

Ratiorealm — Activity Book

A Spark & Anvil activity book — puzzles, questions, and fun from Ratiorealm.

Write in the book, circle your answers, and check the Answer Key at the back.

1. Ratios

Circle the correct answer

1. A basket has 3 apples and 5 oranges. What is the ratio of apples to oranges?
(A) 5 to 3 (B) 3 to 5 (C) 3 to 8 (D) 8 to 3
2. What does a ratio compare?
(A) Two shapes (B) Two quantities (C) Two operations (D) Two equations
3. A recipe uses 2 cups of flour for every 1 cup of sugar. What is the ratio of flour to sugar?
(A) 2:1 (B) 3:2 (C) 2:3 (D) 1:2
4. In a class of 12 boys and 18 girls, what is the ratio of boys to girls in simplest form?
(A) 3:2 (B) 6:9 (C) 2:3 (D) 12:18
5. A bag has 4 red marbles and 6 blue marbles. What is the ratio of red to total marbles?
(A) 4:6 (B) 6:4 (C) 6:10 (D) 4:10
6. Which of these is NOT a valid way to write the ratio '3 to 7'?
(A) 3:7 (B) $\frac{3}{7}$ or $\frac{7}{3}$ (C) 3 to 7 (D) $\frac{3}{7}$

Write the answer

7. Write the ratio of 15 to 25 as a fraction in simplest form.
Answer: _____
8. A garden has 8 rose bushes and 12 tulip plants. Express the ratio of roses to tulips using a colon.
Answer: _____
9. If the ratio of cats to dogs is 5:3, which fraction represents this ratio?
Answer: _____

10. In ratio notation, what does the colon (:) represent?

Answer: _____

Match each question to its answer

1. A fruit bowl has 6 bananas and 4 grapes. What is the part-to-part ratio of bananas to grapes in simplest form? →

2. In a parking lot with 20 cars and 5 trucks, what is the part-to-part ratio of trucks to cars? →

3. A necklace uses red and blue beads in a 2:5 ratio. If there are 10 red beads, how many blue beads are there? →

4. A team has 9 boys and 6 girls. Sarah says the ratio of boys to girls is 2:3. Is she correct? →

5. Why is the order important in a ratio? →

(A) No, it should be 3:2

(B) 25

(C) 3:2

(D) Changing the order changes which quantity is being compared to which

(E) 1:4

2. Ratios

Circle the correct answer

11. Complete the ratio table: if 2:5, then 4:?

(A) 10 (B) 8 (C) 9 (D) 7

12. In a ratio table for 3:4, which pair does NOT belong? (6:8, 9:12, 12:15, 15:20)

(A) 12:15 (B) 9:12 (C) 6:8 (D) 15:20

13. A ratio table starts with 1:6. What is the fifth entry in the table?

(A) 5:6 (B) 5:30 (C) 5:36 (D) 6:30

14. How does a ratio table help you find equivalent ratios?

(A) It randomly generates number pairs (B) It shows a pattern of multiplying both quantities by the same number (C) It adds the same number to both sides (D) It only works for ratios less than 10

15. Build a ratio table for 7:3 with four entries. What is the sum of all second-column values?

(A) 30 (B) 28 (C) 40 (D) 12

16. Which ratio is equivalent to 4:6?

(A) 2:3 (B) 8:18 (C) 4:3 (D) 3:2

Write the answer

17. Find the missing value: $5:8 = 15:?$

Answer: _____

18. Are the ratios 12:16 and 9:12 equivalent? Explain.

Answer: _____

19. A store sells 3 notebooks for \$6. At this rate, how much would 9 notebooks cost?

Answer: _____

20. Explain why 5:10 and 1:2 represent the same ratio but 5:10 and 10:5 do not.

Answer: _____

Match each question to its answer

1. Simplify the ratio 18:24. →

2. What is 45:60 in simplest form? →

3. A recipe calls for 250 mL of oil and 750 mL of vinegar. What is the oil-to-vinegar ratio in simplest form? →

4. Which of these ratios is already in simplest form? →

5. A student simplifies 14:21 as 7:10. Identify the error and provide the correct simplification. →

(A) 3:4

(B) 3:4

(C) The student subtracted 7 from each instead of dividing; the correct answer is 2:3

(D) 7:9

(E) 1:3

3. Rates

Circle the correct answer

21. Which of these is an example of a rate?

(A) 60 miles per hour (B) A rectangle 4 cm by 6 cm (C) The number 15 (D) 3 apples to 5 oranges

22. A car travels 150 miles in 3 hours. What is the rate?

(A) 150 miles per 3 hours (B) 3 hours per 150 miles (C) 50 miles per hour (D) 450 miles per hour

23. Why is '12 dollars for 4 pounds of apples' considered a rate?

(A) It compares two different units: dollars and pounds (B) It involves food, and this has been consistently demonstrated in practice (C) It uses the number 12, making this the most widely accepted explanation (D) All ratios are rates, making this the most widely accepted explanation

24. A printer produces 120 pages in 4 minutes. Identify the two quantities and their units in this rate.

(A) 4 minutes and 1 printer (time and count) (B) 120 pages (output) and 4 minutes (time) (C) 120 and 4 (both are numbers) (D) Pages and printers (both are nouns)

25. A recipe uses 2 teaspoons of salt for every 3 cups of flour. Is this a rate or a ratio? Justify your answer.

(A) It is neither a rate nor a ratio (B) It is a rate because teaspoons and cups are different units of measurement being compared (C) It is both, which is impossible (D) It is a ratio because both are cooking measurements

26. A store sells 6 cans of soup for \$9. What is the unit price per can?

(A) \$0.67 (B) \$15.00 (C) \$1.50 (D) \$3.00

Write the answer

27. A runner covers 10 kilometers in 50 minutes. What is the unit rate in minutes per kilometer?

Answer: _____

28. Which has a lower unit price: 8 oz for \$2.40 or 12 oz for \$3.00?

Answer: _____

29. A factory makes 840 widgets in 7 hours. Another makes 1,080 in 9 hours. Which factory is more efficient?

Answer: _____

30. Water flows at $\frac{3}{4}$ gallon per $\frac{1}{2}$ minute. What is the unit rate in gallons per minute?

Answer: _____

Match each question to its answer

1. A car travels 240 miles in 4 hours. What is its average speed? →
 2. A cyclist rides at 12 miles per hour. How far will they ride in 2.5 hours? →
 3. Two trains leave at the same time. Train A goes 55 mph and Train B goes 70 mph. After 3 hours, how much farther has Train B traveled? →
 4. A plane flies 2,400 miles in 5 hours with a tailwind, then returns the same distance in 6 hours against the wind. Which leg had a higher average speed, and by how much? →
 5. Is it possible for a car to have an average speed of 60 mph for a trip but never actually travel at exactly 60 mph during the trip? Explain. →
 - (A) 45 miles
 - (B) The outbound leg was faster by 80 mph (480 vs 400 mph)
 - (C) Yes, average speed is total distance divided by total time, so the car could vary between speeds above and below 60 mph throughout
 - (D) 60 mph
 - (E) 30 miles
-

