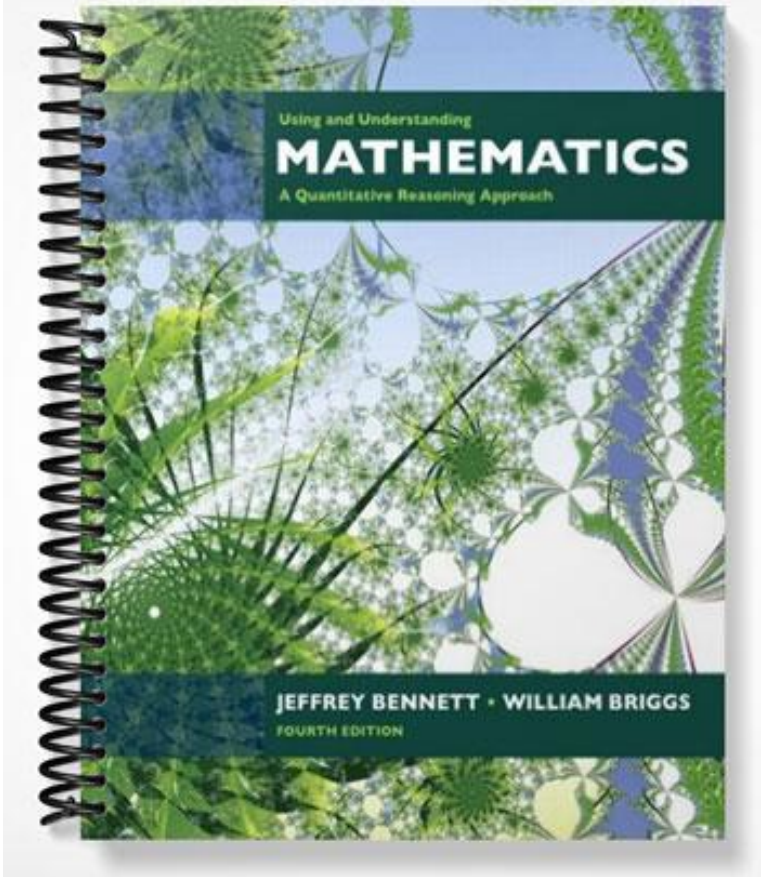
TEST BANK


Using and Understanding
MATHEMATICS
A Quantitative Reasoning Approach
JEFFREY BENNETT • WILLIAM BRIGGS
FOURTH EDITION

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.
Decide whether the statement makes sense. Explain your reasoning.

1) I drove really far, almost 200 kilometers per hour. 1) _____

2) We will need 1800 cubic feet of carpeting to cover the floors in our three-story house. 2) _____

3) The boat leaked and started filling with water. There must be 50 gallons of water in it already. 3) _____

4) I figured out the distance we had traveled by dividing our speed by the amount of time we had traveled. 4) _____

5) I figured out the number of seconds in a week by multiplying 7 by 24 by 60 by 60. 5) _____

6) To convert square yards to square inches, I multiplied by 12^2 or 144. 6) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.
Evaluate.

7) $\frac{1}{5} + \frac{1}{4}$ 7) _____

A) $\frac{9}{10}$ B) $\frac{9}{20}$ C) $\frac{20}{9}$ D) $\frac{9}{40}$

8) $\frac{1}{6} - \frac{1}{12}$ 8) _____

A) $\frac{1}{6}$ B) $\frac{1}{12}$ C) $-\frac{1}{12}$ D) $-\frac{1}{6}$

9) $\frac{2}{15} \times \frac{15}{7}$ 9) _____

A) $\frac{2}{7}$ B) $\frac{7}{2}$ C) $\frac{1}{7}$ D) $\frac{2}{15}$

10) $\frac{5}{2} \div \frac{1}{9}$ 10) _____

A) $\frac{5}{9}$ B) $\frac{5}{18}$ C) $\frac{45}{2}$ D) $\frac{45}{4}$

11) $\frac{3}{2} + \frac{5}{8}$ 11) _____

A) $\frac{8}{17}$ B) $\frac{16}{17}$ C) $\frac{17}{4}$ D) $\frac{17}{8}$

12)

$\frac{8}{5} - \frac{1}{6}$ 12) ___

A) $\frac{43}{30}$ B) $\frac{22}{15}$ C) $\frac{26}{15}$ D) $\frac{53}{30}$

13) $\frac{9}{7} \times \frac{1}{3}$ 13) _____

A) $\frac{3}{11}$ B) $\frac{3}{7}$ C) $\frac{1}{7}$ D) $\frac{2}{7}$

14) $\frac{3}{4} \div \frac{4}{3}$ 14) _____

A) $\frac{9}{16}$ B) $\frac{16}{9}$ C) 1 D) $\frac{3}{4}$

15) $\frac{1}{3} + \frac{1}{4} + \frac{1}{5}$ 15) _____

A) $\frac{3}{4}$ B) $\frac{43}{60}$ C) $\frac{49}{60}$ D) $\frac{47}{60}$

16) $\frac{1}{4} \times \frac{1}{5} \times \frac{1}{6}$ 16) _____

A) $\frac{15}{2}$ B) $\frac{1}{120}$ C) $\frac{1}{60}$ D) $\frac{1}{26}$

Write as a common fraction.

