

7.8 Practice - Dimensional Analysis

Use dimensional analysis to convert the following:

- 1) 7 mi. to yards
- 2) 234 oz. to tons
- 3) 11.2 mg to grams
- 4) 1.35 km to centimeters
- 5) 9,800,000 mm (millimeters) to miles
- 6) 4.5 ft^2 to square yards
- 7) $435,000 \text{ m}^2$ to square kilometers
- 8) 8 km^2 to square feet
- 9) 0.0065 km^3 to cubic meters
- 10) 14.62 in^3 to cubic centimeters
- 11) $5,500 \text{ cm}^3$ to cubic yards
- 12) 3.5 mph (miles per hour) to feet per second
- 13) 185 yd. per min. to miles per hour
- 14) 153 ft/s (feet per second) to miles per hour
- 15) 248 mph to meters per second
- 16) 186,000 mph to kilometers per year
- 17) 7.50 T/yd^2 (tons per square yard) to pounds per square inch
- 18) 16 ft/s^2 to kilometers per hour squared

Use dimensional analysis to solve the following:

- 19) On a recent trip, Jan traveled 260 miles using 8 gallons of gas. How many miles per 1-gallon did she travel? How many yards per 1-ounce?
- 20) A chair lift at the Divide ski resort in Cold Springs, WY is 4806 feet long and takes 9 minutes. What is the average speed in miles per hour? How many feet per second does the lift travel?
- 21) A certain laser printer can print 12 pages per minute. Determine this printer's output in pages per day, and reams per month. (1 ream = 5000 pages)
- 22) An average human heart beats 60 times per minute. If an average person lives to the age of 75, how many times does the average heart beat in a lifetime?
- 23) Blood sugar levels are measured in milligrams of glucose per deciliter of blood volume. If a person's blood sugar level measured 128 mg/dL, how much is this in grams per liter?
- 24) You are buying carpet to cover a room that measures 38 ft by 40 ft. The carpet cost \$18 per square yard. How much will the carpet cost?
- 25) A car travels 14 miles in 15 minutes. How fast is it going in miles per hour? in meters per second?
- 26) A cargo container is 50 ft long, 10 ft wide, and 8 ft tall. Find its volume in cubic yards and cubic meters.
- 27) A local zoning ordinance says that a house's "footprint" (area of its ground floor) cannot occupy more than $\frac{1}{4}$ of the lot it is built on. Suppose you own a $\frac{1}{3}$ acre lot, what is the maximum allowed footprint for your house in square feet? in square inches? (1 acre = 43560 ft²)
- 28) Computer memory is measured in units of bytes, where one byte is enough memory to store one character (a letter in the alphabet or a number). How many typical pages of text can be stored on a 700-megabyte compact disc? Assume that one typical page of text contains 2000 characters. (1 megabyte = 1,000,000 bytes)
- 29) In April 1996, the Department of the Interior released a "spike flood" from the Glen Canyon Dam on the Colorado River. Its purpose was to restore the river and the habitants along its bank. The release from the dam lasted a week at a rate of 25,800 cubic feet of water per second. About how much water was released during the 1-week flood?
- 30) The largest single rough diamond ever found, the Cullinan diamond, weighed 3106 carats; how much does the diamond weigh in milligrams? in pounds? (1 carat - 0.2 grams)



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Answers - Dimensional Analysis

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| 1) 12320 yd | 16) 2,623,269,600 km/yr |
| 2) 0.0073125 T | 17) 11.6 lb/in ² |
| 3) 0.0112 g | 18) 63,219.51 km/hr ² |
| 4) 135,000 cm | 19) 32.5 mph; 447 yd/oz |
| 5) 6.1 mi | 20) 6.608 mi/hr |
| 6) 0.5 yd ² | 21) 17280 pages/day; 103.4 reams/month |
| 7) 0.435 km ² | 22) 2,365,200,000 beats/lifetime |
| 8) 86,067,200 ft ² | 23) 1.28 g/L |
| 9) 6,500,000 m ³ | 24) \$3040 |
| 10) 239.58 cm ³ | 25) 56 mph; 25 m/s |
| 11) 0.0072 yd ³ | 26) 148.15 yd ³ ; 113 m ³ |
| 12) 5.13 ft/sec | 27) 3630 ft ² , 522,720 in ² |
| 13) 6.31 mph | 28) 350,000 pages |
| 14) 104.32 mi/hr | 29) 15,603,840,000 ft ³ /week |
| 15) 111 m/s | 30) 621,200 mg; 1.42 lb |



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