

Lesson 3-4: Ratio and Proportion

Part 1: Ratios and Rates

1. 080002a, P.I. A.A.1

A hockey team played n games, losing four of them and winning the rest. The ratio of games won to games lost is

[A] $\frac{n}{4}$ [B] $\frac{4}{n-4}$ [C] $\frac{n-4}{4}$ [D] $\frac{4}{n}$

2. 060223a, P.I. A.A.26

If the instructions for cooking a turkey state "Roast turkey at 325° for 20 minutes per pound," how many hours will it take to roast a 20-pound turkey at 325° ?

3. 010117a, P.I. A.A.26

In a molecule of water, there are two atoms of hydrogen and one atom of oxygen. How many atoms of hydrogen are in 28 molecules of water?

[A] 42 [B] 56 [C] 14 [D] 29

4. 060505a, P.I. A.A.26

A cake recipe calls for 1.5 cups of milk and 3 cups of flour. Seth made a mistake and used 5 cups of flour. How many cups of milk should he use to keep the proportions correct?

[A] 2.25 [B] 2.5 [C] 2 [D] 1.75

5. 069913a, P.I. A.A.26

A total of \$450 is divided into equal shares. If Kate receives four shares, Kevin receives three shares, and Anna receives the remaining two shares, how much money did Kevin receive?

[A] \$200 [B] \$150
[C] \$100 [D] \$250

6. 069915a, P.I. A.A.26

During a recent winter, the ratio of deer to foxes was 7 to 3 in one county of New York State. If there were 210 foxes in the county, what was the number of deer in the county?

[A] 280 [B] 490 [C] 90 [D] 147

7. 010014a, P.I. A.A.26

Sterling silver is made of an alloy of silver and copper in the ratio of 37:3. If the mass of a sterling silver ingot is 600 grams, how much silver does it contain?

[A] 450 g [B] 555 g
[C] 48.65 g [D] 200 g

8. 010210a, P.I. A.A.26

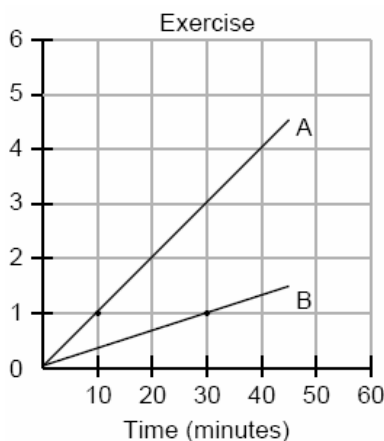
There are 357 seniors in Harris High School. The ratio of boys to girls is 7:10. How many boys are in the senior class?

[A] 117 [B] 147 [C] 107 [D] 210

9. 089931a, P.I. A.A.26
The profits in a business are to be shared by the three partners in the ratio of 3 to 2 to 5. The profit for the year was \$176,500. Determine the number of dollars each partner is to receive.
10. 010331a, P.I. A.A.26
At the Phoenix Surfboard Company, \$306,000 in profits was made last year. This profit was shared by the four partners in the ratio 3:3:5:7. How much *more* money did the partner with the largest share make than one of the partners with the smallest share?
11. 010427a, P.I. A.A.1
Which expression represents the number of yards in x feet?
[A] $12x$ [B] $\frac{x}{12}$ [C] $3x$ [D] $\frac{x}{3}$
12. 060014a, P.I. A.A.1
If rain is falling at the rate of 2 inches per hour, how many inches of rain will fall in x minutes?
[A] $\frac{30}{x}$ [B] $\frac{x}{30}$ [C] $\frac{60}{x}$ [D] $2x$
13. 060709a, P.I. A.M.2
Andy is 6 feet tall. If 1 inch equals 2.54 centimeters, how tall is Andy, to the *nearest centimeter*?
[A] 30 [B] 183 [C] 213 [D] 15
14. 060731a, P.I. A.M.2
If a United States dollar is worth \$1.41 in Canadian money, how much is \$100 in Canadian money worth in United States money, to the *nearest cent*?
15. 080415a, P.I. A.A.26
A rocket car on the Bonneville Salt Flats is traveling at a rate of 640 miles per hour. How much time would it take for the car to travel 384 miles at this rate?
[A] 245 minutes [B] 1.7 hours
[C] 256 minutes [D] 36 minutes
16. 080632a, P.I. A.A.26
Running at a constant speed, Andrea covers 15 miles in $2\frac{1}{2}$ hours. At this speed, how many *minutes* will it take her to run 2 miles?

17. 069926a, P.I. 8.G.13

During a 45-minute lunch period, Albert (A) went running and Bill (B) walked for exercise. Their times and distances are shown in the accompanying graph. How much faster was Albert running than Bill was walking, in miles per hour?



18. 060116b, P.I. A.M.1

On her first trip, Sari biked 24 miles in T hours. The following week Sari biked 32 miles in T hours. Determine the ratio of her average speed on her second trip to her average speed on her first trip.

- [A] $\frac{3}{2}$ [B] $\frac{3}{4}$ [C] $\frac{2}{3}$ [D] $\frac{4}{3}$

19. 080111b, P.I. A.M.1

On a trip, a student drove 40 miles per hour for 2 hours and then drove 30 miles per hour for 3 hours. What is the student's average rate of speed, in miles per hour, for the whole trip?