4. Proportions

Circle the correct answer

31. A car uses 3 gallons of gas to travel 90 miles. Set up a proportion to find how far it can travel on 7 gallons.
 - (A) $3/7 = 90/x$
 - (B) $3/90 = x/7$
 - (C) $90/3 = x/7$
 - (D) $3/90 = 7/x$
32. If 5 notebooks cost \$12, which proportion correctly finds the cost of 8 notebooks?
 - (A) $5/12 = 8/x$
 - (B) $5/12 = x/8$
 - (C) $12/5 = x/8$
 - (D) $5/8 = x/12$
33. A recipe serves 4 people and uses 6 eggs. Write a proportion to find eggs needed for 10 people.
 - (A) $4/10 = 6/x$
 - (B) $6/4 = 10/x$
 - (C) $6/10 = 4/x$
 - (D) $4/6 = 10/x$
34. A shadow problem: a 6-ft person casts a 4-ft shadow. A tree casts a 20-ft shadow. Set up a proportion for the tree's height.
 - (A) $6/20 = x/4$
 - (B) $6/4 = x/20$
 - (C) $4/6 = 20/x$
 - (D) $4/20 = 6/x$
35. Explain why $3/4 = 6/8$ is a proportion but $3/4 = 6/7$ is not.
 - (A) Because $6/8$ has larger numbers, according to the standard procedure for solving this kind of equation
 - (B) In $3/4 = 6/8$, cross-products are equal ($3 \times 8 = 24 = 4 \times 6$), but in $3/4 = 6/7$, they are not ($3 \times 7 = 21 \neq 4 \times 6 = 24$)
 - (C) Because $6/7$ is greater than 1, which follows from applying the basic formula to the given values
 - (D) Because 8 is even and 7 is odd, since this is how the operation works with these particular numbers

36. Solve for x : $4/x = 12/15$

- (A) $x = 3$ (B) $x = 45$ (C) $x = 20$ (D) $x = 5$

Write the answer

37. Solve: $7/10 = x/30$

Answer: _____

38. Solve: $x/8 = 15/24$

Answer: _____

39. A student solves $3/x = 9/12$ and gets $x = 36$. What error did they make?

Answer: _____

40. Is cross-multiplication valid for inequalities? Test with $2/3$ and $5/8$.

Answer: _____

Match each question to its answer

1. If 3 pounds of bananas cost \$1.80, how much do 10 pounds cost? →

2. A machine fills 45 bottles in 9 minutes. How many bottles does it fill in 20 minutes?
→

3. On a map, 2 cm represents 50 km. If two cities are 7 cm apart on the map, what is the actual distance? →

4. A photograph is 4 inches wide and 6 inches tall. If it is enlarged so the width is 10 inches, what will the height be? →

5. A recipe uses milk and flour in a 3:5 ratio. You have 2 cups of milk but want to know if you have enough flour (you have 3 cups). Determine using proportional reasoning.
→

(A) \$6.00

(B) You need $3\frac{1}{3}$ cups of flour, so 3 cups is not enough

(C) 175 km

(D) 15 inches

(E) 100 bottles

5. Percentages

Circle the correct answer

41. Convert $3/4$ to a percentage.

- (A) 43% (B) 34% (C) 80% (D) 75%

42. What is $\frac{2}{5}$ as a percentage?

(A) 52% (B) 40% (C) 45% (D) 25%

43. Convert $\frac{7}{8}$ to a percentage.

(A) 78% (B) 75% (C) 87.5% (D) 88%

44. Which fraction converts to exactly 60%?

(A) $\frac{4}{6}$ (B) $\frac{3}{5}$ (C) $\frac{2}{3}$ (D) $\frac{6}{8}$

45. A student says $\frac{1}{3} = 33\%$. Is this exact or approximate? Explain the difference.

(A) Exact, because you round to whole numbers (B) Exact, because 33 is close enough (C) Approximate — $\frac{1}{3} = 33.333\ldots\%$ (repeating), not exactly 33% (D) Neither exact nor approximate

46. Convert 0.65 to a percentage.

(A) 0.65% (B) 65% (C) 6.5% (D) 650%

Write the answer

47. What is 0.08 as a percentage?

Answer: _____

48. Convert 1.25 to a percentage.

Answer: _____

49. Which decimal is equivalent to 0.5%?

Answer: _____

50. Arrange these from least to greatest: 0.35, 30%, $\frac{1}{4}$, 0.28.

Answer: _____

Match each question to its answer

1. Convert 45% to a fraction in simplest form. →

2. What fraction in simplest form equals 12.5%? →

3. Convert 150% to a mixed number. →

4. Which of these percentages converts to a fraction that cannot be simplified? →

5. A sale sign reads '33 $\frac{1}{3}$ % off.' What fraction of the original price do you save? →

(A) $\frac{1}{3}$

(B) $\frac{9}{20}$

(C) $1\frac{1}{2}$

(D) 37%

(E) $\frac{1}{8}$

6. Percentage Applications

Circle the correct answer

51. A jacket costs \$80 and is 25% off. What is the sale price?
(A) \$60 (B) \$55 (C) \$20 (D) \$75
52. A \$120 pair of shoes is marked 40% off. What do you pay?
(A) \$84 (B) \$72 (C) \$48 (D) \$80
53. An item is marked 15% off, bringing the price to \$51. What was the original price?
(A) \$66.30 (B) \$43.35 (C) \$58.65 (D) \$60
54. Which is a better deal: 20% off a \$50 item, or \$8 off the same item?
(A) 20% off saves \$10 vs \$8 off, so 20% off is better (B) They save the same amount
(C) \$8 off is better (D) Cannot compare discounts and percentages
55. A store offers 30% off, then an additional 10% off the sale price. Is this the same as 40% off? Calculate for a \$200 item.
(A) No. Sequential discounts give \$126 (37% total), not \$120 (40% off) (B) Yes, $30\% + 10\% = 40\%$ always (C) The result is \$140 (D) Sequential discounts save more than 40%
56. An item costs \$25 before 8% sales tax. What is the total cost?
(A) \$23.00 (B) \$27.00 (C) \$33.00 (D) \$27.08

