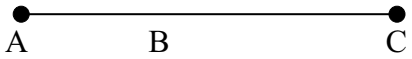
Scarsdale Middle School **Popham House** **Mr. Weiss**
Ratio, Proportion and Percent

1) A class consists of 4 boys out of 10 people. What is the ratio of boys to girls in the class?

2) In the diagram below, if AB = 6 and BC = 9, state each ratio in simplest form.



a) AB: AC b) BC:AC

3) A recipe calls for 1½ cups of milk to every 1¾ cups of flour. What is the ratio of the milk to flour in this recipe?

4) A bag contained 2½ ounces of silver and 4/5 of an ounce of gold. What is the ratio of silver to gold?

5) If M is the midpoint of line segment DE, find each ratio:
a) EM to MD b) DE to EM c) DM to DE

6) A secretary typed 288 words in 6 minutes during a job interview. What is the typist's speed in words per minute?

7) Reduce each to lowest terms:
a) 3 lbs: 20 ounces b) 6 meters: 250 cm c) 5 yds: 10 feet
d) 2 years to 2 months e) 2 feet to 18 inches f) 4 quarts to 1 gallon

8) Two boxes of cereal are priced as follows. Which cereal is the better buy (lesser price per ounce)?

Brand X: 28 ounces for $5.00 Brand Y: 25 ounces for $4.00

9) Ron runs 300 meters in 40 seconds. Carlos runs 200 meters in 30 seconds. Which boy ran faster?

10) A car traveled 54 mph. What is the car's speed in feet per second?

11) Convert 35 lbs per week to ounces per day. 12) Convert 120 feet per second to yards per hour.

13) Convert 300 mph to feet per second 14) Convert 30 ounces per hour to lbs per minute

15) The ratio of the sides of a triangle is 2:5:6. Its perimeter is 39 cm. What is the length of each side of the triangle?

16) The ratio of boys to girls in a particular 8^{th} grade is 8:7. There are 300 students. How many boys and how many girls are there?

17) The angles of a triangle are in a ratio of 2:3:5. Find the measure of each angle.

18) Two numbers are in a ratio of 5:8. The smaller number increased by 12 is equal to the larger decreased by 3. Find the numbers.

19) Three numbers are in a ratio of 3:5:9. The largest decreased by twice the smallest is equal to 24 more than the middle. Find the numbers.

20) A 42-foot pipe is cut into three sections in which each piece is twice as long as the preceding one. How long is each piece?

21) A fraction is equal to $^3/_5$. Its denominator is 60 more than its numerator. What is the numerator of this fraction?

22) Sam was present in school only 11 out of the first 20 days. How many consecutive school days will he need to attend in order to be present for 7/8 of the total days?

23) Two numbers are in a ratio of 5:3. If each number is reduced by 7, the numbers will be in a ratio of 2:1. What are the original numbers?

24) Two numbers are in a ratio of 5:2. If 21 is subtracted from the larger and the smaller remains the same, the numbers become equal. What are the original numbers?

25) In Jill's purse, the ratio of the number of dimes to the number of nickels is 3:4. If the value of these coins is $3.00, how many of each coin does Jill have?

26) The ratio of Sue's age to Betty's age is 4:1. Twenty years from now, Sue will be twice as old as Betty will be then. Find their present ages.

27) Two numbers are in a ratio of 4:3. One-half of the larger exceeds one-third of the smaller by five. Find the numbers.

28) Three numbers are in a ratio of 1:3:5. Their mean is 18. What are the three numbers?

29) A casting is mad from an alloy containing 4 parts lead, 3 parts copper and 2 parts tin. How many pounds of each does a 117-pound casting contain?

30) Two numbers are in a ratio of 3:5. If 9 is added to their sum, the result is 41. Find the numbers.

31) The ratio of Carl's money to Donald's money is 3:7. If Donald gives Carl $20, the two will have equal amounts. Find the original amount each one had.

32) A printer can print 10 pages of text per minute or 4 pages of graphics per minute. How many minutes will it take to print 31 pages of text and 7 pages of graphics?

33) A tree casts a shadow of 15 feet. At the same time, a 6-foot man casts a shadow of 5 feet. How tall is the tree?

34) A team won 13 out of their first 20 games. At this rate, how many games will they win if they play 80 games?

35) A speed of ¾ of a mile per minute is equal to how many miles per hour

36) Solve for x: a) $\frac{3x+5}{4} = \frac{7x-10}{6}$ b) $\frac{x+a}{b} = \frac{c}{5}$

37) A boy 5 feet 6 inches tall casts a shadow of 12 feet 9 inches. If the shadow of a nearby tree measures 153 feet, how tall is the tree?

