Lin's Bike Ride: Illustrative Math w/Student Achievement Partners Prototype Machine-Scorable Assessment Item				
ES Key	**Evidence Statement Text**	**Clarifications**	**MP**	**Calculator**
6.RP.2	Understand the concept of a unit rate *a/b* associated with a ratio *a:b* with *b≠0*, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*	i) Expectations for unit rates in this grade are limited to non-complex fractions. (See footnote, CCSS p 42.)	2	No
6.RP.3b	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. b. 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?*	i) See ITN Appendix F, Table F.c, "Minimizing or avoiding common drawbacks of selected response," specifically, Illustration 1 (in contrast to the problem "A bird flew 20 miles in 100 minutes. At that speed, how long would it take the bird to fly 6 miles?") ii) Expectations for unit rates in this grade are limited to non-complex fractions. (See footnote, CCSS p 42)	2, 8, 5	Yes

Addressed Portion of the PLDs: Grade 6, Sub-claim A, Ratios			
Level 5: Distinguished Command	**Level 4: Strong Command**	**Level 3: Moderate Command**	**Level 2: Partial Command**
Uses ratio and rate reasoning to solve real-world and mathematical problems, including ratio, unit rate percent and unit conversion problems.	Uses ratio and rate reasoning to solve real-world and mathematical problems, including ratio, unit rate, percent and unit conversion problems.	Uses ratio and rate reasoning to solve **real-world** and mathematical problems, including ratio, unit rate, percent and unit conversion problems.	Uses ratio and rate reasoning to solve mathematical problems, including ratio, unit rate, percent and unit conversion problems.
Uses and **connects a variety** of representations and strategies to solve these problems.	Uses **a variety of representations** and strategies to solve these problems.	Uses a limited variety of representations and strategies to solve these problems.	Uses a limited variety of representations and strategies to solve these problems.

Illustrative Math w/Student Achievement Partners Prototype Machine-Scorable Assessment Item	Cognitive Complexity
Lin rode a bike 20 miles in 150 minutes. If she rode at a constant speed, a. How far did she ride in 15 minutes? b. How long did it take her to ride 6 miles? c. How fast did she ride in miles per hour? d. What was her pace in minutes per mile?	*Rate each of the following as: low, moderate, or high. Explain.* Mathematical Content: Mathematical Practice: Processing Demand: Stimulus Material: Response Mode:

Illustrative Math w/Student Achievement Partners Prototype Machine-Scorable Assessment Item	Cognitive Complexity
Ty took the escalator to the second floor. The escalator is 12 meters long, and he rode the escalator for 30 seconds. Which statements are true? Select all that apply. a. He traveled 2 meters every 5 seconds. b. Every 10 seconds he traveled 4 meters. c. He traveled 2.5 meters per second. d. He traveled 0.4 meters per second. e. Every 25 seconds, he traveled 7 meters. f. None of the above.	*Rate each of the following as: low, moderate, or high. Explain.* Mathematical Content: Mathematical Practice: Processing Demand: Stimulus Material: Response Mode:

6.RP.2_6.RP.3b_7.RP.1

Note: These tasks were developed by Student Achievement Partners as prototypes of machine-scorable assessment item as part of the illustrative mathematics project, http://illustrativemathematics.org) and is not a PARCC task.

1. Lin rode a bike 20 miles in 150 minutes. If she rode at a constant speed,
a. How far did she ride in 15 minutes?

2 miles

$$\frac{20}{150} = \frac{x}{15} \qquad \frac{300 = 150x}{150 \quad 150}$$

b. How long did it take her to ride 6 miles?

45 mins.

$$\frac{20}{180} = \frac{6}{x} \qquad \frac{20x = 900}{20 \quad 20}$$

c. How fast did she ride in miles per hour?

8 mph

$$\frac{20}{150} = \frac{x}{60} \qquad \frac{1200 = 150x}{150 \quad 150}$$

d. What was her pace in minutes per mile?

7.5 min/mile

$$\frac{20}{150} = \frac{1}{x} \qquad 20x = \frac{15}{2}$$

2. Ty took the escalator to the second floor. The escalator is 12 meters long, and he rode the escalator for 30 seconds. Which statements are true? Select all that apply.

(a.) He traveled 2 meters every 5 seconds.

$$\frac{12}{30} = \frac{2}{5}$$

(b.) Every 10 seconds he traveled 4 meters.

$$\frac{12}{30} = \frac{4}{10} \qquad 120 = 120$$

c. He traveled 2.5 meters per second.

$$\frac{12}{30} = \frac{2.5}{1} \qquad 12 = 75$$

(d.) He traveled 0.4 meters per second.

$$\frac{12}{30} = \frac{0.4}{1} \qquad 12 = 12$$

e. Every 25 seconds, he traveled 7 meters.

$$\frac{12}{30} = \frac{7}{25} \qquad 300 = 210$$

f. None of the above.

3. Molly ran $\frac{2}{3}$ of a mile in 8 minutes. If Molly runs at that speed, how long will it take her to run one mile?