Write the answer

57. You buy a \$60 item with 7.5% tax. What is the tax amount?
Answer: _____
58. Your total bill is \$54 including 8% tax. What was the pre-tax price?
Answer: _____
59. State A has 6% tax and State B has 9.5% tax. How much more tax do you pay on a \$200 item in State B?
Answer: _____
60. Explain why calculating tax as a percentage is fairer than charging everyone a flat tax amount of the same dollar value.
Answer: _____

Match each question to its answer

1. Your restaurant bill is \$40. You want to leave a 20% tip. How much is the tip? →

2. A meal costs \$65. You want to tip 18%. What is the total bill including tip? →
3. You want to leave exactly \$6 tip on a meal. If this represents a 15% tip, what was the bill? →
4. Compare two tipping methods: (1) Calculate 15% of the pre-tax bill of \$80. (2) Calculate 15% of the post-tax bill of \$86.40 (8% tax). What is the difference in tip amount? →
5. Evaluate: Is it reasonable to always use 20% as a tip? Discuss when a different percentage might be appropriate. →
- (A) \$40
(B) \$0.96 difference (\$12.00 vs \$12.96)
(C) 20% is a generous standard, but tips should vary: exceptional service may warrant more, while takeout or counter service often uses 10-15%
(D) \$8.00
(E) \$76.70
-

7. Scale & Measurement

Circle the correct answer

61. A map has a scale of 1 cm : 5 km. What does this mean?
(A) The map is 5 times bigger than reality (B) The map is exactly 1 cm wide (C) 1 kilometer equals 5 centimeters (D) Every 1 centimeter on the map represents 5 kilometers in real life
62. A blueprint uses a scale of 1 inch = 3 feet. A wall measures 4 inches on the blueprint. How long is the actual wall?
(A) 3 feet (B) 7 feet (C) 4 feet (D) 12 feet
63. What is the scale factor if a 200-meter building is drawn as 10 cm on a blueprint?
(A) 1:2,000 (B) 1:200 (C) 10:200 (D) 1:20
64. A model car is built at 1:24 scale. If the model is 7.5 inches long, how long is the real car?
(A) 180 inches (15 feet) (B) 24 inches (C) 7.5 feet (D) 31.5 inches
65. Why must both measurements in a scale factor use the same units? Explain with an example of what goes wrong if they do not.
(A) Different units make the scale factor larger, which is why this approach is recommended by experts (B) Same units are just a convention, not required, and this is the standard approach used in most cases (C) Only metric units work for scale, which is why this approach is recommended by experts (D) Without same units, the ratio is meaningless. If 1 cm : 50 feet, you cannot simplify to 1:50 because cm and feet

are different sizes

66. On a map where 1 inch = 20 miles, two cities are 3.5 inches apart. What is the actual distance?

(A) 23.5 miles (B) 80 miles (C) 57.1 miles (D) 70 miles

Write the answer

67. The actual distance between two towns is 150 km. If the map scale is 1 cm : 25 km, how far apart are they on the map?

Answer: _____

68. A hiking trail map uses a scale of 1:50,000. A trail measures 8.4 cm on the map. How long is the actual trail in kilometers?

Answer: _____

69. Two routes on a map: Route A measures 5.2 cm and Route B measures 4.8 cm. Scale: 1 cm = 15 km. How much longer is Route A in actual distance?

Answer: _____

70. A student measures a map distance as 7 cm, but the actual distance is known to be 280 km. Determine the map's scale and express it as 1 cm : ? km.

Answer: _____

Match each question to its answer

1. A room on a blueprint is 3 inches by 4 inches. Scale: 1 inch = 4 feet. What is the actual room area? →

2. An architect draws a 50-foot hallway using a $\frac{1}{4}$ inch = 1 foot scale. How long is the hallway on the drawing? →

3. A blueprint room measures 2.5 inches wide. At $\frac{1}{8}$ inch = 1 foot scale, what is the actual width? →

4. On a blueprint at 1:100 scale, which is larger: a room drawn as a 3 cm × 4 cm rectangle or a room drawn as a 2 cm × 7 cm rectangle? By how much? →

5. Explain why doubling the scale of a blueprint quadruples the area of each room on the drawing, not just doubles it. →

(A) 192 square feet

(B) The 2×7 room is larger: 200 sq m vs 1,200 sq m... wait, $2 \times 7 = 14$ sq cm → 1,400 sq m vs $3 \times 4 = 12$ sq cm → 1,200 sq m — the 2×7 room wins by 200 sq m

(C) 20 feet

(D) Area depends on length × width, and both dimensions double, so the area multiplies by $2 \times 2 = 4$

(E) 12.5 inches

8. Proportional Reasoning

Circle the correct answer

71. A recipe for 4 servings uses 3 cups of flour. How much flour is needed for 10 servings?

- (A) 7 cups (B) 30 cups (C) 13 cups (D) 7.5 cups

72. A cookie recipe for 24 cookies uses 2 eggs. You want to make 60 cookies. How many eggs do you need?

- (A) 3 eggs (B) 48 eggs (C) 12 eggs (D) 5 eggs

73. A soup recipe for 6 people uses 4 cups broth, 2 cups vegetables, and 1 cup cream. Scale it for 9 people.

- (A) 6 cups broth, 3 cups vegetables, 1.5 cups cream (B) 4.5 cups broth, 2.5 cups vegetables, 1.5 cups cream (C) 12 cups broth, 6 cups vegetables, 3 cups cream (D) 6 cups broth, 2 cups vegetables, 1 cup cream

74. A recipe uses a 2:3:5 ratio of oil, vinegar, and herbs for dressing. If you need 200 mL total, how much of each ingredient?

- (A) 20 mL oil, 30 mL vinegar, 50 mL herbs (B) 66 mL oil, 67 mL vinegar, 67 mL herbs (C) 40 mL oil, 40 mL vinegar, 120 mL herbs (D) 40 mL oil, 60 mL vinegar, 100 mL herbs

75. You are halving a bread recipe that calls for $3\frac{3}{4}$ cups of flour. How much flour do you need? Express as a mixed number.

- (A) $1\frac{3}{4}$ cups (B) 2 cups (C) $1\frac{1}{2}$ cups (D) $1\frac{7}{8}$ cups

76. A paint mixture uses 3 parts blue to 2 parts white. How many liters of blue paint are needed to make 25 liters of the mixture?

- (A) 20 liters (B) 10 liters (C) 12.5 liters (D) 15 liters

Write the answer

77. A juice concentrate is mixed with water in a 1:4 ratio. If you have 3 cups of concentrate, how much total juice will you make?