17) 0. 4 17) _____

A) $\frac{2}{5}$ B) $\frac{4}{9}$ C) $\frac{1}{25}$ D) $\frac{4}{11}$

18) 0. 9 1 2 18) _____

A) $\frac{228}{25}$ B) $\frac{57}{625}$ C) $\frac{456}{5}$ D) $\frac{114}{125}$

19) 0. 7 8 19) _____

A) $\frac{39}{5}$ B) $\frac{87}{10}$ C) $\frac{39}{50}$ D) $\frac{87}{100}$

20) 0.000 2 20) _____

A) $\frac{1}{500}$ B) $\frac{1}{5000}$ C) $\frac{1}{50}$ D) $\frac{1}{50000}$

21) 8. 4 6 21) _____

A) $\frac{423}{5}$ B) $\frac{423}{50}$ C) $\frac{423}{500}$ D) $\frac{216}{25}$

22) 5. 3 22) _____

A) $\frac{7}{20}$ B) $\frac{53}{10}$ C) $\frac{53}{100}$ D) $\frac{7}{2}$

Convert the common fraction into decimal form. If necessary, round to the nearest thousandth.

23) $\frac{7}{2}$ 23) _____

A) 2.5 B) 4.5 C) 14 D) 3.5

24) $\frac{9}{11}$ 24) _____

A) 0.9 B) 0.692 C) 0.081 D) 0.818

25) $\frac{6}{7}$ 25) _____

A) 0.854 B) 1 C) 0.857 D) 0.862

26) $\frac{12}{45}$ 26) _____

A) 0.177 B) 0.427 C) 0.267 D) 3.75

27) $\frac{107}{72}$ 27) _____

A) 1.486 B) 1.596 C) 0.673 D) 1.296

28) $\frac{697}{844}$ 28) _____

A) 0.636 B) 0.826 C) 0.936 D) 0.833

29) $\frac{448}{64}$ 29) _____

A) 6 B) 7 C) 6.4 D) 8

Identify the units you would expect for the given quantity.

30) A speed found by dividing a distance measured in meters by a time measured in seconds. 30) _____

A) seconds per meter B) meter-seconds
C) square meters D) meters per second

31) The price of gravel, found by dividing its total cost in dollars by its total weight in tons. 31) _____

A) dollars per ton B) cubic tons
C) tons per dollar D) ton-dollars

32) The gas mileage of a car, when you travel 3514 kilometers using 7 gallons of gas. 32) _____

A) 50 B) $/gal C) km/gal D) gal/km

33) The amount of electricity utilized, calculated by multiplying power in kilowatts by time in hours. 33) _____

A) kilowatt-hours B) kilowatts per second
C) hours per kilowatt D) kilowatts per hour

34) The price of pudding, found by dividing its cost in dollars by its weight in ounces. 34) _____

A) dollars per ounce B) ounce-dollars

C) dollar-ounces D) ounces per dollar

35) The density of a meteor, found by dividing its mass in kilograms by its volume in cubic meters. 35) _____

A) kg^3/m B) $_{kg/}cm^3$ C) cm^3/kg D) $_{kg/}cm^2$

Carry out the indicated unit conversion. Round your answer, if appropriate.

36) Convert a distance of 39 feet into yards. 36) _____

A) 117 yards B) 13 yards
C) 26 yards D) 16 yards

37) Convert a weight of 14 pounds into ounces; there are 16 ounces in 1 pound. 37) _____

A) 112 ounces B) 448 ounces
C) 280 ounces D) 224 ounces

38) There are 8 ounces in a cup, 4 cups in a quart, and 4 quarts in a gallon. Using a chain with these conversions, convert 6 gallons into ounces. 38) _____

A) 192 ounces B) 96 ounces
C) 768 ounces D) 1536 ounces

39) Convert a distance of 11 miles into yards; there are 1760 yards in a mile. 39) _____

A) 20,020 yards B) 1936 yards
C) 20,680 yards D) 19,360 yards

40) A car is driving at 240 miles per hour. What is its speed in miles per minute? 40) _____

A) 864,000 miles per minute B) 4 miles per minute
C) 14,400 miles per minute D) 300 miles per minute

41) Convert a lot size of $\frac{1}{2}$ acre to square feet (1 acre = 43,560 ft^2). 41) _____

A) 2189 square feet B) 2178 square feet
C) 21,890 square feet D) 21,780 square feet

42) Use a chain of conversions with familiar measures of time to convert 8 weeks into seconds. 42) _____

A) 4,838,400 seconds B) 201,600 seconds
C) 691,200 seconds D) 80,640 seconds

Solve the problem.

43) A swimming pool 4 meters deep, 11 meters long, and 7 meters wide is filled with water. What is the area of the water's surface? 43) _____

A) $_{44}\ m^2$ B) $_{28}\ m^2$ C) $_{308}\ m^3$ D) $_{77}\ m^2$

44) A swimming pool 3 meters deep, 12 meters long, and 6 meters wide is filled with water. What volume of water does the pool contain? 44) _____

A) $_{237}\ m^3$ B) $_{216}\ m^3$ C) $_{18}\ m^2$ D) $_{72}\ m^2$

45) A packing crate measures 3 feet by 14 feet by 9 feet. What is the area of its

smallest side? 45) ___
___

A) $42\ ft^2$ B) $27\ ft^2$ C) $126\ ft^2$ D) $378\ ft^3$

46) A warehouse is 43 yards long and 32 yards wide with a height of 14 yards. What is the volume of the warehouse? 46) _____

A) $1376\ yd^2$ B) $1376\ ft^2$

C) $19{,}264\ yd^3$ D) $19{,}264\ ft^3$

47) A column has a circular base with an area of 5 square feet and is 14 feet tall. What is its total volume? 47) _____

