I. Understanding Ratio Relationships

A. Determine whether each statement represents additive reasoning or multiplicative reasoning.

1. Ellie's plant has grown a total of 8 inches, and Lin's plant has grown a total of 9 inches. Lin's has grown more than Ellie's.

2. Juan has 7 apples, and Latanya has 4 times as many, or 28 apples.

3. Melanie is 8 years old, and Justin is 4 years older than Melanie.

4. Tim ran 15 laps, which was 3 times as many laps as Nathan ran.

5. The Hawks scored 20 points in the first half of the game. The team scored twice as many points in the second half of the game.

6. The temperature was 70 degrees Fahrenheit. It rose 3 degrees in one hour.

B. Nina buys a variety box of cereal bars. The box contains 5 blueberry bars, 3 strawberry bars, and 2 apple bars. Write the ratio that represents each relationship in words, in colon form, and in fractional form.

1. strawberry bars to blueberry bars

2. apple bars to blueberry bars

3. strawberry bars to total bars

4. apple bars to total bars

5. blueberry bars to total bars

6. apple bars to strawberry bars

C. Write a part-to-part and a part-to-whole ratio for each problem situation.

1. Of the 200 students surveyed in 5th grade, 120 prefer bananas and 80 prefer apples.

2. Serena's book collection contains 23 fiction books and 4 non-fiction books.

3. Of the 100 students surveyed, 53 prefer to watch football and 42 prefer to watch baseball.

4. Of the 100 students surveyed, 42 prefer to play basketball and 28 prefer to play hockey.

5. Kata's movie collection consists of 45 action movies and 31 comedy movies.

6. Juanita received a bouquet of 2 dozen roses. In the bouquet, 12 were red and 12 were pink.

7. Wei planted 15 daffodils and 14 day-lilies in her garden.

8. Of the 31 students surveyed, 19 prefer white bread. The remaining students prefer wheat bread.

9. Of the 400 students surveyed, 139 packed lunch and 261 bought lunch from the school cafeteria.

10. Emilio's vegetable garden consists of 8 tomato plants and 3 zucchini plants.

11. Of the 250 students surveyed, 142 prefer carrots and 97 prefer peas.
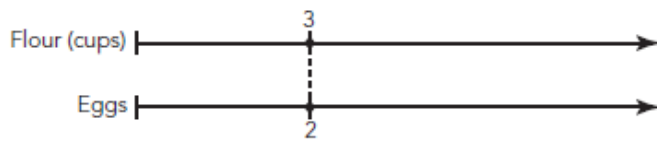
12. Raul collected the mail from his mailbox. It contains 3 catalogues and 2 bills.

## II. Problem Solving with Equivalent Ratios and Rates using Double Number Lines

**A.** Use a double number line to answer each question.

1. Yuko is making pancakes. The double number line shows the ratio flour : eggs. If Yuko accidentally uses 3 eggs instead of 2 eggs, how much flour should he use?

2. Teresa is mixing red paint and blue paint to create a shade of purple paint. The double number line shows the ratio red paint : blue paint. If Teresa has 75 ounces of red paint, how much blue paint does she need?

Flour (cups) |————————3————————→

Eggs |————————2————————→

Red Paint (oz) |————————12————————→

Blue Paint (oz) |————————8————————→
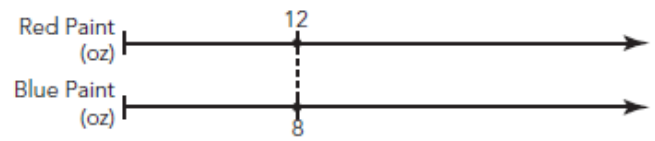
3. Pedro is going on a school field trip. The double number line shows the ratio students : chaperones. If 32 students are going on the field trip, how many chaperones must also go on the trip?
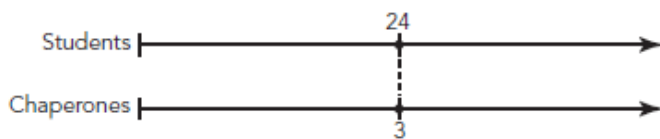
4. Ling is conducting a survey outside of a grocery store. The double number line shows the ratio of customers using reusable shopping bags to customers using plastic bags on a typical day. If there are 50 customers that use plastic bags, how many use reusable shopping bags?