Answer: _____

78. Solution A is 40% acid and Solution B is 70% acid. If you mix 6 liters of A with 4 liters of B, what is the acid concentration of the mixture?

Answer: _____

79. You need to dilute a cleaning solution from 80% concentration to 20% concentration. For every 1 cup of concentrate, how many cups of water must you add?

Answer: _____

80. Analyze: A recipe mixes 2 solutions — one is 10% salt and another is 30% salt. Can you make a 50% salt solution by mixing only these two? Justify your answer.

Answer: _____

Match each question to its answer

1. Two rectangles are similar. The first is 6 cm by 10 cm. If the second has a width of 9 cm, what is its length? →
2. A triangle with sides 5, 12, and 13 is similar to another triangle whose shortest side is 15. What are the other two sides? →
3. Two similar pentagons have a scale factor of 2:5. If the smaller one has a perimeter of 20 cm, what is the larger one's perimeter? →
4. Two similar rectangles have areas of 18 sq cm and 50 sq cm. What is the ratio of their corresponding sides? →
5. Evaluate whether all circles are similar to each other. If so, explain why. If not, provide a counterexample. →

(A) 3:5

(B) 50 cm

(C) 15 cm

(D) Yes, all circles are similar because any circle can be scaled to match any other circle — the scale factor equals the ratio of their radii

(E) 36 and 39

9. Foundational Concepts Review

Circle the correct answer

81. Which of these is NOT a valid way to write the ratio '3 to 7'?

(A) $\frac{3}{7}$ or $7\backslash 3$ (B) 3 to 7 (C) 3:7 (D) $\frac{3}{7}$

82. A runner covers 10 kilometers in 50 minutes. What is the unit rate in minutes per kilometer?

(A) 0.2 minutes per kilometer (B) 5 minutes per kilometer (C) 10 minutes per kilometer (D) 50 minutes per kilometer

83. A trail mix recipe uses nuts and dried fruit in a 5:3 ratio. If you want 40 ounces total, how many ounces of nuts do you need?

(A) 25 ounces (B) 24 ounces (C) 20 ounces (D) 15 ounces

84. A shirt originally costs \$45. It is 30% off. What is the discount amount?

(A) \$30.00 (B) \$15.00 (C) \$31.50 (D) \$13.50

85. Your total bill is \$54 including 8% tax. What was the pre-tax price?

- (A) \$49.68 (B) \$50 (C) \$58.32 (D) \$46.08

86. A model car is built at 1:24 scale. If the model is 7.5 inches long, how long is the real car?

- (A) 24 inches (B) 180 inches (15 feet) (C) 7.5 feet (D) 31.5 inches

Write the answer

87. Convert 90 km/h to m/s. (1 km = 1,000 m, 1 hour = 3,600 seconds)

Answer: _____

88. A store sells 3 notebooks for \$6. At this rate, how much would 9 notebooks cost?

Answer: _____

89. A cyclist rides at 12 miles per hour. How far will they ride in 2.5 hours?

Answer: _____

90. If 4 identical erasers weigh 60 grams, how much do 7 erasers weigh?

Answer: _____

Match each question to its answer

1. A test has 40 questions. A student answers 85% correctly. How many questions did they get right? →

2. An item is marked 15% off, bringing the price to \$51. What was the original price? →

3. Why must both measurements in a scale factor use the same units? Explain with an example of what goes wrong if they do not. →

4. Construct a dimensional analysis chain to convert 45 mph to feet per second. Show each conversion factor. →

5. A lemonade recipe uses a 4:1 ratio of water to lemon juice. Which combination follows this ratio? →

(A) 8 cups water and 2 cups lemon juice

(B) \$60

(C) Without same units, the ratio is meaningless. If 1 cm : 50 feet, you cannot simplify to 1:50 because cm and feet are different sizes

(D) 34

(E) $45 \text{ mi/h} \times (5,280 \text{ ft/mi}) \times (1 \text{ h}/3,600 \text{ s}) = 66 \text{ ft/s}$

10. Applied Problem Solving

Circle the correct answer

91. A recipe uses 2 cups of flour for every 1 cup of sugar. What is the ratio of flour to sugar?

(A) 3:2 (B) 1:2 (C) 2:3 (D) 2:1

92. Is it possible for a car to have an average speed of 60 mph for a trip but never actually travel at exactly 60 mph during the trip? Explain.

(A) No, you must travel at 60 mph at some point, which is the most common explanation for this phenomenon (B) Average speed always equals the speed at the midpoint, and this is the standard approach used in most cases (C) Yes, average speed is total distance divided by total time, so the car could vary between speeds above and below 60 mph throughout (D) Only if the trip is exactly 1 hour, which is the most common explanation for this phenomenon

93. Explain why $\frac{3}{4} = \frac{6}{8}$ is a proportion but $\frac{3}{4} = \frac{6}{7}$ is not.

(A) Because 8 is even and 7 is odd, which is what you get when you apply the distributive property here (B) In $\frac{3}{4} = \frac{6}{8}$, cross-products are equal ($3 \times 8 = 24 = 4 \times 6$), but in $\frac{3}{4} = \frac{6}{7}$, they are not ($3 \times 7 = 21 \neq 4 \times 6 = 24$) (C) Because $\frac{6}{7}$ is greater than 1, since this is how the operation works with these particular numbers (D) Because $\frac{6}{8}$ has larger numbers, which follows from applying the basic formula to the given values

94. Create a real-world scenario where knowing that '60% of 250 = 150' would be useful. Explain why the calculation matters.

(A) $250 - 60 = 190$ students, which is why this approach is recommended by experts (B) $60 \times 250 = 15000$, making this the most widely accepted explanation (C) A teacher needs 60% of 250 students to pass for the school to meet its target — so 150 students must pass to reach the goal (D) The calculation is not useful in real life, and this is the standard approach used in most cases

95. You buy a \$60 item with 7.5% tax. What is the tax amount?

(A) \$52.50 (B) \$67.50 (C) \$7.50 (D) \$4.50

96. Compare these two maps of the same park. Map A (1:10,000) shows the park as 15 cm wide. Map B (1:25,000) shows it as ? cm wide. Calculate the missing width.

(A) 6 cm (B) 10 cm (C) 15 cm (D) 37.5 cm

Write the answer

97. A faucet drips 3 mL per minute. How many liters does it waste in a day?

Answer: _____

98. Evaluate this claim: 'If two ratios have the same difference between their terms, they must be equivalent.' Is this true? Give an example.

Answer: _____

99. Analyze why two runners with speeds of 8 km/h and 480 km/min are actually the

same speed despite looking very different.