A) $70\ ft^3$ B) $350\ ft^3$ C) $350\pi\ ft^3$ D) $70\pi\ ft^3$

48) Find a conversion factor between square feet and square yards. Write it in three forms. 48) _____

A) $1\ ft^3 = (3\ yd)^3 = 27\ yd^3$ B) $1\ yd^3 = (3\ ft)^3 = 27\ ft^3$

C) $1\ ft^2 = (3\ yd)^2 = 9\ yd^2$ D) $1\ yd^2 = (3\ ft)^2 = 9\ ft^2$

49) How many square inches are in 8 square yards? 49) _____

A) $1152\ in.^2$ B) $288\ in.^2$

C) $10{,}368\ in.^2$ D) $96\ in.^2$

50) A field is 130 yards long and 50 yards wide. Find its area in square feet. 50) _____

A) $6500\ ft^2$ B) $175{,}500\ ft^2$

C) $19{,}500\ ft^2$ D) $58{,}500\ ft^2$

51) Find a conversion factor between cubic inches and cubic yards. Write it in three forms. 51) _____

A) $1\ yd^3 = (3\ ft)^3 = 27\ ft^3$

B) $1\ yd^3 = (36\ in.)^3 = 46{,}656\ in.^3$

C) $1\ yd^2 = (36\ in.)^2 = 1296\ in.^2$

D) $1\ in.^3 = (36\ yd)^3 = 46{,}656\ yd^3$

52) There are 1000 meters in 1 kilometer. Find a conversion factor between cubic meters and cubic kilometers. Write it in three forms. 52) _____

A) $1\ km^3 = (1000\ m)^3 = 1{,}000{,}000{,}000\ m^3$

B) $1\ m^3 = (1000\ km)^3 = 1{,}000{,}000\ km^3$

C) $1\ km^3 = (1000\ m)^3 = 100{,}000\ m^3$

D) $1\ km^2 = (1000\ m)^2 = 1{,}000\ m^2$

53) How many cubic inches are in 16 cubic feet? 53) _____

A) $746{,}496\ in.^3$ B) $2304\ in.^3$

C) $20{,}736\ in.^3$ D) $27{,}648\ in.^3$

54) How many cubic furlongs are in a cubic mile? (1 mile = 8 furlongs) 54) _____

A) 4096 cubic furlongs B) 8 cubic furlongs
C) 512 cubic furlongs D) 64 cubic furlongs

Use the following table of exchange rates to solve the problem.

Currency	Dollars per Foreign	Foreign per Dollar
British pound	1.678	0.5958
Canadian dollar	0.7483	1.336
European euro	1.169	0.8554
Japanese yen	0.008482	117.9
Mexican peso	0.0943	10.6045

Round your answer, if appropriate.

55) Which is worth most, 1 British pound, 1 Canadian dollar, 1 European euro, or 1 dollar? 55) _____
A) 1 European euro B) 1 Canadian dollar
C) 1 British pound D) 1 dollar

56) How many Mexican pesos can you buy for $ 180? 56) _____
A) 1908.81 pesos B) 16.974 pesos
C) 1.52676 pesos D) 21,222 pesos

57) You return from a trip with 3100 Japanese yen. How much are your yen worth in dollars? 57) _____
A) $ 292.33 B) $ 365,490 C) $ 26.29 D) $ 2651.74

58) A fresh juice stand in Montreal sells a large glass of orange juice for 4.20 Canadian dollars. If you buy 3 glasses, how much have you spent in (U.S.) dollars? 58) _____
A) $ 14.73 B) $ 10.78 C) $ 9.43 D) $ 16.83

Use units to help you answer the question. If necessary, round your answer to two decimal places.

59) A community garden contains 25 rectangular plots each measuring 6 yd by 10 yd. What is the total area available for gardening? 59) _____
A) $1525\ yd^2$ B) $800\ yd^2$ C) $60\ yd^2$ D) $1500\ yd^2$

60) A stockbroker sold 95 shares of stock for $25.84 each. What was the total amount of the sale? 60) _____
A) $2454.80 B) $2454.91 C) $2454.7 D) $2454.9

61) Suppose you could spend $9 every hour, night and day. How much could you spend in a year? (Assume that there are 365 days in a year.) 61) _____
A) $ 4,730,400 B) $ 78,840
C) $8760 D) $ 12,960

62) A paint mixture contains 22 gallons of base for every gallon of color. In 874 gallons of paint, how many gallons of color are there? 62) _____
A) 437 gal B) 291 gal C) 836 gal D) 38 gal

63) Your car gets 33 miles per gallon of gasoline, and you drive at an average speed of 44 miles per hour. How much gas do you use in an hour? 63) _____

A) 1.45 gal B) 1.33 gal C) 0.69 gal D) 0.75 gal

64) You are buying carpet to cover a room that measures 12 feet by 17 feet. The carpet costs $27.50 per square yard. How much will the carpet cost? 64) _____
A) $1870.00 B) $204.00 C) $623.33 D) $741.82

65) Assuming that your heart beats 70 times per minute, how many times does your heart beat in 6 days? 65) _____
A) 201,600 B) 25,200
C) 36,288,000 D) 604,800

66) Suppose water flows from a shower at a rate of 0.32 cubic feet per minute. Do you use more water by taking a 12-minute shower or by filling a bathtub with 0.4 cubic yards of water, and by how much? 66) _____
A) Bath uses an additional 6.96 ft^3 of water
B) Shower uses an additional 3.44 ft^3 of water
C) Bath uses an additional 3.44 ft^3 of water
D) Shower uses an additional 6.96 ft^3 of water

67) An acre is equal to 43,560 square feet, and there are 5280 feet in a mile. If a farm has the shape of a rectangle measuring 0.9 miles by 1.5 miles, what is the area of the farm in acres? 67) _____
A) 864 acres B) 0.16 acres
C) 1050 acres D) 11.14 acres

68) Assume that you breathe once every 10 seconds. How many breaths do you take in 3 weeks? 68) _____
A) 260,480 B) 181,440 C) 25,920 D) 3024

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.
An exam question is given along with the solution offered by a student. State whether the solution is right or wrong. If it is wrong, explain why the answer is wrong and how to solve the problem correctly.