38) Jamie read 40 pages of her book in an hour and 15 minutes. At this rate, how long will it take her to read the entire 600-page book?

39) On a certain map, the scale is 3/8 of an inch to 100 miles. What is the distance represented by 1.5 inches on the map?

40) A researcher caught 40 fish, tagged them, and returned them to the pond. Later, she caught 60 fish and found 4 of them to be marked. What is the expected number of fish in the pond?

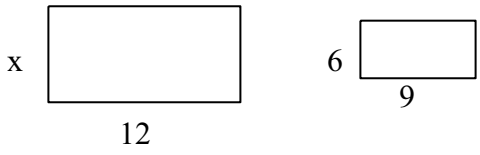
41) What number would be added to both the numerator and denominator of 21/29 so that the resulting fraction is equal to 5/6?

42) Mrs. Ima Winner won a lottery and decided to keep 13/20 of the money and donate the rest to charity. She kept $12,000 more than she donated. How much money did she win?

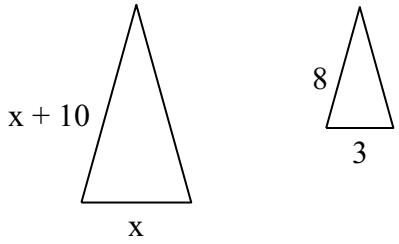
43) What number would be added to both the numerator and denominator of 13/24 so that the resulting fraction is equal to 3/4?

44) A free-throw shooter made 9 out of 20 shots attempted. He corrected a flaw in his technique and went on to make all of the free throws that he attempted and finished with a success rate of 75%. How many shots did he make after he corrected the flaw?

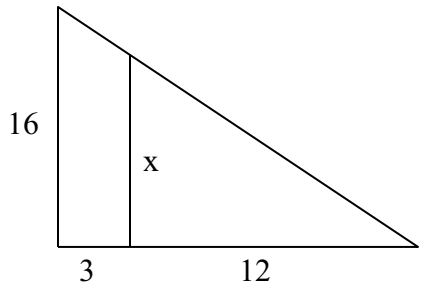
45) The two rectangles are similar. Find x.



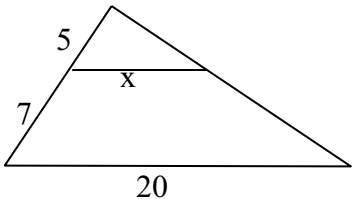
46) The two triangles are similar. Find x.



47) The two triangles in the figure are similar. Find x.



48) The two triangles in the figure are similar. Find x.



49) The shortest side of a polygon is 6 cm and its perimeter is 45 cm. The shortest side of a similar polygon is 20 cm. What is the perimeter of the larger polygon?

50) The ratio of the perimeters of two polygons is 2:3. What is the ratio of their areas?

51) A side of a hexagon is 6 cm. The corresponding side of a similar hexagon is 10 cm. The area of the larger hexagon is 50 cm^2. What is the area of the smaller hexagon?

52) Robert got 75% of the questions correct on his unit test. The test had 80 questions. How many questions did Robert get right?

53) After Karen lost 15% of her investment she had $2,550 left. How much did she invest originally?

54) This week all dresses at a Di's fashions are on sale at a 25% discount. By Friday, a certain dress was reduced an additional 15% off of the already reduced price. If the item was sold for $33.15, what was the original price?

55) 75% of 60% of a number is 36. Find the number.

56) An item is on sale for 35% off, leading to a sale price of $260. What was the original price?

57) A basketball player has made 85% of her foul shots this season. If she has made 51 shots, how many has she attempted?

58) A class has 8 girls. 60% of the class is male. How many students are in the class?

59) At Martha's Boutique, a style of shirt was not selling so Martha marked the price of each shirt down by 35%. The discounted price is now $26.00. What was the original price of a shirt?

60) The purchase price of a bicycle, which includes 7% sales tax, is $374.50. What was the price before tax was added?

61) The original price of an item was $50. The store deducted 20% and then deducted an additional 20% off the reduced price. How much money would a customer save if the store had simply reduced the original price by 40%?

62) After a 20% wage increase, a worker now earns $150,000. What was her salary before the increase?

63) In a savings account, $5,000 is invested at an annual rate of 9% simple interest. How much money would have to be invested at 7.5% simple interest to earn an equal amount of interest?