12 mins

$$\frac{\frac{2}{3}}{8} = \frac{1}{x} \qquad \frac{\frac{2}{3}x = 8}{\frac{2}{3} \quad \frac{2}{3}} \qquad \frac{8 \div \frac{2}{3}}{1 \div \frac{2}{3}} \qquad \frac{8 \cdot \frac{3}{1}}{1 \cdot \frac{2}{3}} = \frac{12}{1}$$

6.RP.2_6.RP.3b_7.RP.1

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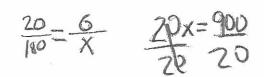
1. Lin rode a bike 20 miles in 150 minutes. If she rode at a constant speed,
a. How far did she ride in 15 minutes?

$$\frac{min}{mi}\frac{150}{20} \diagdown \frac{15}{x}$$

$$\frac{150x}{150} = \frac{300}{150}$$

$$\boxed{x = 2\ miles}$$

b. How long did it take her to ride 6 miles?

$$\frac{min}{mi}\frac{150}{20} \diagdown \frac{x}{6}$$

$$\frac{20x}{20} = \frac{900}{20}$$

$$\boxed{x = 45\ minutes}$$

c. How fast did she ride in miles per hour?

$$\frac{min}{mi}\frac{150}{20} \diagdown \frac{60}{x}$$

$$\frac{150x}{150} = \frac{1200}{150}$$

$$\boxed{x = 8\ mph}$$

d. What was her pace in minutes per mile?

$$\frac{min}{mi}\frac{150}{20} \diagdown \frac{x}{1}$$

$$\frac{20x}{20} = \frac{150}{20}$$

$$\boxed{x = 7.5\ minutes\ in\ 1\ mile}$$

2. Ty took the escalator to the second floor. The escalator is 12 meters long, and he rode the escalator for 30 seconds. Which statements are true? Select all that apply.

True a. He traveled 2 meters every 5 seconds.

$$\frac{12}{30} \diagdown \frac{x}{5} \quad \frac{30x}{30} = \frac{60}{30}$$

$$\boxed{x = 2}$$

True b. Every 10 seconds he traveled 4 meters.

$$120 \quad \frac{12}{30} \diagdown \frac{4}{10} \quad 120$$

False c. He traveled 2.5 meters per second.

$$12 \quad \frac{12}{30} \diagdown \frac{2.5}{1} \quad 75$$

True d. He traveled 0.4 meters per second.

$$12 \quad \frac{12}{30} \diagdown \frac{.4}{1} \quad 12$$

False e. Every 25 seconds, he traveled 7 meters.

$$300 \quad \frac{12}{30} \diagdown \frac{7}{25} \quad 210$$

False f. None of the above.

3. Molly ran $\frac{2}{3}$ of a mile in 8 minutes. If Molly runs at that speed, how long will it take her to run one mile?
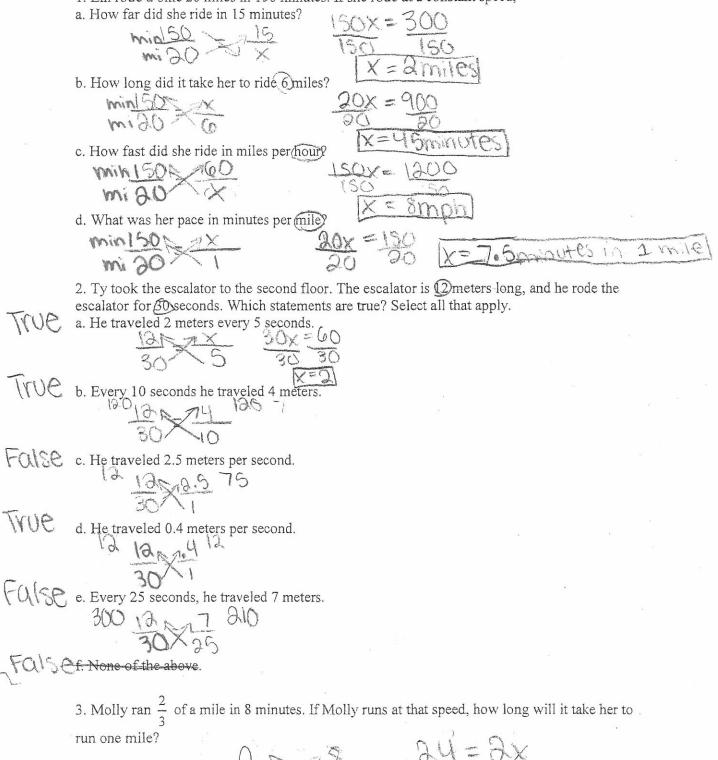
$$\frac{2}{3} \diagdown \frac{8}{x}$$

$$\frac{24}{2} = \frac{2x}{2}$$

$$\boxed{x = 12\ minutes}$$

6.RP.2_6.RP.3b_7.RP.1

Note: These tasks were developed by Student Achievement Partners as prototypes of machine-scorable assessment item as part of the illustrative mathematics project, http://illustrativemathematics.org) and is not a PARCC task.

1. Lin rode a bike 20 miles in 150 minutes. If she rode at a constant speed,
a. How far did she ride in 15 minutes?

2 miles $\frac{2}{15}$

b. How long did it take her to ride 6 miles?