69) Exam Question: A supermarket sells apples for $ 14.6 per pound. You are buying 5.1 pounds of apples. How much will they cost, to the nearest cent? (Sales tax is already included.)
Student Solution: 14.6 ÷ 5.1 = 2.86. The apples will cost $ 2.86. 69) _____

70) Exam Question: An airplane travels 105 miles in 20 minutes. How fast is it going in miles per hour?
Student Solution: 105 ÷ 20 × 60 = 315. The airplane is going 315 miles per hour. 70) _____

71) Exam Question: You purchased 80 acres of farm land for $ 320,000. How much did you pay per acre?
Student Solution: 320,000 × 80 = 25,600,000. You paid $ 25,600,000 per acre. 71) _____

Decide whether the statement makes sense. Explain your reasoning.

72) I donated 64 fluid ounces of blood today. 72) _____

73) My friend wants to lose 15 pounds, but I think that's too much. I think 10 kilograms would make more sense. 73) _____

74) I got pulled over by a police officer for speeding. I was going 150 kiloliters per second. 74) _____

75) I can walk on my hands for 5 meters before falling down, but my goal is to walk a full decimeter without losing my balance. 75) _____

76) The container was big enough to hold a barrel of water, but it wasn't big enough to hold a barrel of petroleum. 76) _____

77) I found a rock at the bottom of our swimming pool. It had a mass of 500 grams and a volume of 1000 cubic centimeters, so its density was 0.5 g/cm^3. 77) _____

78) Our utility company charges 10 cents per joule for the energy we use. 78) _____

79) To convert from Kelvin to Celsius, you subtract 273.15. For example, -100 K = -373.15 °C. 79) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.
Solve the problem.

80) $10^5 \times 10^7$ 80) _____
A) 10^{12} B) 10^{35} C) 10^{17} D) 10^{14}

81) $10^3 \times 10^{-6}$ 81) _____
A) 10^9 B) 10^{-3} C) 10^{-18} D) 10^{-9}

82) $\frac{10^3}{10^7}$ 82) _____
A) 10^{-4} B) 10^4 C) 10^{10} D) 10^{21}

83) $\frac{10^8}{10^{-6}}$ 83) _____
A) 10^{-14} B) 10^{14} C) 10^{-48} D) 10^2

84) $10^{-14} \times 10^{-8}$ 84) _____
A) 10^{-6} B) 10^{22} C) 10^{-22} D) 10^{112}

85) $\frac{10^{-11}}{10^{-6}}$ 85) _____
A) 10^{-17} B) 10^{-66} C) 10^5 D) 10^{-5}

86) $10^4 + 10^9$ 86) _____

A) 10,000,000,000,000 B) 100,010,000
C) 1,000,100,000 D) 1,000,010,000

87) $10^6 - 10^3$ 87) _____

A) 1000 B) 999,000 C) 1,001,000 D) 101,000

Convert within the U.S. customary system. Round your answer to hundredths, if appropriate.

88) The baby weighs 8.4 pounds. How many ounces is that? 88) _____

A) 134.4 ounces B) 100.8 ounces
C) 84 ounces D) 0.53 ounces

89) The container holds 9 gallons of water. How many fluid ounces is that? 89) _____

A) 1152 fl oz B) 288 fl oz C) 576 fl oz D) 2304 fl oz

90) If a horse ran 5 furlongs, how many yards did it run? 90) _____

A) 4400 yd B) 8800 yd C) 26,400 yd D) 1100 yd

91) A boat is moving at 45 miles per hour. What is its speed in knots (nautical miles per hour)? 91) _____

A) 37.1 knots B) 53.8 knots
C) 39.1 knots D) 51.8 knots

92) How many gallons are in 75 barrels of petroleum? 92) _____

A) 3900 gal B) 1.8 gal C) 2325 gal D) 3150 gal

93) How many quarts are in 55 barrels of water? 93) _____

A) 2310 qt B) 9240 qt C) 1705 qt D) 6820 qt

94) The customer bought a peck of flour. How many cubic inches of flour did he buy? 94) _____

A) 537.6 $in.^3$ B) 33.6 $in.^3$ C) 268.8 $in.^3$ D) 67.2 $in.^3$

State how much larger or smaller the first unit is than the second.

