumped" instead of "gallons" (no credit for MP6).

Total Awarded Points: 2 out of 5

Task 3. Water Pumps Task

Pump A TV.				
	Water Pumped (in gallons)	TimetheRumpwason (inminutes)	Rate (in gallons per minute)	
Test 1	128	4		
Test 2	96	3		
Test 3	192	6		

 Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.

+ 62+ + 62+	1 15 32 9 9 9 1 1 1 1 5 3 2 9 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1942N0/1 1942N0/ 1942N01	minute. Minute Minute

	Pump B	
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
60	t	15

15-60=25 ftf00825Minutston Fumps to Bamf60 Jallons Of gater.

Guide 9 Litho 687865

Total Content Points: 1 (6.RP.A.1)

Total Practice Points: 0

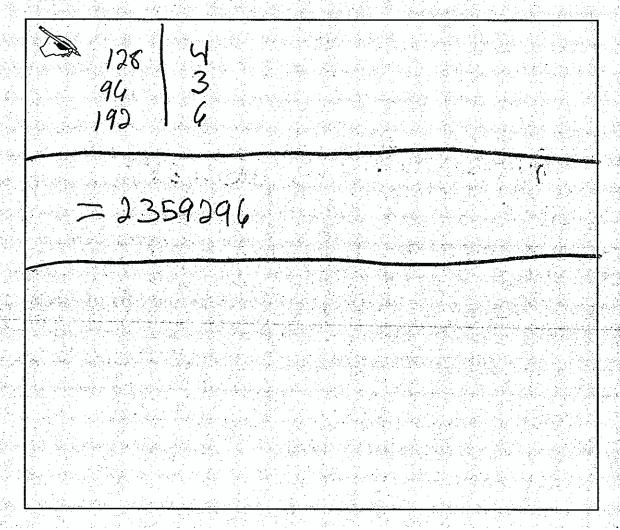
In this response, the student uses ratio language to describe the relationship between water pumped and time ("32 gallons per minute") (6.RP.A.1). The student does not use rate or ratio reasoning to show how the rates in Part A are equivalent (no credit for 6.RP.A.3). The student does not use unit rate to determine the correct time in Part B (no credit for 6.RP.A.3b). The student's model in Part B incorrectly expresses the relationship between the water pumped and the rate, dividing 15 by 60 instead of 60 by 15 (no credit for MP4). The student states that the rate is 32 for all three tests in Part A, but although the labeling is correct, the process and calculation in Part B are both incorrect ("it took 25 minutes for pump B to Bump 60 gallons of water") (no credit for MP6).

Total Awarded Points: 1 out of 5

Task 3. Water Pumps Task

Pump/A										
	Watera Rumped (in gallons)	Timetie Pumpwason (inminutes)	raje							
Test 1	128	4								
Test 2	96	3								
Test 3	192	6								

Maurice wants to know if the pump was working at the same rate during all 3 tests. Use ratios and ratio language to explain if the rate of water being pumped is the same for all 3 tests.



1 1944 - 1 17 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Pump B	
Water Pumped (in gallons)	Time the Pump was on (in minutes)	Rate (in gallons per minute)
60	t	15

		vata	vc	pra je	tir	re								
	4		7	1.	.	;								-
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Litho 688293

Guide 10

Total Content Points: 0

Total Practice Points: 0

In this response, the student does not use ratio language and/or reasoning to describe the relationship between water pumped and time (no credit for 6.RP.A.1). The student does not use rate or ratio reasoning to show that the test rates in Part A are equivalent (no credit for 6.RP.A.3); neither does the student use unit rate to determine the correct time in Part B (no credit for 6.RP.A.3b). The student does not model the relationships present in either table; copies of the tables in the prompt are given for Parts A and B (no credit for MP4). The student does not provide any incorrect labels, but does not accurately determine that the rate is the same for all three tests (no credit for MP6).

Total Awarded Points: 0 out of 5