64) How much simple interest would be earned on a $5,000 investment at $4\frac{1}{4}\%$ annual interest for 10 years?

65) An investor earned $1,760 in simple interest by investing $8,000 over a 4-year period. What interest rate did he receive?

66) At the age of 25, Sam put away $10,000 in a retirement savings account. He earns 4% interest compounded annually. What will the value of this account when he retires at age 65? *Round to the nearest whole dollar*.

67) An item is placed on sale. It is reduced from $120 to $96. By what percent was the item reduced?

68) The yearly changes in the population of a town for 4 consecutive years were, respectively, 25% increase, 25% increase, 25% decrease, 25% decrease. What is the net percent decrease over the 4 years, to the nearest percent?

69) A 3 X 5 photograph is enlarged to 5 X 7 size. What is the percent increase in the area?

70) A homeowner expanded the size of it's deck from 10 feet by 20 feet to 15 feet by 30 feet. What is the percent increase in the area?

71) A weight lifter increased the amount he could bench press from 240 lbs to 300 pounds. What is the percent increase?

72) The regular price of a stereo is $800. It is placed on sale at 35% off the regular price. Sales tax of $7\frac{1}{2}\%$ is then added to the sale price to determine the final cost. What is the final cost of the stereo?

73) A school has 7 class periods a day. Six are 48 minutes in length and one is one hour. The school day starts at 7:35 am and ends at 2:13 pm with 4 minutes passing time between periods and one-half hour for lunch. What percent of the day is spent in class?

74) A class consists of 14 boys and 19 girls. On a certain day, all of the boys were present and some of the girls were absent, so that the girls present made up only 30% of the class attendance. How many girls were absent?

75) 1275 of the students at a college are male. This represents 42.5% of the students enrolled. How many students are enrolled in the college?

76) A family drives from their home to Disneyland. After driving 55% of the total number of miles to Disneyland, the family had 360 miles remaining to drive. What is the total number of miles from their home to Disneyland?

77) On her final exam, a student answered 75% of the 40 questions correctly on part I and she answered 90% of the 80 questions correctly on part II. What percent of all 120 questions did the student answer correctly?

78) Last year, because of strong company profits, a worker received a 20% raise in salary. This year, because of weak demand for the company's product, the worker was forced to reduce his pay by 20%. By what percent (if any) was his salary changed by these two events?

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

80) A man went on a diet and lost 18% of his weight. If after his diet he weighs 287 lbs, what was his weight before the diet?

81) The price of a stock increased 45% to $116 per share. What was the price of the stock before the increase?

82) A game was on sale for 30% off. After sales tax of 7% was added to the discounted price, the cost of the game was $29.96. What was the original price of the game?

83) At the end of the season a new baseball glove was on sale for 40% off. After 8¼ % sales tax was added to the discount price, the final cost of the glove was $51.96. What was the original price of the glove?

84) The original price of an item was $50. The store deducted 20% and then deducted an additional 20% off the reduced price. How much money would a customer save if the store had simply reduced the original price by 40%?

85) Albany and NYC are 150 miles apart. One car left Albany for NYC averaging 40 mph. At the same time, another car left NYC for Albany, averaging 35 mph. How far from Albany did the cars pass each other?

86) Two planes started at the same time from the same airport and flew in opposite directions. One flew 60 miles per hour faster than the other. In 5 hours they were 2800 miles apart. Find the rate of each plane.

87) A salesman made a trip of 375 total miles some by bus the rest by train. He traveled 3 hours by bus and 4 hours by train. If the train averaged 15 mph more than the bus, find the rate of each.

88) Traveling 20 mph faster, John can drive 800 miles in the same time it takes him to drive 600 miles at the slower speed. Find each speed.

89) A train traveled 240 miles. If it increased its average speed by 20 mph, it would have traveled 300 miles in the same amount of time. Find each speed.

90) A plane left JFK airport at 9:00 am and traveled 3000 miles west. Another plane left JFK at 12:00 noon and traveled 2000 miles west. Averaging the same speed, the two planes arrived at their destination at the same time. What time did the two planes reach their destinations?

91) Before lunch, John drove his car five mph faster than after lunch. Before lunch, he traveled 80 miles. After lunch, in the same amount of time, he traveled 70 miles. What was his speed before and after lunch?

92) Kim jogged 16 miles on Wednesday. On Friday, she jogged 12 miles. By averaging the same rate each day, it took Kim a half an hour longer on Wednesday to complete her run. At what rate did she average each day?