- [A] 35 [B] 36 [C] 37 [D] 34

20. 080119b, P.I. A.M.1

If Jamar can run $\frac{3}{5}$ of a mile in 2 minutes 30 seconds, what is his rate in miles per minute?

- [A] $4\frac{1}{6}$ [B] $\frac{6}{25}$ [C] $\frac{4}{5}$ [D] $3\frac{1}{10}$

21. 080736a, P.I. A.M.1

The trip from Manhattan to Montauk Point is 120 miles by train or by car. A train makes the trip in 2 hours, while a car makes the trip in $2\frac{1}{2}$ hours. How much faster, in miles per hour, is the average speed of the train than the average speed of the car?

22. fall0734ia, P.I. A.M.1

Hannah took a trip to visit her cousin. She drove 120 miles to reach her cousin's house and the same distance back home. It took her 1.2 hours to get halfway to her cousin's house. What was her average speed, in miles per hour, for the first 1.2 hours of the trip? Hannah's average speed for the remainder of the trip to her cousin's house was 40 miles per hour. How long, in hours, did it take her to drive the remaining distance? Traveling home along the same route, Hannah drove at an average rate of 55 miles per hour. After 2 hours her car broke down. How many miles was she from home?

[1] C

[2] $6\frac{2}{3}$ or 6 hr 40 min or $6.\overline{66}$ or an

equivalent answer, and appropriate work is shown.

[1] 400 min, but the answer is not converted into hours.

or [1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but the answer is rounded to the nearest hour.

or [1] 6 or 6 hr 40 min or $6.\overline{66}$ or an equivalent answer, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[2] incorrect procedure.

[3] B

[4] B

[5] B

[6] B

[7] B

[8] B

[4] \$52,950, \$35,300, and \$88,250 and an appropriate method is shown, such as $3x + 2x + 5x = \$176,500$.

[3] A correct equation is set up or multiplied by correct fractional values $\frac{3}{10}$, $\frac{2}{10}$, and $\frac{5}{10}$,

but a computational mistake is made, and three appropriate values are found.

or [3] An appropriate method is shown, but not all three values are found.

[2] The equation is set up correctly, but numerous computational mistakes are made, and three appropriate values are found.

or [2] An incorrect equation is shown, but three appropriate values are found.

or [2] An appropriate equation is shown but is solved only for x (17,650).

[1] The equation is set up correctly, but no appropriate values are found.

or [1] Three correct answers are found, and no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[9] incorrect procedure.

[4] \$68,000, and appropriate work is shown.

[3] \$119,000 and \$51,000, and appropriate work is shown, but the answers are not subtracted to find the difference.

or [3] Appropriate work is shown, but one computational error is made.

[2] Appropriate work is shown, but more than one computational error is made.

[1] The value for one share (\$17,000) is found, but no further correct work is shown.

or [1] \$68,000, but no work is shown.

[0] \$17,000 or \$119,000 or \$51,000, and no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[10] obviously incorrect procedure.

[11] D

[12] B

[13] B

[2] 70.92, and appropriate work is shown, such as a proportion.

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] 70.92, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[14] incorrect procedure.

[15] D

[2] 20, and appropriate work is shown, such

as $\frac{15}{150} = \frac{2}{x}$.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made, such as expressing

the answer as $\frac{1}{3}$ hour.

or [1] 20, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[16] incorrect procedure.

[3] 4 and an appropriate method is shown, such as calculating A at 6 mph and B at 2 mph through arithmetic, formula, or extending the graph to 60 minutes.

[2] The speeds of 6 and 2 are found but not their difference.

or [2] Their difference is found but not in miles per hour.

[1] Only distances of 4.5 miles and 1.5 miles are found.

or [1] The speeds found are incorrect but then are subtracted appropriately.

or [1] 3 times as fast and no appropriate explanation is given.

or [1] 4 and no appropriate explanation is given.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[17] incorrect procedure.

[18] D

[19] D

[20] B

[3] 12, and appropriate work is shown, such as finding the rates of both vehicles and then subtracting 48 from 60.

[2] Appropriate work is shown, but one computational error is made.

or [2] The rates of both vehicles are found correctly, and appropriate work is shown, but they are not subtracted.

or [2] The rates of both vehicles are found correctly, and the correct difference is found, but no work is shown.

[1] Appropriate work is shown, but two or more computational errors are made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The rates of both vehicles are found correctly, but no work is shown, and the difference is not found.

or [1] 12, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[21] incorrect procedure.

[3] 50, 1.5, and 10, and appropriate work is shown.

[2] Appropriate work is shown, but one computational error is made.

[1] Appropriate work is shown, but one conceptual error is made.

or [1] Appropriate work is shown, but two or more computational errors are made.

or [1] 50, and appropriate work is shown, but no further correct work is shown.

or [1] 1.5, and appropriate work is shown, but no further correct work is shown.

or [1] 10, and appropriate work is shown, but no further correct work is shown.

or [1] 50, 1.5, and 10, but no work is shown.

[0] 50 or 1.5 or 10, but no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[22] obviously incorrect procedure.
