Rate, Ratio, Proportion and Percent.

1) An IV-bag with 1000 ml of fluid is delivering fluid to a patient at the rate of 3 ml per minute. After the first three hours, how many ml of fluid will remain in the IV bag?

2) If Andy bikes at a steady rate of 15 miles per hour, how many miles will he bike in four minutes?

3) At sea level, air pressure is 14.7 pounds per square inch. If the pressure under water increases by 4.3 lbs/in^2 for every 10 feet you descend, how many times greater is the pressure at 400 feet below sea level than at sea level?

4) George's first trip was 300 miles. If on his second trip, the time necessary to complete the trip doubled and his average speed is two-thirds the average speed of his first trip, how many miles is this second trip?

5) Each student works at the same speed. If five students can complete a job in six days, how many days would it take three students to complete the same job?

6) Lisa flies from San Francisco to New York (2500 mi) in 5.5 hours and then flies from New York to Rome (3500 mi) in 7 hours. What was his average speed (in mph) for her entire trip?

7) One pump can empty a tank in eight hours. A second pump can empty the same tank in five hours. What is the positive difference between the time it would take the faster pump to empty the tank working alone and the time it would take for the two pumps to work together?

8) A stone is dropped into a well and the splash is heard 8.9 seconds after it was dropped. The stone falls at a rate of $16t^2$ feet in t seconds, and the speed of sound is 1120 feet per second. What is the distance from the well to the top of the water? Round to nearest whole number.

9) At 7:40 p.m., Brett passed mile marker 134. At 8:20, he passed mile marker 176. What is his average speed in miles per hour?

10) A high school football player runs 40 yards in 4.5 seconds. If he were to maintain his speed, how many miles would he run in one hour? Round to the nearest tenth.

11) A faucet leaked at a rate of 1 pint every 2 hours for 4 full days. How many gallons of water leaked from the faucet?

12) A train leaves Boston at 8:00 am and travels the 216 miles to New York at a speed of 90 mph. At what time in the morning does the train arrive in New York?

13) With 2 minutes left in the game, Madison leads Crescent Valley 76 to 69. Madison scores two points every minute. For Crescent Valley to win the game by at least one point, what is the minimum number of points per minute that they must average?

14) A large pump can fill a pool in five hours, and a small pump can fill the pool in 6 hours. At 10 a.m., the slower pump is turned on, and at 11 a.m., the faster pump is turned on. What time in the afternoon will it be when the pool is full?

15) Howard ran a half-marathon (13.1 miles) in 2 hours. He completed the first 10 miles in 95 minutes. How many minutes per mile did Howard average for the remainder of the race? Round to the nearest tenth.

16) Theresa runs one mile at 4 miles per hour, three miles at 5 miles per hour, and then four miles at 6 miles per hour. What is her average speed in miles per hour? Round to nearest tenth.

17) A discount food store allows you to buy a total of 150 lbs of beef by paying $13.15 each week for 17 weeks. What is the cost per pound?

18) If 6 computer programmers can write 8 computer programs in 3 days, how many programmers will be required to write a series of 20 similar programs in 15 days?

19) Scott is leaving his office to attend a meeting. If he drives 38 mph, he will arrive one hour late. If he drives 57 mph, he will arrive one hour early. How many mph must he average to arrive on time? Express the answer to the nearest tenth.

20) Suppose a, b and c are numbers satisfying $\frac{a}{b} = \frac{3}{8}$ and $\frac{b}{c} = \frac{12}{21}$. What is the value of $\frac{a}{c}$?

21) A softball pitcher has a strikeout to walk ratio of 2:1. In the next two games she pitched, she had 10 strikeouts and allowed 10 walks, which changed her ratio of strikeouts to walks to 5:3. What is the total number of strikeouts that she has thrown in all?

22) A hose would fill a non-leaky pool in 5 hours. In Eric's pool there is a leak at the bottom that would empty a full pool in 20 hours. After two hours of trying to fill Eric's pool with a hose starting from empty, what percent of the pool will be filled?

23) Dave and Nick share their bread with Albert. Dave has 5 loaves of bread and Nick has 3 loaves. They share the bread equally among the three of them. Albert gives Dave and Nick $8, which they agree to share in proportion to the amount of bread they each gave away. How much money should Dave receive?

24) The ratio of cats to dogs to squirrels in Dogpatch is 4:5:12, while the ratio of squirrels to raccoons to opossums is 10:3:6. What is the ratio of dogs to opossums?

25) The scale of a map of St. Louis is 4 miles to $\frac{3}{4}$ inch. On a map of Dallas, the scale is 3 miles to $\frac{1}{2}$ inch. The distance from the University of Dallas to Southern University is $1\frac{1}{4}$ inches on the Dallas map. How many inches apart would the two schools be if they were on a map for which the scale for the St. Louis map is used?

26) Felipe types 60 words per minute and Chung types 40 words per minute. They each type one-half of an article. What was the rate at which the article was typed?

27) A store puts everything on sale for 20% off. If the sales tax is 8%, what percent of the original marked price is the final cost including tax? Round to the nearest tenth

28) "Buy 3, Get 2 Free" is equivalent to purchasing the five items at a discount of what percent?

29) A baseball team won 50% of the first 120 games it played in a 162-game season. What is the minimum number of its remaining games that the team must win in order to win at least 60% of its games this season?

30) The wholesale price of a CD player is $180. The storeowner sets the price so that she can yield a 35% profit over the wholesale cost when the CD player sells at a 20% discount. What is the price of the CD player?

31) Kyle's science project grade has two parts. The oral presentation is worth 30 points, and the written report is worth 70 points. Kyle earns 84% of the possible points for his written report. To earn at least 87% of the possible points for the entire project, what percent of the possible points for the oral presentation must he earn?

32) Tracy wants to leave the waiter a tip to equal 10% of the cost of her family's meal and tax. When the check comes, an 8% tip has already been included and the total is $50.76. How much more money does Tracy need to add so that the waiter receives the 10% tip Tracy intended?

33) A full gas tanker holds 9000 gallons of gasoline. A car that gets 25 miles per gallon is driven 20 miles per day. What percent of the gas in the full tanker will the car use in 365 days? Round to the nearest tenth.

34) Jared has an average of 86% in his math class before the final exam. The final exam is 20% of his total grade. There are 55 points possible in the final exam and partial points are not given. If Jared wants to get an average of at least 88% in the class, what is the least number of points he needs to earn on the final exam?

35) Mike has thrown 24 football passes and completed 37.5% of them. What is the least number of additional passes he will have to complete if he wants an overall completion rate greater than 62%?

36) 10 ounces of fruit drink is 90% juice. How many ounces of water must be added to dilute the mixture to 50% juice?

Answers:

1) 460 ml

2) 1 mile

3) 12.7

4) 400 miles

5) 10 days

6) 480 mph

7) 25/13 hrs

8) 1021 ft

9) 63 mph

10) 18.2

11) 6 gallons

12) 10:24

13) 6

14) 1:16

15) 8.1 min/mi

16) 5.3 mph

17) $1.49

18) 3

19) 45.6 mph

20) 3/14

21) 50

22) 30

23) $7

24) 25:36

25) 1 13/32

26) 48 wpm

27) 86.4%

28) 40%

29) 38

30) $303.75

31) 94%

32) $0.94

33) 3.2%

34) 53

35) 16

36) 8 ozs