95) nanometer, meter 95) _____

A) Smaller by a factor of 10^6 B) Larger by a factor of 10^6
C) Smaller by a factor of 10^9 D) Larger by a factor of 10^9

96) gram, milligram 96) _____

A) Smaller by a factor of 10^3 B) Larger by a factor of 10^3
C) Larger by a factor of 10^6 D) Smaller by a factor of 10^6

97) centiliter, microliter 97) _____

A) Smaller by a factor of 10,000 B) Larger by a factor of 10,000
C) Smaller by a factor of 1000 D) Larger by a factor of 1000

98) square decimeter, square kilometer 98) _____

A) Smaller by a factor of 10^3 B) Smaller by a factor of 10^8
C) Smaller by a factor of 10^6 D) Smaller by a factor of 10^4

99) gigagram, microgram 99) _____

A) Larger by a factor of 10^{12} B) Larger by a factor of 10^{9}

C) Larger by a factor of 10^{18} D) Larger by a factor of 10^{15}

100) cubic micrometer, cubic meter 100) _____

A) Smaller by a factor of 10^{12} B) Smaller by a factor of 10^{18}

C) Smaller by a factor of 10^{6} D) Smaller by a factor of 10^{9}

Convert the measurement to the units specified. Round your answer to the nearest tenth.

101) 28 feet to meters 101) _____

A) 8.5 meters B) 25.6 meters

C) 91.8 meters D) 10.6 meters

102) 8 kilometers to yards 102) _____

A) 26,247.9 yards B) 22,658.9 yards

C) 8749.3 yards D) 67,976.8 yards

103) 20 liters to gallons 103) _____

A) 5.3 gallons B) 18.9 gallons

C) 21.1 gallons D) 75.7 gallons

104) 11 cubic inches to milliliters 104) _____

A) 0.4 milliliters B) 325.3 milliliters

C) 0.7 milliliters D) 180.2 milliliters

105) 2600 square yards to square meters 105) _____

A) 2377.4 square meters B) 2173.9 square meters

C) 2844.4 square meters D) 3111.8 square meters

106) 33 pounds to grams 106) _____

A) 72.8 grams B) 72,765 grams

C) 14,968.8 grams D) 15 grams

107) 95 kilometers per hour to miles per hour 107) _____

A) 69.1 miles per hour B) 131.8 miles per hour

C) 59 miles per hour D) 152.9 miles per hour

Convert the temperature, as indicated. Round your answer to hundredths, if appropriate.

108) 60°F, into Celsius 108) _____

A) 15.56°C B) 28.00°C C) 33.33°C D) 51.11°C

109) 15°C, into Fahrenheit 109) _____

A) 59°F B) -5°F C) 47°F D) 40.3°F

110) 105°F, into Celsius 110) _____

A) 40.56°C B) 73.00°C C) 131.40°C D) 58.33°C

111) -10°C, into Fahrenheit 111) _____

A) -50°F B) 26.4°F C) 14°F D) 22°F

112) 380 K, into Celsius 112) _____

A) 206.85°C B) 106.85°C C) -62.04°C D) 306.85°C

113) -80°C, into Kelvin 113) _____
A) 129.15 K B) 193.15 K C) 93.15 K D) -353.15 K

Solve the problem.

114) A 14-gram object has a volume of 35 cubic centimeters. Find its density. 114) _____
A) $0.4\ g/cm^3$ B) $490\ g\text{-}cm^3$
C) $21\ cm^3$ D) $2.5\ cm^3/g$

115) What is the cost of lighting a 500-watt outdoor light for 8 hours, if electricity costs 7.5¢ per kilowatt-hour? 115) _____
A) 30 cents B) 45 cents C) 60 cents D) 67 cents

116) Suppose a necklace is made from 18-karat gold and weighs 54 grams. Find the weight, in grams, of the pure gold in the necklace. 116) _____
A) 18 grams B) 6 grams
C) 40.5 grams D) 54 grams

117) A certain land area is 330,000 square miles, and it holds a population of 69.1 million people. Calculate the population density. 117) _____
A) $48\ people/mi^2$ B) $209\ people/mi^2$
C) $2094\ people/mi^2$ D) $478\ people/mi^2$

118) An average 12-ounce can of beer contains about 15 grams of alcohol. Consider a person with approximately 5 liters (5000 milliliters) of blood, who quickly drinks two cans of beer. If all the alcohol were immediately absorbed into the bloodstream, what blood alcohol content would we find? 118) _____
A) 0.3 g/100 ml B) 0.6 g/100 ml
C) 0.03 g/100 ml D) 0.06 g/100 ml

119) Your electrical bill states that you used 810 kilowatt-hours of energy in January. Determine your total electrical energy use, in joules. 119) _____
A) 2,916,000,000 joules B) 259,200,000 joules
C) 291,600,000 joules D) 2,592,000,000 joules

120) Your electrical bill states that you used 670 kilowatt-hours of energy in September. Determine your average power use, in watts. 120) _____
A) 900.5 watts B) 930.6 watts
C) 1023.6 watts D) 1116.7 watts

121) You find a 7-pound nugget that is 30% gold. What is its purity in karats? 121) _____
A) 30 karats B) 24 karats
C) 16.8 karats D) 7.2 karats

122) An object has a total volume of 5 liters (which is 5000 cubic centimeters) and a mass of 3 kilograms. What is its density? Will it sink or float in water? 122) _____
A) $0.6\ g/cm^3$; sink B) $1.67\ g/cm^3$; float

C) 1.67 g/cm^3; sink D) 0.6 g/cm^3; float

123) You burn 900 Calories will exercising for 55 minutes. What is your average power while exercising, in watts? 123) _____
A) 1141.1 watts B) 912.9 watts
C) 1711.6 watts D) 1369.3 watts

124) Suppose the potatoes at a store in the Netherlands are priced at 0.42 guilders per kilogram, where one dollar is worth 1.91 guilders. What is the price of the potatoes in dollars per pound? 124) _____
A) $0.48 per pound B) $0.10 per pound
C) $0.36 per pound D) $1.77 per pound