Students |————————24————————→

Chaperones |————————3————————→

Plastic Bags |————————15————————→

Reusable Bags |————————3————————→
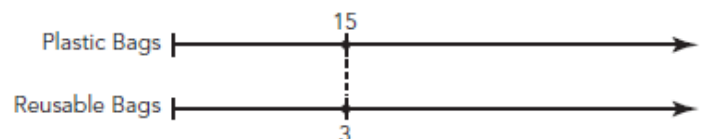
5. Aiko is planting a flower garden. The double number line shows the ratio of daisies to blue bells. If Aiko plants 16 daisies, how many blue bells will she plant?

Daisies ⊢————————12————————▶

Blue Bells ⊢————————9————————▶
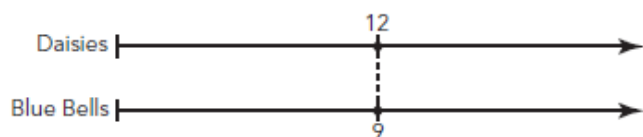
6. Marcus is exercising. The double number line shows the ratio of calories burned to time. If Marcus exercises for 45 minutes, how many calories will he burn?

Calories Burned ⊢————————112————————▶

Time (minutes) ⊢————————20————————▶
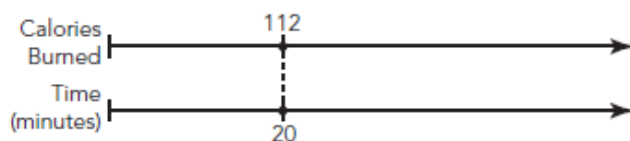
III. Problem Solving with Equivalent Ratios and Rates using Tables

A. Complete each ratio table. Show your calculations.

1.

Yellow paint (oz)			8	16
Blue paint (oz)	4	8	16	

2.

Yellow paint (oz)	1	2	10	
Red paint (oz)		6		60

3.

Red paint (oz)	1		50	100
Blue paint (oz)		20		400

4.

Green paint (oz)		15	30	
White paint (oz)	5	25		75

5.

White paint (oz)	2	6	8	
Red paint (oz)	3			36

6.

White paint (oz)	1	3		
Purple paint (oz)		30	40	60

B. Complete the ratio table to answer each question. Show your calculations.

1. Alberto is in charge of making lunch at a summer camp. He knows that 3 tuna casseroles will serve 15 campers. How many tuna casseroles should Alberto make to serve 35 campers?

Casseroles	1	3		
Campers		15	30	35

2. Shawna is mixing red and white paint to create a shade of pink to paint her room. After experimenting, Shawna decides that the perfect shade of pink is created by mixing 3 ounces of red paint and 1 ounce of white paint. How much red and white paint does Shawna need to make 1 gallon of pink paint? (1 gallon = 128 fluid ounces)

Pink Paint (oz)			128
Red Paint (oz)		3	
White Paint (oz)		1	

3. Perry is responsible for distributing soccer balls to the kids at soccer camp. During practice, Perry would like each group of 5 children to share two soccer balls. How many soccer balls does Perry need if 25 kids attend camp?

Soccer balls	2		
Children	5	20	25

4. Leon is bringing boxes of fruit snacks to class for a holiday party at school. Leon knows that 2 boxes of fruit snacks will serve 11 students. How many boxes of fruit snacks does Leon need to serve 33 students?

Boxes	2		
Students	11	22	33

5. Eva is planting flowers in her garden. Each variety pack of bulbs contains 4 lilies and 6 dahlias. How many dahlias will Eva plant if she plants 12 lilies?

