Name:_____   Date:_____

Math 8/9H: Section 3.5 Rate of Problems and Comparing Ratios (2021)

1. Three people contributed to buy a lottery ticket, in the ratio 2: 5: 3. If the ticket wins $25,000, how should the prize be divided?

2. The ratio of Japanese cars to German cars in a parking lot is 9:5. If the lot contains 252 cars, how many more Japanese cars are there?

3. Four partners in a business agreed to share the profits in the ratio 4: 2: 3: 6. The first year's profits were $84,000. Calculate each partners' share.

4. A worker is paid $8.60/h for a 40h week and time and a half for overtime. How many hours are worked to earn $414.95 in one week?

5. Three painters can paint 4 houses in 5 days. To the nearest whole number of days, how long would it take 7 painters to paint 18 houses if all the work was done at the same rate all the time?

   (a) 3   (b) 4   (c) 7   (d) 10   (e) 18

6. Jason can fill a water tank in 4 min using a large hose. He takes 6 min using a smaller hose. How long will he take if he uses both hoses?

7. Andrew can deliver 500 handbills in 2h. Amos can deliver the same number in 3h. How long will they take to deliver 500 handbills if they work together?

8. Katie leaves school at the same time every day. If she cycles at 20 km/h, she arrives home at 4:30 in the afternoon. If she cycles at 10 km/h, she arrives home at 5:15 in the afternoon. At what speed, in km/h, must she travel to arrive home at 5:00 in the afternoon?

9. Ken and Mark are office cleaners. Ken earns $10/h and takes 8hours to clean an office. Mark earn $8/h and takes 10h to clean it. How long will it take Ken and Mark to clean the office together? What is the cost of cleaning the office using only Ken? Only Mark? Ken and Mark together?

10. Mario can take inventory at the store in 30min. His partner, Carmen, can take inventory in 20min. If they work together, how long will the inventory take?

11. Machine X makes 200 boxes in 3 min and machine Y makes 200 boxes in 2min. With both machines working, how long will it take to make 200boxes?

12. A study shows that an office staff of "x" people will consume "y" cups of coffee over a period of "z" days. At this rate, how long would it take a staff of "3x" people to consume $\dfrac{y}{12}$ cups of coffee?

13. Mike takes 3hours to complete a task. Mike and Sam together takes 2hours to complete the same task. How long will it take Sam to complete the task alone?

14. A wolf can eat a lamb in ¼ of an hour. A bear can eat a lamb in 1/5 of an hour. How many hours will it take the wolf and the bear, to eat a lamb if they dine together? (Assume that they will not attack each other). Express your answer as a common fraction.

15. A 1-cent coin minted before 1860 had a mass of 4.50 g and contained copper, tin, and zinc in the ratio 95:4:1. What mass of tin did each coin contain? If the amount of tin doubled, with the mass of the coin remaining the same, what is the new ratio of copper, tin, and to zinc?

16. The scale on a map of Saskatchewan is 1 cm represents 50 km. The actual straight line distance between Regina and Saskatoon is about 257 km. What is the map distance between these 2 cities?

17. The scale on a map of British Columbia is 1:5 000 000. This means that 1 cm on the map represents 5 000 000 cm actual distance. The map distance between Kelowna and Salmon Arm is 2.1 cm. What is the actual distance in kilometres between these towns?

18. Forty-five students take piano lessons. The ratio of the number of students who take piano lessons to violin lessons is 15:8. The ratio of the number of students who take violin lessons to clarinet lessons is 8:9. How many students take violin and clarinet lessons respectively?

19. Bill and Mary are planting trees for the town. On the first day, they planted 38 trees. Bill didn't work on the second day, but Mary planted the same number she had the first day. They had now planted 60 trees. How many trees were planted by Bill? Set up an equation to solve this problem.

20. Before beginning an exam, Gerry calculated that, if she were to spend 10 minutes solving each of the 12 problems, then she would be able to complete the exam in 2 hours. During the exam, Gerry found some problems difficult. They each took her twice as long as she had calculated. She found the remaining problems easy. They took only half as long as she calculated. She completed the 12 problems in exactly 2 hours. How many problems did Gerry find to be difficult?

21. A cask is filled with 45 gallons of wine. Nine gallons are removed, and the cask is refilled with water. Then nine gallons of the mixture are removed and the cask is refilled with water again. What is the ratio of water to wine in the final mixture?

22. A professional lawn mower charges $40 per hour. It takes Mike, the professional lawn mower, 45 minutes to mow an area of 10 m by 30 m. How much will it cost to hire him to mow a rectangular area of 20 m by 60 m?

23. A small hose fills a swimming pool in 16 hours. A large hose fills the same pool in 12 hours. With the pool empty, the owner turns on the smaller hose at 8:00 AM. He turns on the larger hose at 10:00 AM. Both hoses are used from 10:00 AM to 3:00 PM. Rounded to the nearest percent, how full is the pool at 3:00 PM?

24. Two bottles of equal volume contain orange juices with different concentrations. The first bottle contains a mixture of orange juice to water with a ratio of 3:2. The second bottle contains a mixture of orange juice to water with a ratio of 3:4. If the two bottles are put together, what is the ratio of orange juice to water?

25. A wire is cut into two parts in the ratio 3 : 2. Each part is bent to form a square. What is the ratio of the area of the larger square ot the area of the smaller square?

(A) $3:2$ (B) $9:4$ (C) $5:3$ (D) $5:2$ (E) $12:5$

26. In older TVs, the ratio of screen width to screen height is 4:3. In newer flat-screen TVs, the ratio of screen width to screen height is 16:9. Both pictures below show a 32-inch 4:3 screen TV. (Here 32 inches means that the diagonal measure 32inches) A newer TV show has been shot for 16:9 TVs. When it is viewed on a 4:3 TV, equal grey bands are produced at the top and bottom, so that the rest of the picture is in the correct 16:9 ratio. What is the vertical height in inches of one of these grey bands? Express the answer as a decimal, to the nearest tenth of an inch.
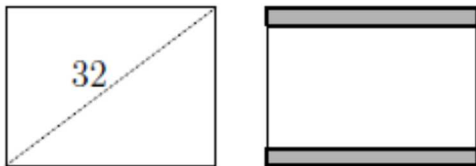
6   Bill and Jill are hired to paint a line on a road. If Bill works by himself, he could paint the line in "B" hours. If Jill works by herself, she could paint the line in "J" hours. Bill starts painting the line from one end, and Jill begins painting the line from the other end on hour later. They both work until the line is painted. Which of the following is an expression for the number of hours that Bill works?

(A) $\dfrac{B(J+1)}{B+J}$ (B) $J+1$ (C) $\dfrac{BJ}{B+J}+1$ (D) $\dfrac{B+J-1}{2}$ (E) $\dfrac{B(J-1)}{B+J}$