93) A moving van leaves a house traveling at an average rate of 35 mi/h. The family leaves the house ¾ of an hour later following the same route in a car. They traveled at an n average rate of 50 mi/h. How long will it take the car to catch up with the moving van?

94) Ellen and Kate raced on their bicycles to the library after school. They both left school at 3:00 and biked along the same route. Ellen rode at a speed of 12 mph and Kate rode at 9 mph. Ellen got to the library 15 minutes before Kate. At what time did Ellen get to the library?

95) A plane can fly 320 mph in still air. Flying with the wind, the plane can fly 1,400 miles in the same time it requires to fly 1,160 against the wind. Find the rate of the wind.

96) A pilot plans to make a flight lasting 2 hours and 30 minutes. How far will he fly from his base at a rate of 300 mph and return over the same route at a rate of 200 mph?

97) The rate of a passenger train is 20 mph more than the rate of a freight train. It takes the passenger train ½ as much time to travel 160 miles as it does the freight train. Find the rate of each train.

98) An airplane flew from New Orleans, Louisiana to Atlanta, Georgia at an average rate of 280 miles per hour. The airplane then returned at an average rate of 320 miles per hour. The total travel time was 3 hours. How long was the flight from New Orleans to Atlanta?

99) Tina drives to work and because of traffic conditions, she averages only 22 mph. When she returns home, she is able to improve her average rate to 32 mph. If her total travel time is 2 hours and 15 minutes, how much time does she spend driving to work?

100) A grocer mixed nuts worth $4.00 per pound with nuts worth $2.50 per pound. How many pounds of each did he use to make a mixture of 30 pounds to sell at $3.75 per pound?

101) How much gasoline worth $2.10 per gallon should be mixed with gasoline worth $2.60 per gallon to produce 500 gallons worth $2.40 per gallon?

102) When coffee priced at $3.25 per pound is mixed with 10 pounds of coffee priced at $4.50 per pound, a mixture is created that should be priced at $3.50 per pound. How much of the cheaper priced coffee would be used?

103) How many pounds of nuts worth $3.50 per pound must be mixed with 12 pounds of nuts worth $2.50 per pound to produce a mixture, which can be sold for $3.25 per pound?

104) How much of an 18% solution of sulfuric acid should be added to 360 ml of a 10% solution to obtain a 15% solution?

105) How many mL of a 10% solution of acid should be mixed with a 60% solution to produce 150 mL of a 30% solution?

106) A chemist has a solution, which is 75% pure acid and another solution, which is 15% pure acid. How many ounces of each solution should he use to make 40 ounces of a solution, which is 25% pure acid?

107) A farmer has some cream, which is 24% butterfat and some cream, which is 18% butterfat. How many quarts of each must he use to produce 90 quarts of 22% butterfat cream?

108) How much water should be added to 20 mL of a solution that is 30% alcohol to produce a solution that is 12% alcohol?

109) How much salt should be added to 80 pounds of a 5% salt solution to make a 24% salt solution?

110) How much pure antifreeze must be added to 12 L of a 40% solution of antifreeze to obtain a 60% solution?

111) How many ounces of water must be evaporated from a barrel containing 80 pounds of a 6% brine (salt and water) solution to obtain a 10% brine solution?

112) How many ounces of water must be added to 4 ounces of a 50% antiseptic solution to produce a 40% solution?

113) Susan invested $4,500. She earned 8% on part of the investment and the rest earned 10%. She earned an equal amount from each investment. How much money did she invest at each rate?

114) Mr. Smith invested a sum of money at 6%. He invested $200 more than this sum at 4%. If the annual incomes from both investments were the same, how much was invested at each rate.

115) An investor purchased $10,000 in the stock of two companies. He earned 5% for his Nike Corp. investment and 10% for his Pepsi Corp. investment. He earned a total of $800. How much money did he invest at each rate?

116) An investor earned a 12% return on her $4500 investment. She made a separate investment and earned a 20% return. Taken together, she earned a 15.2% return. Find the amount invested at each rate.

117) James invested $12,000. Part of the investment earned 12% and the rest earned 6%. If the entire investment earned 9%, how much money was invested at each rate?

118) Ken invested $7200, part earned 4% and the remainder earned 5%. If the annual incomes from both investments were equal, find the amount invested at each rate.

119) Ms. Allen invested $7,500 in two business enterprises. In one enterprise he made a 5% profit; in the other a 2% loss. Her net profit for the year was $130. Find the amount invested at each rate.