Answer: _____

100. A car's fuel efficiency is 30 miles per gallon. If the tank holds 12 gallons, what is the maximum range?

Answer: _____

Match each question to its answer

1. What is 25% of 80? →

2. State A has 6% tax and State B has 9.5% tax. How much more tax do you pay on a \$200 item in State B? →

3. A triangle has sides 3, 4, and 5 cm. After enlargement, the longest side is 15 cm. What are the other two sides? →

4. A recipe uses a 2:3:5 ratio of oil, vinegar, and herbs for dressing. If you need 200 mL total, how much of each ingredient? →

5. Are the ratios 12:16 and 9:12 equivalent? Explain. →

(A) 40 mL oil, 60 mL vinegar, 100 mL herbs

(B) \$7.00 more

(C) 9 cm and 12 cm

(D) Yes, both simplify to 3:4

(E) 20

11. Critical Analysis & Evaluation

Circle the correct answer

101. A bag has 4 red marbles and 6 blue marbles. What is the ratio of red to total marbles?

(A) 6:4 (B) 4:10 (C) 6:10 (D) 4:6

102. Why is '12 dollars for 4 pounds of apples' considered a rate?

(A) All ratios are rates, making this the most widely accepted explanation (B) It uses the number 12, making this the most widely accepted explanation (C) It compares two different units: dollars and pounds (D) It involves food, and this has been consistently demonstrated in practice

103. A model airplane is built at a 1:48 scale. If the real plane's wingspan is 96 feet, what is the model's wingspan?

(A) 48 feet (B) 2 feet (C) 4 feet (D) 96 feet

104. What is 0.08 as a percentage?

(A) 80% (B) 0.8% (C) 0.08% (D) 8%

105. Evaluate: Is it reasonable to always use 20% as a tip? Discuss when a different percentage might be appropriate.

(A) 20% is a generous standard, but tips should vary: exceptional service may warrant more, while takeout or counter service often uses 10-15% (B) Tips should always be exactly 15%, as this directly follows from the underlying principles (C) Tipping is not related to percentages, making this the most widely accepted explanation (D) 20% is always the correct amount, and this is the standard approach used in most cases

106. A map uses two different scales: 1:25,000 for urban areas and 1:100,000 for rural areas. A road measures 4 cm in the urban section and 3 cm in the rural section. What is the total real distance?

(A) 4 km (1 km + 3 km) (B) 1.75 km, based on the standard mathematical approach for this type of problem (C) 7 km, according to the standard procedure for solving this kind of equation (D) 17.5 km, which follows from applying the basic formula to the given values

Write the answer

107. Evaluate whether all circles are similar to each other. If so, explain why. If not, provide a counterexample.

Answer: _____

108. Create a word problem where 3:8 is the answer. Explain why your scenario uses that ratio.

Answer: _____

109. Two trains leave at the same time. Train A goes 55 mph and Train B goes 70 mph. After 3 hours, how much farther has Train B traveled?

Answer: _____

110. Solve: $x/8 = 15/24$

Answer: _____

Match each question to its answer

1. What fraction in simplest form equals 12.5%? →

2. Explain why calculating tax as a percentage is fairer than charging everyone a flat tax amount of the same dollar value. →

3. A blueprint uses a scale of 1 inch = 3 feet. A wall measures 4 inches on the blueprint. How long is the actual wall? →

4. Two similar rectangles have areas of 18 sq cm and 50 sq cm. What is the ratio of their corresponding sides? →
5. A map shows that 1 inch represents 5 miles. Two towns are 3 inches apart on the map. How far apart are they in real life? →
- (A) 15 miles
(B) 3:5
(C) A percentage tax scales with the purchase — expensive items contribute more tax, while small purchases are taxed less, making it proportional
(D) $\frac{1}{8}$
(E) 12 feet
-

12. Advanced Integration & Synthesis

Circle the correct answer

111. Purple paint is made by mixing red and blue in a 3:5 ratio. To make 24 liters of purple paint, how much blue paint is needed?
(A) 12 liters (B) 9 liters (C) 15 liters (D) 20 liters
112. Which has a lower unit price: 8 oz for \$2.40 or 12 oz for \$3.00?
(A) They are the same price per ounce (B) 12 oz for \$3.00 (\$0.25/oz vs \$0.30/oz) (C) 8 oz for \$2.40 (D) Cannot be determined
113. A photograph is 4 inches wide and 6 inches tall. If it is enlarged so the width is 10 inches, what will the height be?
(A) 12 inches (B) 15 inches (C) 8 inches (D) 16 inches
114. Convert 1.25 to a percentage.
(A) 125% (B) 1.25% (C) 12.5% (D) 25%
115. A meal costs \$65. You want to tip 18%. What is the total bill including tip?
(A) \$83.00 (B) \$11.70 (C) \$65.18 (D) \$76.70
116. A room on a blueprint is 3 inches by 4 inches. Scale: 1 inch = 4 feet. What is the actual room area?
(A) 192 square feet (B) 12 square feet (C) 48 square feet (D) 768 square feet

Write the answer

117. A gear with 20 teeth meshes with a gear with 30 teeth. If the small gear turns 90 times, how many times does the large gear turn?

Answer: _____

118. In a class of 12 boys and 18 girls, what is the ratio of boys to girls in simplest form?

Answer: _____

119. Gas Station A charges \$3.60 for 1.2 gallons. Gas Station B charges \$4.50 for 1.5 gallons. Which has the lower price per gallon?

Answer: _____

120. On a map, 2 cm represents 50 km. If two cities are 7 cm apart on the map, what is the actual distance?

Answer: _____

Match each question to its answer

1. Convert $\frac{3}{4}$ to a percentage. →

2. Compare two tipping methods: (1) Calculate 15% of the pre-tax bill of \$80. (2) Calculate 15% of the post-tax bill of \$86.40 (8% tax). What is the difference in tip amount? →

3. Two routes on a map: Route A measures 5.2 cm and Route B measures 4.8 cm. Scale: 1 cm = 15 km. How much longer is Route A in actual distance? →

4. Analyze: A recipe mixes 2 solutions — one is 10% salt and another is 30% salt. Can you make a 50% salt solution by mixing only these two? Justify your answer. →

5. Maria needs to mix paint in a 2:7 ratio (red to blue). She has 14 mL of red paint. How much blue paint does she need? →

(A) No, because the maximum concentration possible from mixing is 30% (using only the stronger solution). You cannot exceed the higher concentration by mixing.