125) Suppose the eggplants at a store in Thailand are priced at 1.24 baht per kilogram, where one dollar is worth 1.37 baht. What is the price of the eggplants in dollars per pound? 125) _____
A) $0.41 per pound B) $2.00 per pound
C) $3.75 per pound D) $0.77 per pound

126) A supermarket in Japan sells soy milk for 351 yen per liter. If there are 127.3 yen per dollar, then what is the price in dollars per quart? 126) _____
A) $ 2.61 per quart B) $ 2.91 per quart
C) $ 2.19 per quart D) $ 2.76 per quart

127) A piece of land in Ottawa with an area of 0.3 square kilometers is priced at 5300 Canadian dollars. If there are 1.379 Canadian dollars per (U.S.) dollar, then what is the price in dollars per square mile? 127) _____
A) $ 20,617.09 per square mile B) $ 33,179.08 per square mile
C) $ 63,094.70 per square mile D) $ 4946.71 per square mile

128) Recently, one U.S. dollar was worth about 0.52521 British pounds. How much would a car have cost in U.S. dollars that cost 9560 British pounds? 128) _____
A) $ 18,202.24 B) $ 18,599.22
C) $ 5143.28 D) $ 5021.01

129) Recently, one U.S. dollar was worth about 11.059 Mexican pesos. How much would 110 U.S. dollars be worth in Mexican pesos? 129) _____
A) $ 10.08 B) $ 9.95 C) $ 1244.10 D) $ 1216.49

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.
Decide whether the statement makes sense. Explain your reasoning.

130) If you complete the four-step problem-solving process carefully and thoroughly, then you will have no uncertainty about your final answer. 130) _____

131) It is not recommended that you use approximations to solve a problem, because then your solution is only an approximation. 131) _____

132) Whether it's a problem in mathematics or something else, I always find it's best to complete the work by looking back to chec k, interpret, and explain my

solution. 132) ____
____
____

Solve the problem.

133) A traffic counter consists of a thin black tube stretched across a street or highway and connected to a "brain box" at the side of the road. The device registers one "count" each time a set of wheels (that is, wheels on a single axle) rolls over the tube. A normal automobile (two axles) registers two counts, and a light truck (three axles) registers three counts. Suppose that, during a one-hour period, a particular counter registers 41 counts on a residential street on which only two-axle vehicles (cars) and three-axle vehicles (light trucks) are allowed. How many cars and light trucks passed over the traffic counter? Find all the possible solutions to the problem. 133) _____

134) Paul and Saul ran a 50-meter race. When Paul crossed the finish line, Saul had run only 48 meters. Then they ran a second race, with Paul starting 2 meters behind the starting line. Assuming that both runners ran at the same pace as in the first race, who won the second race? 134) _____

135) Two bicyclists, 42 miles apart, begin riding toward each other on a long straight avenue. One cyclist travels 15 miles per hour and the other 20 miles per hour. At the same time, Spot (a greyhound), starting at one cyclist, runs back and forth between the two cyclists as they approach each other. If Spot runs 38 miles per hour and turns around instantly at each cyclist, how far has he run when the cyclists meet? 135) _____

136) Suppose that you begin with a red bucket containing 12 red marbles and a yellow bucket containing 12 yellow marbles. You move three marbles from the red bucket to the yellow bucket, and then you move any four marbles from the yellow bucket to the red bucket. Which is greater, the number of yellow marbles in the red bucket or the number of red marbles in the yellow bucket? 136) _____

137) Suppose that 8 turns of a wire are wrapped around a pipe with a length of 60 inches and a circumference of 4 inches. What is the length of the wire? 137) _____

138) Suppose that China's population policy is modified so that every family could have children until either a boy is born or two children are born, whichever comes first. Assuming that every family chooses to have as many children as possible under this policy, and that boys and girls are equally likely, how many children would be born in a typical group of 1000 families? 138) _____

139) A curved bridge rises over a river, so that the two endpoints of the bridge are

140 yards apart horizontally. You walk across the bridge with a device to measure its length and discover that the walking distance is 148 yards. Approximately how high does the bridge rise above the horizontal?

139) ____
____
____

140) A curved bridge rises over a canyon. The two endpoints of the bridge are one mile apart horizontally. The bridge rises to a height of 320 feet above the horizontal. Approximately what is the walking distance along the bridge, in feet? 140) _____

141) Cheddar cheese comes in 2-pound bags, and mozzarella cheese comes in 5-pound bags. Using entire bags, you make a 47-pound mixture of cheese. How many bags of each type of cheese did you use? Find all the possible solutions to the problem. 141) _____

142) Suppose that you have 10 white socks and 6 black socks in a clothes dryer. How many socks must you withdraw from the dryer (without looking) to be certain of having a pair of white socks? 142) _____

143) You are considering buying 15 silver coins that look alike, but you have been told that one of the coins is a lightweight counterfeit. How can you determine the lightweight coin in a maximum of three weighings on a balance scale? 143) _____

144) It takes you 84 seconds to walk from the first (ground) floor of a building to the fourth floor. How long will it take to walk from the first floor to the 10th floor (at the same pace, assuming that all floors have the same height)? 144) _____

145) A father and son are in a terrible car accident. The father is killed. The son, badly injured, is brought to the hospital for emergency surgery. The surgeon takes one look at the patient and exclaims, "That's my son!" How is this possible? 145) _____