Lilies	4	8	12
Dahlias	6		

6. Olivia is celebrating her birthday at a movie theater. She invites 12 friends for a movie and popcorn. She is told that 1 large bucket of popcorn can be shared by 3 people. How many buckets of popcorn does Olivia need?
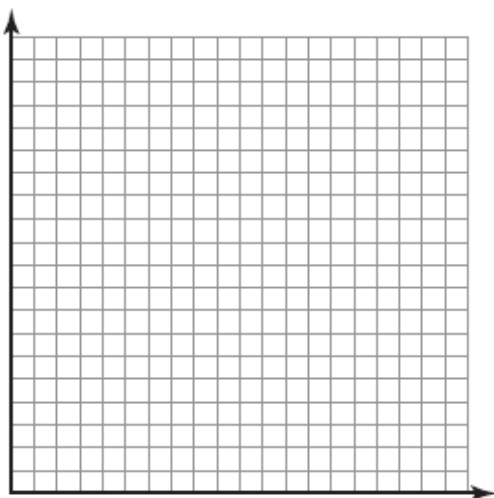
Buckets of popcorn	1		
People	3	9	12

IV. Problem Solving with Equivalent Ratios and Rates using Graphs

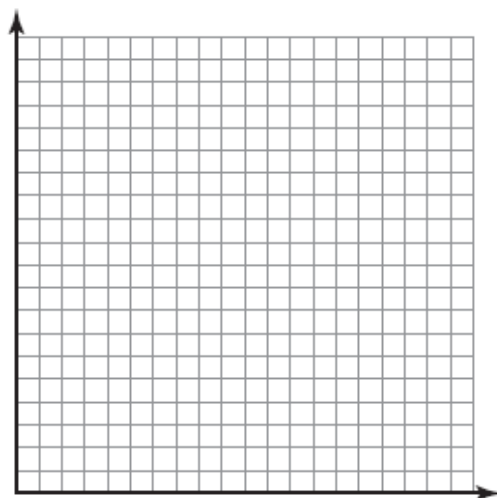**A.** Create a graph that represents the values shown in each ratio table.
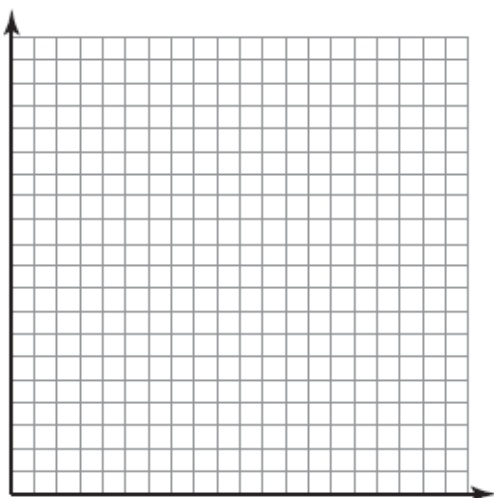
1.

Weight (pounds)	1	2	4	5
Cost (dollars)	3	6	12	15

2.

Distance (miles)	25	75	125	175
Time (hours)	1	3	5	7

3.

Calories	80	160	240	320
Time (minutes)	15	30	45	60

4.

Data (Mb)	10	100	150	200
Time (seconds)	1	10	15	20
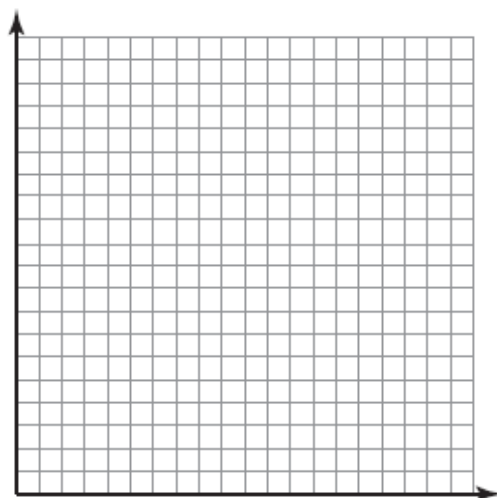
5.

