Ratio and Proportion

1) When you sketch a figure of an adult male, it is recommended that the head be $\frac{1}{8}$ of the total height. If the full drawn height of a 6-foot man is 10 inches, how

many inches should the drawing of his head be from top to bottom? (1) 2004-WU1-6

2) If a certain recipe requires five tablespoons of flour for every two ounces of butter, how many tablespoons of flour are needed if two pounds of butter are used?
(1) 2004-WU2-5

3) After 12 minutes on a stair-stepper, Rick has burned 210 calories. At the same rate, what is the total number of calories Rick will burn in a 20-minute workout? (1) 2004-WO2-8

4) If 2 Lops are equal to 4 Gops, then 3 Lops are equal to how many Gops? (1) 2004-WU10-2

5) Out of 28 students in Mr. Sullivan's homeroom, the ratio of boys to girls is 3:4. The ratio of students who have returned their fieldtrip forms to those who have not is 3:1. If exactly half of the boys returned their field trip forms, how many girls have not returned their forms? (2) 2004-WU13-1

6) A telephone pole is supported by a steel cable, which extends from the top of the pole to a point on the ground 3 meters from its base. What Leah walks 2.5 meters from the base of the pole toward the point where the cable is attached to the ground, her head just touches the cable. Leah is 1.5 meters tall. How tall is the pole? (1) 1999-WU2-1

7) The sum of three numbers is 81 and their ratio is 3:7:17. What is the smallest number? (1) 1999-WU3-7

8) Of a group of boys and girls at Central Middle School's after-school party, 15 girls left early to play in a volleyball game. The ratio of boys to girls then remaining was 2 to 1. Later, 45 boys left for a football game. The ratio of girls to boys was then 5 to 1. How many students attended the party? (3) 1999-WU14-1

9) American Flyer model trains are built at 1:64 scale. If the actual locomotive is 60 feet in length, what is the number of inches in the length of the American Flyer model? (1) 1999-WO4-2

10) Express the ratio of $\frac{2}{5}$ to $\frac{4}{7}$ as a decimal to the nearest tenth. (1) 1999-WO7-4

11) A circular flowerbed has a circumference of 18.84 feet. The scale use in making a drawing of the bed is 1" = 3'. Determine the length of the diameter on the scale drawing. Round to nearest whole number. (2) 2000-WU14-2

12) Plastic bags are recycled at the local grocery store. For every 5 bags that are recycled by customers, 3 new bags can be made. How many new bags can be made if 800 bags are returned? (2)

13) A storm in Sydney, Australia, caused \$30 million in damage. That estimate was in Australian dollars. At that time, 1.5 Australian dollars were worth 1 American dollar. Determine the number of American dollars of damage the storm caused. (1) 2000-WO4-5

14) At the beginning of a study 24 fish are caught, tagged and released back into a large pond containing fish. A few days later, 19 fish are caught from the pond and three of them have tags. Using this ratio, how many total fish would you expect to be living in the pond? (1) 2003-WU2-10

15) 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 $\frac{a}{c}$? (3) 2002-WU6-4

16) Hanna averages 16.8 points per game and 24 minutes of playing time. How many points would she average if she played 32 minutes per game and continued to score at the same rate? (1) 2003-WO3-1

17) 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? (2) 2003-WU16-5

18) 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? (3) 2003-WU17-4

19) If a:b = 3:7 and b:c = 5:4 then what is the value of (a + c) : c ? (2) 2002-WO3-9

20) If a CD spins at an average speed of 500 rpm, how many times will the disc spin during a song that lasts 3 minutes and 27 seconds? (1) 1997-WU7-6

21) A regular hexagon and a regular octagon have equal perimeters. What is the ratio of the measure of one side of the octagon to the measure of one side of the hexagon? (1) 1997-WU10-4

22) There are 12 red marbles and 12 black marbles in a jar. What is the least number of marbles that must be removed so that the ratio of red to black marbles remaining in the jar is 4 to 3? (1) 2003-WU11-3

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? (2) 2001-WU2-7

24) A fraction is equal to $\frac{3}{5}$. Its denominator is 60 more than its numerator. What is the numerator of this fraction? (2) 2001-WU3-6

25) A bag contains 30 red marbles and 50 white marbles. 20% of the red marbles are removed, and each removed red marble is replaced by 4 white marbles. Next, 50% of the white marbles are removed, and each removed white marble is replaced by 2 red marbles. In the bag, what is the ratio of white marbles to red marbles after replacements? (2) 2001-WU9-1

26) The quantities x and y vary inversely and x = 27 when y = 9. Determine the value of x when y = 60. (2) 2001-WU11-6

27) John wants to choose a height for his son's basketball hoop that is in the same proportion to his son's height as the standard 10-foot hoop is to the average 6 foot 6 inch professional basketball player. His son is 4 feet 4 inches tall. What is the number of inches in the height at which he should place the basket? (2) 2001-WU15-3

28) Karen caught 40 fish, marked them, and returned them to the pond. Later, she randomly netted 60 fish and found 4 marked fish in this group. What is the expected number of fish in the pond? (1) 1996-WU9-7

29) A machine can fill 160 boxes of nails in 8 minutes. Each box contains 100 nails. How many boxes can be filled in one hour? (2) 1993-WU6-7

30) 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? (2) 1995-WU4-1

31) A rectangle is formed by doubling the length of one side of a square and halving the other side of the square. What is the ratio of the perimeter of the rectangle to the perimeter of the square? (1) 1995-WU4-9

32) 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? (2) 1995-WO4-5

33) 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? (3) 1995-WO4-7

Answers	23) \$7
1) 1.25 in	24) 90
2) 80 tbs	25) 37:98
3) 350 calories	26) 4 1/20
<i>4) 6 cups</i>	27) 80"
5) 1	28) 600
6) 9 meters	29) 1200
7) 9	30) 25:36
8) 90	31) 5:4
9) 11 ¼ inches	32) 1 13/32
10).7	33) 48 wpm
11) 2	
12) 480	
13) \$20,000,000	
14) 152	
15) 3/14	
16) 22.4	
17) 50	
18) 30	
19) 43/28	
20) 1725	
21) 3:4	
22) 3	