146) A trader bought a stock for $ 20 and then sold it for $ 30. He bought it back for $ 38 and then sold it again for $ 48. How much did he gain or lose on these transactions? 146) _____

147) Three boxes are labeled "CDs," "DVDs," and "CDs & DVDs." Each label is wrong. Bey selecting just one item from just one box, how can you determine the correct labeling of the boxes? 147) _____

148) There are 20 bags filled with coins that all look alike. The coins in 19 of the bags are authentic and weigh 10 ounces each. The coins in one of the bags are counterfeit and weigh 11 ounces each. With only one weighing on a scale, how can you determine which bag contains the counterfeit coins? 148) _____

149) There is a large jar of marbles, containing red, blue, yellow, black, and white marbles. How many marbles must you draw (without looking) from the jar to be sure of getting at least three of one color? 149) _____

150) Abe, Boris, Cal, and David all proposed to Ellie on Friday. Abe proposed at 5:00, Boris proposed at 6:00, Cal proposed at 7:00, and David proposed at 8:00. Ellie accepted the last of the four proposals. Some clues: (1) The times may be A.M. or P.M. (2) Boris proposed before Abe (3) At least one suitor proposed between the proposals of Cal and David. (4) Cal did not propose between Boris and Al. Whose proposal did Ellie accept? 150) _____

151) How do you measure 6 minutes with a 7-minute hourglass and a 5-minute hourglass? Assume that the hourglasses can only measure 7-minute and 5-minute intervals, respectively, and cannot be used to measure other time intervals. 151) _____

1) Does not make sense. Kilometers per hour are a unit of speed, not distance. If you drive fast but only for a short period of time, you will not go far. (Explanations will vary.)
2) Does not make sense. Carpeting covers the area of the floors, not volume. (Indeed, if it covered the volume of the rooms, there wouldn't be any space left for people or furniture.) Cubic feet are a measure of volume, not area. (Explanations will vary.)
3) Makes sense. Gallons are a measure of volume and, depending on the size of the boat, 50 gallons could be a reasonable quantity of water. (Explanations will vary.)
4) Does not make sense. Dividing speed by time does not yield distance. Multiplying speed by time yields distance. For example, 10 mi/hr × 2 hr = 20 mi. (Explanations will vary.)
5) Makes sense. $1 \text{ wk} \times \frac{7 \text{ days}}{1 \text{ wk}} \times \frac{24 \text{ hr}}{1 \text{ day}} \times \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{60 \text{ sec}}{1 \text{ min}} = (7 \times 24 \times 60 \times 60)$ seconds, since all the other units cancel. There are 604,800 seconds in a week. (Explanations will vary.)
6) Does not make sense. There are 12 inches per foot, but there are 36 inches per yard. To convert square yard to square inches, multiply by 36^2 or 1296. (Explanations will vary.)
7) B
8) B
9) A
10) C
11) D
12) A
13) B
14) A
15) D
16) B
17) A
18) D
19) C
20) B
21) B
22) B
23) D
24) D
25) C
26) C
27) A
28) B
29) B
30) D
31) A
32) C
33) A
34) A
35) B
36) B
37) D
38) C
39) D
40) B
41) D
42) A

43) D
44) B
45) B
46) C
47) A
48) D
49) C
50) D
51) B
52) A
53) D
54) C
55) C
56) A
57) C
58) C
59) D
60) A
61) B
62) D
63) B
64) C
65) D
66) A
67) A
68) B
69) The student solution is wrong. The price per pound should be multiplied by the number of pounds, not divided. It helps to include the units in the calculation, as follows:
$ 14.6/pound × 5.1 pounds = $ 74.46.
70) The student solution is right. With the units included, the calculation is as follows:
105 miles ÷ 20 minutes × 60 minutes/hour = 315 mph.
71) The student solution is wrong. The price should be divided by the number of acres, not multiplied. It helps to include the units in the calculation, as follows:
$ 320,000 ÷ 80 acres = $4000 per acre.
72) Does not make sense. The units are fine, but 64 fluid ounces are equivalent to 4 pints. A typical blood donation is one pint; donating four pints would be dangerous. (Explanations will vary.)
73) Does not make sense. 10 kilograms is about 22 pounds. If 15 pounds is too much, then certainly 22 pounds is too much. (Explanations will vary.)
74) Does not make sense. Kiloliters are a unit of volume, and speed is measured in units of distance divided by time. (Explanations will vary.)
75) Does not make sense. A decimeter is a tenth of a meter, and this person can already travel 50 times that. Perhaps he wants to be able to walk on his hands for a full decameter, or 10 meters. (Explanations will vary.)
76) Makes sense. A barrel of liquid and a barrel of petroleum are two distinct measures of volume. A barrel of liquid, such as water, is 31 gallons, but a barrel of petroleum is 42 gallons. If the container were 31-41 gallons, it could hold a barrel of water but not a barrel of petroleum. (Explanations will vary.)
77) Does not make sense. The calculation is correct, and the units are fine, but an object with a density under 1 g/cm^3 would not sink in water. (Explanations will vary.)
78) Does not make sense. The units are fine, but the magnitude is ridiculous. A regular 100-watt bulb consumes energy at a rate of 100 joules per second. If the utility charged 10

cents per joule, it would cost $1 just to keep a 100-watt bulb on for a single second. That's $86,400 a day! (Explanations will vary.)