Distance (miles)	1.5	3	4.5	6
Time (minutes)	15	30	45	60
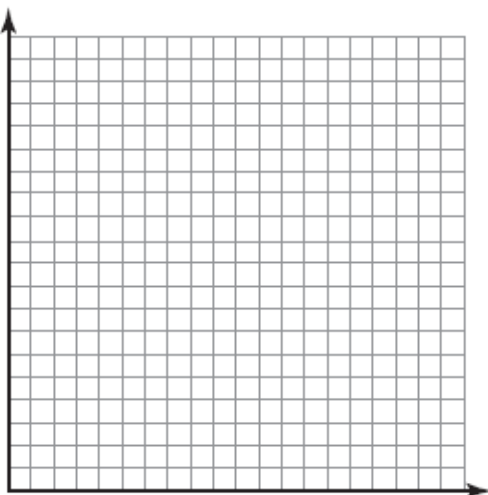
6.

| Height (feet)	6	30	36	60
Time (minutes)	1	5	6	10
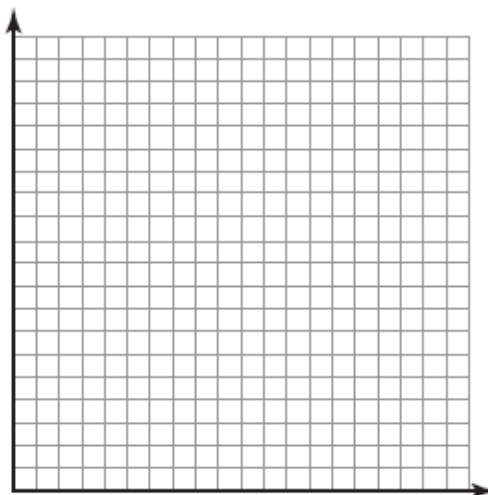
B. Use the given graph to answer each question.

1. Serena is driving to the mountains for a summer camping trip. She is traveling at a constant rate of 45 miles per hour. The graph shows the ratio time : distance. How far has Serena traveled after 4 hours?
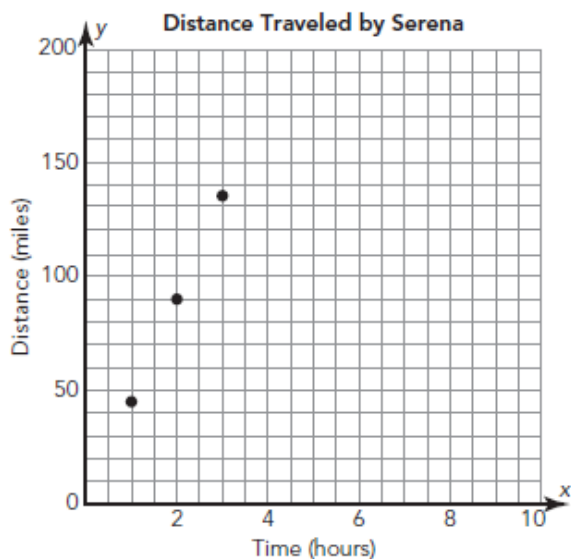
2. Cisco is exercising. The graph shows the ratio calories burned : time for Cisco. How many calories did Cisco burn in 30 minutes?

Distance Traveled by Serena

Calories Burned Exercising
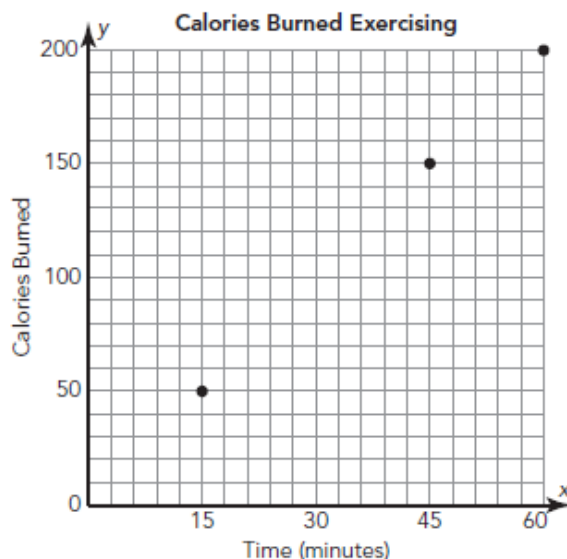
3. Manuel is biking at a constant rate. The graph shows the ratio time : distance. How long did it take Manuel to bike 4 miles?