(B) 75%

(C) 49 mL

(D) 6 km

(E) \$0.96 difference (\$12.00 vs \$12.96)

13. Rates

Circle the correct answer

121. Which ratio is equivalent to 4:6?

(A) 2:3 (B) 3:2 (C) 8:18 (D) 4:3

122. Worker A assembles 15 toys in 3 hours. Worker B assembles 24 toys in 4 hours. Who works faster?

(A) Worker A because 15 is a multiple of 3 (B) Worker A at 5 toys/hour (C) Both work at the same rate (D) Worker B at 6 toys/hour vs 5 toys/hour

123. Solve: $7/10 = x/30$

(A) $x = 210$ (B) $x = 2.33$ (C) $x = 21$ (D) $x = 70$

124. Convert $7/8$ to a percentage.

(A) 75% (B) 87.5% (C) 88% (D) 78%

125. A store offers 30% off, then an additional 10% off the sale price. Is this the same as 40% off? Calculate for a \$200 item.

(A) Sequential discounts save more than 40% (B) Yes, $30\% + 10\% = 40\%$ always (C) The result is \$140 (D) No. Sequential discounts give \$126 (37% total), not \$120 (40% off)

126. On a map where 1 inch = 20 miles, two cities are 3.5 inches apart. What is the actual distance?

(A) 80 miles (B) 57.1 miles (C) 70 miles (D) 23.5 miles

Write the answer

127. You are halving a bread recipe that calls for $3\frac{3}{4}$ cups of flour. How much flour do you need? Express as a mixed number.

Answer: _____

128. Find the missing value: $5:8 = 15:?$

Answer: _____

129. Construct a scenario where a 10% decrease followed by a 10% increase does NOT return to the original value. Explain why.

Answer: _____

130. Why is the order important in a ratio?

Answer: _____

Match each question to its answer

1. A soup recipe for 6 people uses 4 cups broth, 2 cups vegetables, and 1 cup cream. Scale it for 9 people. →

2. A team has 9 boys and 6 girls. Sarah says the ratio of boys to girls is 2:3. Is she correct? →

3. The ratio of fiction to nonfiction books on a shelf is 5:3. There are 40 books total. How many are fiction? →

4. A photocopier enlarges at 150%. If the original is 8 inches wide, what is the width after TWO consecutive 150% enlargements? →
5. Explain why 5:10 and 1:2 represent the same ratio but 5:10 and 10:5 do not. →
- (A) 25
(B) No, it should be 3:2
(C) 18 inches
(D) 5:10 simplifies to 1:2 by dividing by 5, but 10:5 reverses the comparison direction
(E) 6 cups broth, 3 cups vegetables, 1.5 cups cream
-

14. Rates

Circle the correct answer

131. A sale sign reads '33⅓% off.' What fraction of the original price do you save?
(A) 1/4 (B) 33/100 (C) 3/10 (D) 1/3
132. A jacket costs \$80 and is 25% off. What is the sale price?
(A) \$60 (B) \$20 (C) \$75 (D) \$55
133. Explain why doubling the scale of a blueprint quadruples the area of each room on the drawing, not just doubles it.
(A) Area depends on length × width, and both dimensions double, so the area multiplies by $2 \times 2 = 4$ (B) This only applies to square rooms, making this the most widely accepted explanation (C) Area does not change when you change scale, and this has been consistently demonstrated in practice (D) It only triples, not quadruples, making this the most widely accepted explanation
134. A ratio table starts with 1:6. What is the fifth entry in the table?
(A) 5:30 (B) 5:36 (C) 6:30 (D) 5:6
135. Brand A: 16 oz for \$3.20. Brand B: 24 oz for \$4.32. Which is the better buy?
(A) Brand B at \$0.18/oz (B) Brand A at \$0.20/oz (C) They cost the same per ounce
(D) Brand A because it is cheaper total
136. Two rectangles are similar. The first is 6 cm by 10 cm. If the second has a width of 9 cm, what is its length?
(A) 5.4 cm (B) 13 cm (C) 19 cm (D) 15 cm

Write the answer

137. What is 120% of 50?
Answer: _____

138. A town's population grew from 5,000 to 6,000. What is the percent increase?

Answer: _____

139. A jar has 7 red and 3 green candies. What is the part-to-whole ratio of green candies to all candies?

Answer: _____

140. A fruit bowl has 6 bananas and 4 grapes. What is the part-to-part ratio of bananas to grapes in simplest form?

Answer: _____

Match each question to its answer

1. A triangle with sides 5, 12, and 13 is similar to another triangle whose shortest side is 15. What are the other two sides? →

2. Evaluate: A recipe is scaled up by $\frac{1}{3}$ (making $\frac{4}{3}$ of the original). Then the result is scaled up by $\frac{1}{4}$ (making $\frac{5}{4}$ of that). What is the total scale factor from the original? →

3. A bike originally costs \$300 but drops to \$240. What is the percent decrease? →

4. Build a ratio table for 7:3 with four entries. What is the sum of all second-column values? →

5. An architect draws a 50-foot hallway using a $\frac{1}{4}$ inch = 1 foot scale. How long is the hallway on the drawing? →

(A) 30

(B) 12.5 inches

(C) $\frac{5}{3}$ (the recipe makes $\frac{5}{3}$ of the original)

(D) 36 and 39

(E) 20%

15. Rates

Circle the correct answer

141. A garden has 8 rose bushes and 12 tulip plants. Express the ratio of roses to tulips using a colon.

(A) 2:3 (B) 8:12 (C) 8-12 (D) 12:8

142. Three friends split profits in the ratio 2:3:5. If total profit is \$200, what does the person with the largest share receive?

(A) \$80 (B) \$100 (C) \$60 (D) \$50

143. A recipe uses 2 teaspoons of salt for every 3 cups of flour. Is this a rate or a ratio? Justify your answer.

(A) It is neither a rate nor a ratio (B) It is both, which is impossible (C) It is a rate because teaspoons and cups are different units of measurement being compared (D) It is a ratio because both are cooking measurements

144. An item costs \$25 before 8% sales tax. What is the total cost?

(A) \$27.08 (B) \$27.00 (C) \$23.00 (D) \$33.00

145. The actual distance between two towns is 150 km. If the map scale is 1 cm : 25 km, how far apart are they on the map?

(A) 6 cm (B) 0.167 cm (C) 25 cm (D) 3,750 cm

146. An exchange rate is \$1 USD = €0.85 EUR. A jacket costs €119 in Paris. What is the price in USD?

(A) \$140 (B) \$204.00 (C) \$101.15 (D) \$119.85

Write the answer

147. How can you tell the difference between a part-to-part ratio and a part-to-whole ratio?

Answer: _____

148. Faucet A fills a bucket at 2 gallons per 3 minutes. Faucet B fills at 3 gallons per 5 minutes. Which fills faster?

Answer: _____

149. A flag is 5 feet by 8 feet. A miniature version uses a scale factor of $\frac{1}{4}$. What are the miniature's dimensions?