79) Does not make sense. The general formula is correct, but the numbers don't make sense. A temperature of 0 K is the coldest possible temperature, known as absolute zero. A temperature of -100 K is theoretically impossible. (Explanations will vary.)
80) A
81) B
82) A
83) B
84) C
85) D
86) D
87) B
88) A
89) A
90) D
91) C
92) D
93) D
94) A
95) C
96) B
97) B
98) B
99) D
100) B
101) A
102) C
103) A
104) D
105) B
106) C
107) C
108) A
109) A
110) A
111) C
112) B
113) B
114) A
115) A
116) C
117) B
118) B
119) A
120) B
121) D
122) D
123) A
124) B
125) A
126) A

127) B
128) A
129) D
130) Does not make sense. The four-step process is a useful guide to problem solving, but the four steps offer only general advice. Following them will not automatically lead to a unique solution, since some questions do not lend themselves to unique solutions. This is fairly obvious when the question is one of politics or policy. For example, what is the best way to improve the economy? Different experts will recommend different-even contradictory-things (e.g., raise taxes, lower taxes), and no single best answer may be available. The same is true of mathematical problems, particularly when the information provided is incomplete or lacks context. Nonunique solutions often occur because not enough information is available to distinguish among a variety of possibilities. (Explanations will vary.)
131) Does not make sense. Most real problems involve approximate numbers to begin with, so an approximation is often good enough for a final answer. In other cases, an approximation will reveal the essential character of a problem, making it easer to reach an exact solution. Approximations also provide a useful check. If you come up with an "exact solution" that isn't close to the approximate one, something may have gone wrong. (Explanations will vary.)
132) Makes sense. This is essentially step 4 in the four-step process. Although you may be tempted to think you have finished after you find a result in step 3, this final step is the most important. After all, a result is not very useful if it is wrong or misinterpreted or cannot be explained to others. (Explanations will vary.)
133) 1 car and 13 light trucks; 4 cars and 11 light trucks; 7 cars and 9 light trucks; 10 cars and 7 light trucks; 13 cars and 5 light trucks; 16 cars and 3 light trucks; 19 cars and 1 light truck
134) Paul
135) 45.6 mi
136) The number of yellow marbles in the red bucket is greater.
137) 68 in.
138) 1500
139) 24 yards
140) 5318.6 feet
141) 1 bag cheddar and 9 bags mozzarella; 6 bags cheddar and 7 bags mozzarella; 11 bags cheddar and 5 bags mozzarella; 16 bags cheddar and 3 bags mozzarella; 21 bags cheddar and 1 bag mozzarella.
142) 8 socks
143) Answers may vary. One possible answer: Separate the coins into three sets of five coins. Weigh two of the sets. The lightweight coin is in the lighter of the two sets, or if the two sets balance, it is in the third set. Now weigh two pairs of coins from the lightweight set of five coins. If they balance, the fifth coin is the lightweight coin; otherwise, weigh the coins in the lightweight pair to find the lightweight coin.
144) 252 seconds
145) The surgeon is a woman. She is the mother of the patient.
146) He gained $20 on the transactions.
147) Select an item from the box labeled "CDs & DVDs." Since the label is wrong, it must be either a box of CDs or a box of DVDs. First assume that the item you selected is a CD. This box is therefore a box of CDs and should be labeled "CDs." Since the box labeled "DVDs" is also labeled incorrectly, it must be either a box of CDs or a box of both CDs and DVDs. Since you have already identified the first box as a box of CDs, the second box must therefore be a box of CDs and DVDs and should be labeled "CDs & DVDs." Finally, the box incorrectly labeled "CDs" should have the remaining label, "DVDs." Now assume that the item you selected is a DVD. By similar reasoning, this box should be labeled "DVDs," the

box rectly labeled "CDs" should be labeled "CDs & DVDs," and the box incorrectly labeled
incor "DVDs" should be labeled "CDs."

148) Label the bags 1-20 and choose one coin from bag 1, two coins from bag 2, three coins from bag 3, and so on. Weigh all the coins you chose together, a total of 210 coins. If all the coins were authentic, they would would weigh 2100 oz, since $210 \text{ coins} \times 10 \text{ oz/coin} = 2100 \text{ oz}$. However, 1-20 of the coins are counterfeit, and each (11-oz) counterfeit coin will add an extra ounce to the weight. If the actual weight is 2101, there must be one counterfeit coin, and since one coin was chosen from bag 1, bag 1 must have the counterfeit coins. If the actual weight is 2102, bag 2 must have the counterfeits; if the actual weight is 2103, bag 3 must have the counterfeits, etc. In general:
$(\text{Actual weight, in oz}) - 2100 = \text{the number of the bag with the counterfeit coins.}$

149) 11 marbles

150) Cal's proposal

151) Answers may vary. One possibility: Start both hourglasses simultaneously. When the 5-minute hourglass runs out, immediately turn it upside down and start the timing of the 6-minute interval. There will be 2 minutes of time left in the 7-minute hourglass. When it runs out, immediately turn both hourglasses upside down. There will be 2 minutes of time left in the 5-minute hourglass (the 2 minutes that ran down before it was flipped). When it runs out, immediately turn the 7-minute hourglass upside down. There will be 2 minutes of time left in it (again, the 2 minutes that ran down before it was flipped). When it runs out, the timing of the 6-minute interval is complete $(2 + 2 + 2 \text{ minutes} = 6 \text{ minutes})$. Incidentally, if you continue in this fashion, you can measure any interval of an even number of minutes using these two hourglasses. Of course, some intervals (e.g., 10 minutes, 14 minutes) can be measured much more simply using just one hourglass.