Distance Biked by Manuel
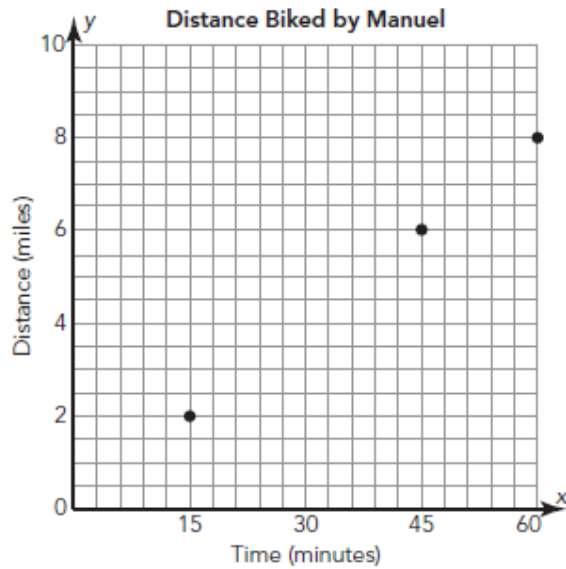
4. Jose is climbing a challenging section of a mountain. The graph shows the ratio time : distance climbed. How far did Jose climb after 10 minutes?

Distance Climbed by Jose
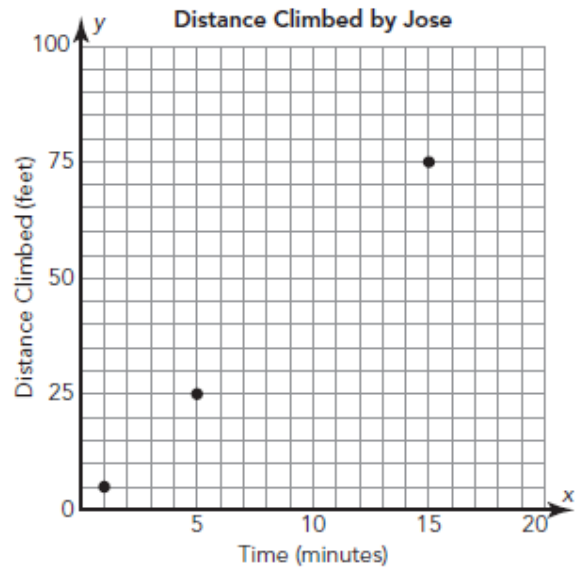
5. Sofia is grocery shopping. Oranges are on sale. The graph shows the ratio cost : weight. How much will it cost Sofia to purchase 4 pounds of oranges?

Cost of Oranges
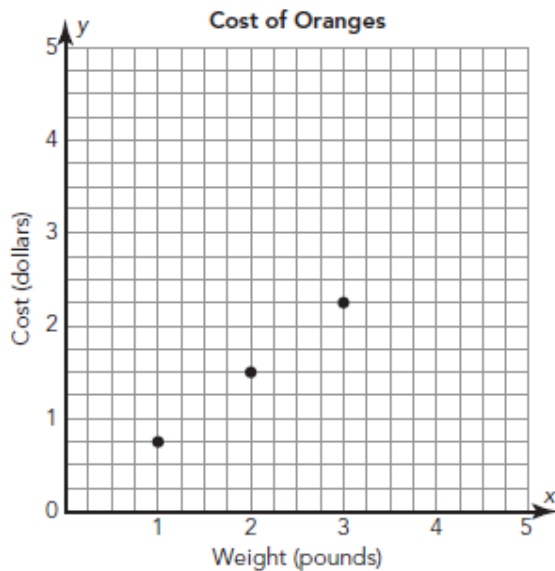
6. Hector is grocery shopping. Bananas are on sale. The graph shows the ratio cost : weight. If Hector wants to spend $2, how many pounds of bananas can he purchase?

Cost of Bananas