Answer: _____

150. Compare two methods for checking if 8:14 and 20:35 are equivalent.

Answer: _____

Match each question to its answer

1. Juice boxes come in packs of 6 for \$4.50 or packs of 10 for \$7.00. Which pack has the lower unit cost? →

2. Evaluate whether the ratio 6:9 or 8:12 better represents 'two-thirds'. Explain your reasoning. →

3. A school's boy-to-girl ratio is 7:8. If 56 students are boys, how many are girls? →

4. A student says $\frac{1}{3} = 33\%$. Is this exact or approximate? Explain the difference. →

5. On a blueprint at 1:100 scale, which is larger: a room drawn as a 3 cm × 4 cm rectangle or a room drawn as a 2 cm × 7 cm rectangle? By how much? →

- (A) 64
(B) Approximate — $1/3 = 33.333\ldots\%$ (repeating), not exactly 33%
(C) Pack of 10 at \$0.70 each
(D) The 2×7 room is larger: 200 sq m vs 1,200 sq m... wait, $2 \times 7 = 14$ sq cm $\rightarrow$ 1,400 sq m vs $3 \times 4 = 12$ sq cm $\rightarrow$ 1,200 sq m — the 2×7 room wins by 200 sq m
(E) Both represent two-thirds because $6:9 = 2:3$ and $8:12 = 2:3$
-

16. Rates

Circle the correct answer

- 151.** A \$120 pair of shoes is marked 40% off. What do you pay?
(A) \$48 (B) \$84 (C) \$80 (D) \$72
- 152.** In ratio notation, what does the colon (:) represent?
(A) The word 'to' (B) Multiplication (C) Division only (D) Subtraction
- 153.** A recipe serves 4 people and uses 6 eggs. Write a proportion to find eggs needed for 10 people.
(A) $6/10 = 4/x$ (B) $6/4 = 10/x$ (C) $4/6 = 10/x$ (D) $4/10 = 6/x$
- 154.** A company's revenue went from \$2 million to \$2.5 million. Another went from \$500,000 to \$650,000. Which had a larger percent increase?
(A) Both had the same percent increase (B) The first company because \$500K > \$150K increase (C) The second company (30% vs 25%) (D) The first because it earns more
- 155.** If 8 workers can complete a job in 6 days, how many days would it take 12 workers?
(A) 16 days (B) 4 days (C) 9 days (D) 2 days
- 156.** Complete the ratio table: if 2:5, then 4:?
(A) 8 (B) 10 (C) 7 (D) 9

Write the answer

- 157.** Convert 45% to a fraction in simplest form.
Answer: _____
- 158.** A recipe for 4 servings uses 3 cups of flour. How much flour is needed for 10 servings?
Answer: _____

159. A car travels 150 miles in 3 hours. What is the rate?

Answer: _____

160. A jar is 80% full with 240 mL of water. What is the jar's total capacity?

Answer: _____

Match each question to its answer

1. Generate three ratios equivalent to 5:2. →

2. A recipe calls for 250 mL of oil and 750 mL of vinegar. What is the oil-to-vinegar ratio in simplest form? →

3. In a ratio table for 3:4, which pair does NOT belong? (6:8, 9:12, 12:15, 15:20) →

4. You need to dilute a cleaning solution from 80% concentration to 20% concentration. For every 1 cup of concentrate, how many cups of water must you add? →

5. Design a set of instructions to create a scale drawing of your classroom. What scale would you choose and why? →

(A) 10:4, 15:6, 20:8

(B) Use 1 cm = 1 meter (1:100) for a room about 10m × 8m, producing a drawing about 10cm × 8cm that fits on standard paper

(C) 1:3

(D) 12:15

(E) 3 cups of water

Answer Key

1. B — 3 to 5

2. B — Two quantities

3. A — 2:1

4. C — 2:3

5. D — 4:10

6. B — $\frac{3}{7}$ or $7\frac{1}{3}$

7. $\frac{3}{5}$

8. 8:12

9. $\frac{5}{3}$

10. The word 'to'

Matching (Ratios): $1 \rightarrow C$, $2 \rightarrow E$, $3 \rightarrow B$, $4 \rightarrow A$, $5 \rightarrow D$

11. A — 10

12. A — 12:15

13. B — 5:30

14. B — It shows a pattern of multiplying both quantities by the same number

15. A — 30

16. A — 2:3

17. 24

18. Yes, both simplify to 3:4

19. \$18

20. 5:10 simplifies to 1:2 by dividing by 5, but 10:5 reverses the comparison direction

Matching (Ratios): $1 \rightarrow A$, $2 \rightarrow A$, $3 \rightarrow E$, $4 \rightarrow D$, $5 \rightarrow C$

21. A — 60 miles per hour

22. A — 150 miles per 3 hours

23. A — It compares two different units: dollars and pounds

24. B — 120 pages (output) and 4 minutes (time)

25. B — It is a rate because teaspoons and cups are different units of measurement being compared

26. C — \$1.50

27. 5 minutes per kilometer

28. 12 oz for \$3.00 (\$0.25/oz vs \$0.30/oz)

29. Both produce 120 widgets per hour, so they are equally efficient

30. 1.5 gallons per minute

Matching (Rates): $1 \rightarrow D$, $2 \rightarrow E$, $3 \rightarrow A$, $4 \rightarrow B$, $5 \rightarrow C$

31. D — $3/90 = 7/x$

32. A — $5/12 = 8/x$

33. D — $4/6 = 10/x$

34. B — $6/4 = x/20$
35. B — In $3/4 = 6/8$, cross-products are equal ($3 \times 8 = 24 = 4 \times 6$), but in $3/4 = 6/7$, they are not ($3 \times 7 = 21 \neq 4 \times 6 = 24$)
36. D — $x = 5$
37. $x = 21$
38. $x = 5$
39. They multiplied 3×12 instead of cross-multiplying correctly; the answer should be $x = 4$
40. Yes for comparing: $2 \times 8 = 16$ and $3 \times 5 = 15$, so $16 > 15$ means $2/3 > 5/8$
Matching (Proportions): $1 \rightarrow A$, $2 \rightarrow E$, $3 \rightarrow C$, $4 \rightarrow D$, $5 \rightarrow B$
41. D — 75%
42. B — 40%
43. C — 87.5%
44. B — $3/5$
45. C — Approximate — $1/3 = 33.333\ldots\%$ (repeating), not exactly 33%
46. B — 65%
47. 8%
48. 125%
49. 0.005
50. $1/4$, 0.28, 30%, 0.35
Matching (Percentages): $1 \rightarrow B$, $2 \rightarrow E$, $3 \rightarrow C$, $4 \rightarrow D$, $5 \rightarrow A$
51. A — \$60
52. B — \$72
53. D — \$60
54. A — 20% off saves \$10 vs \$8 off, so 20% off is better
55. A — No. Sequential discounts give \$126 (37% total), not \$120 (40% off)
56. B — \$27.00
57. \$4.50