45 minutes $\frac{6}{2}$ $\frac{2}{15}$ $\frac{15}{6}$ $\frac{\cdot 6}{90}$

c. How fast did she ride in miles per hour?

8 mph $\frac{}{60}$ $\frac{2}{15}$

d. What was her pace in minutes per mile?

.13 $\frac{2}{1\ 15}$

2. Ty took the escalator to the second floor. The escalator is 12 meters long, and he rode the escalator for 30 seconds. Which statements are true? Select all that apply.
(a.) He traveled 2 meters every 5 seconds.

True $\frac{2}{5}$ $\frac{12}{30}$

(b.) Every 10 seconds he traveled 4 meters.

True $\frac{4}{10}$ $\frac{12}{30}$

c. He traveled 2.5 meters per second.

False $\frac{2.5}{1}$ $\frac{12}{30}$

(d.) He traveled 0.4 meters per second.

True $\frac{.4}{1}$ $\frac{12}{30}$

e. Every 25 seconds, he traveled 7 meters.

False $\frac{7}{25}$ $\frac{12}{30}$

f. None of the above.

False

3. Molly ran $\frac{2}{3}$ of a mile in 8 minutes. If Molly runs at that speed, how long will it take her to run one mile?

$\frac{\frac{2}{3}}{8}$ $\frac{1}{12}$ 12 minutes

Sample D

6.RP.2_6.RP.3b_7.RP.1

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1. Lin rode a bike 20 miles in 150 minutes. If she rode at a constant speed,
a. How far did she ride in 15 minutes?

2 miles

150 min ÷ 10 = 15 min
20 ÷ 10 = 2

b. How long did it take her to ride 6 miles?

45 minutes

15 min = 2 mi
2 mi × 3 = 6 mi
15 min × 3 = 45 min

12.5 hours

c. How fast did she ride in miles per hour?

8 MPH

25√20 = 8

d. What was her pace in minutes per mile?

7.5 minutes per mile

15 ÷ 2 = 7.5

45 ÷ 6 = 7.5

2. Ty took the escalator to the second floor. The escalator is 12 meters long, and he rode the escalator for 30 seconds. Which statements are true? Select all that apply.

a. He traveled 2 meters every 5 seconds.

yes

30 ÷ 5 = 6
2 × 6 = 12

b. Every 10 seconds he traveled 4 meters.

yes

30 ÷ 10 = 3·4 = 12

c. He traveled 2.5 meters per second. X   30 × 2.5

No

d. He traveled 0.4 meters per second.   30 × .4 = 12

yes

e. Every 25 seconds, he traveled 7 meters.   X

no

f. None of the above. X

No

3. Molly ran $\frac{2}{3}$ of a mile in 8 minutes. If Molly runs at that speed, how long will it take her to run one mile?

12 minutes

$8 \div \frac{2}{3}$

Sample E

Note: These tasks were developed by Student Achievement Partners as prototypes of machine-scorable assessment item as part of the illustrative mathematics project,
http://illustrativemathematics.org) and is not a PARCC task.

1. Lin rode a bike 20 miles in 150 minutes. If she rode at a constant speed,
a. How far did she ride in 15 minutes?

$$\frac{20}{150} = \frac{x}{15} \qquad \frac{150x}{15} = \frac{300}{15} \qquad x = \boxed{2 \text{ miles}}$$

b. How long did it take her to ride 6 miles?

2, 4, 6
15, 30, 45 $\boxed{45 \text{ min}}$

c. How fast did she ride in miles per hour?

$\frac{m.}{min.}$ $\frac{2}{15}$ $\frac{4}{30}$ $\frac{6}{45}$ $\frac{8}{60}$ $\boxed{8 \text{ m/hr}}$

d. What was her pace in minutes per mile?

$15/2 = 7.5$ $\boxed{7\frac{1}{2} \text{ min/mi}}$

2. Ty took the escalator to the second floor. The escalator is 12 meters long, and he rode the escalator for 30 seconds. Which statements are true? Select all that apply.

☒ He traveled 2 meters every 5 seconds.

$\frac{m.}{s.}$ $\frac{12}{30} = \frac{6}{15} = \frac{2}{5}$

☑ b. Every 10 seconds he traveled 4 meters.

$\frac{m.}{s.}$ $\frac{12}{30} = \frac{4}{10}$ 4 m ✓

☒ He traveled 2.5 meters per second.

$\frac{4}{10} = 2.5 \cdot 30 = 75$

☑ d. He traveled 0.4 meters per second.

$\frac{4}{10} = .4 \cdot 30 = 12$

☒ Every 25 seconds, he traveled 7 meters.

that means in 5 sec he'd travel 5m. Notrue.

☒ None of the above.

3. Molly ran $\frac{2}{3}$ of a mile in 8 minutes. If Molly runs at that speed, how long will it take her to run one mile?

$\frac{1}{3} = 4 \text{ min}$
$\frac{2}{3} = 8 \text{ min}$ $\boxed{12 \text{ min}}$
$\frac{3}{3} = 12 \text{ min}$