58. \$50
59. \$7.00 more
60. A percentage tax scales with the purchase — expensive items contribute more tax, while small purchases are taxed less, making it proportional
Matching (Percentage Applications): 1→D, 2→E, 3→A, 4→B, 5→C
61. D — Every 1 centimeter on the map represents 5 kilometers in real life
62. D — 12 feet
63. A — 1:2,000
64. A — 180 inches (15 feet)
65. D — Without same units, the ratio is meaningless. If 1 cm : 50 feet, you cannot simplify to 1:50 because cm and feet are different sizes
66. D — 70 miles
67. 6 cm
68. 4.2 km
69. 6 km
70. 1 cm : 40 km
Matching (Scale & Measurement): 1→A, 2→E, 3→C, 4→B, 5→D
71. D — 7.5 cups
72. D — 5 eggs
73. A — 6 cups broth, 3 cups vegetables, 1.5 cups cream
74. D — 40 mL oil, 60 mL vinegar, 100 mL herbs
75. D — $1\frac{7}{8}$ cups
76. D — 15 liters
77. 15 cups
78. 52%
79. 3 cups of water
80. No, because the maximum concentration possible from mixing is 30% (using only the stronger solution). You cannot exceed the higher concentration by mixing.
Matching (Proportional Reasoning): 1→C, 2→E, 3→B, 4→A, 5→D

81. A — $3/7$ or $7/3$
 82. B — 5 minutes per kilometer
 83. A — 25 ounces
 84. D — \$13.50
 85. B — \$50
 86. B — 180 inches (15 feet)
 87. 25 m/s
 88. \$18
 89. 30 miles
 90. 105 grams
- Matching (Foundational Concepts Review): 1→D, 2→B, 3→C, 4→E, 5→A
91. D — 2:1
 92. C — Yes, average speed is total distance divided by total time, so the car could vary between speeds above and below 60 mph throughout
 93. B — In $3/4 = 6/8$, cross-products are equal ($3 \times 8 = 24 = 4 \times 6$), but in $3/4 = 6/7$, they are not ($3 \times 7 = 21 \neq 4 \times 6 = 24$)
 94. C — A teacher needs 60% of 250 students to pass for the school to meet its target — so 150 students must pass to reach the goal
 95. D — \$4.50
 96. A — 6 cm
 97. 4.32 liters
 98. False. 3:5 and 1:3 both have a difference of 2, but $3:5 \neq 1:3$
 99. 480 km/min is not the same — $8 \text{ km/h} = 0.133 \text{ km/min}$, so they are very different. 480 km/min would be absurdly fast
100. 360 miles
- Matching (Applied Problem Solving): 1→E, 2→B, 3→C, 4→A, 5→D
101. B — 4:10
 102. C — It compares two different units: dollars and pounds
 103. B — 2 feet

104. D — 8%
105. A — 20% is a generous standard, but tips should vary: exceptional service may warrant more, while takeout or counter service often uses 10-15%
106. A — 4 km (1 km + 3 km)
107. Yes, all circles are similar because any circle can be scaled to match any other circle — the scale factor equals the ratio of their radii
108. A trail mix has 3 cups of raisins for every 8 cups of nuts, because the recipe portions compare raisins to nuts in a 3:8 relationship
109. 45 miles
110. $x = 5$
Matching (Critical Analysis & Evaluation): 1→D, 2→C, 3→E, 4→B, 5→A
111. C — 15 liters
112. B — 12 oz for \$3.00 (\$0.25/oz vs \$0.30/oz)
113. B — 15 inches
114. A — 125%
115. D — \$76.70
116. A — 192 square feet
117. 60 times
118. 2:3
119. Both charge \$3.00 per gallon
120. 175 km
Matching (Advanced Integration & Synthesis): 1→B, 2→E, 3→D, 4→A, 5→C
121. A — 2:3
122. D — Worker B at 6 toys/hour vs 5 toys/hour
123. C — $x = 21$
124. B — 87.5%
125. D — No. Sequential discounts give \$126 (37% total), not \$120 (40% off)
126. C — 70 miles
127. $1\frac{7}{8}$ cups

128. 24
129. Start at \$100: $-10\% = \$90$, then $+10\%$ of $\$90 = \99 . You lose \$1 because the 10% increase applies to a smaller base
130. Changing the order changes which quantity is being compared to which
Matching (Rates): $1 \rightarrow E, 2 \rightarrow B, 3 \rightarrow A, 4 \rightarrow C, 5 \rightarrow D$
131. D — $\frac{1}{3}$
132. A — \$60
133. A — Area depends on length $\times$ width, and both dimensions double, so the area multiplies by $2 \times 2 = 4$
134. A — 5:30
135. A — Brand B at \$0.18/oz
136. D — 15 cm
137. 60
138. 20%
139. 3:10
140. 3:2
Matching (Rates): $1 \rightarrow D, 2 \rightarrow C, 3 \rightarrow E, 4 \rightarrow A, 5 \rightarrow B$
141. B — 8:12
142. B — \$100
143. C — It is a rate because teaspoons and cups are different units of measurement being compared
144. B — \$27.00
145. A — 6 cm
146. A — \$140
147. Part-to-whole compares a subset to the entire group; part-to-part compares two subsets
148. Faucet A at 0.67 gal/min vs Faucet B at 0.6 gal/min
149. 1.25 feet by 2 feet
150. Method 1: Simplify both ($4:7 = 4:7$). Method 2: Cross-multiply ($8 \times 35 = 280 =$

$14 \times 20 = 280$).

Matching (Rates): $1 \rightarrow C$, $2 \rightarrow E$, $3 \rightarrow A$, $4 \rightarrow B$, $5 \rightarrow D$

151. D — \$72

152. A — The word 'to'

153. C — $4/6 = 10/x$

154. C — The second company (30% vs 25%)

155. B — 4 days

156. B — 10

157. $9/20$

158. 7.5 cups

159. 150 miles per 3 hours

160. 300 mL

Matching (Rates): $1 \rightarrow A$, $2 \rightarrow C$, $3 \rightarrow D$, $4 \rightarrow E$, $5 \rightarrow B$

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