7.8

1) $7\ mi\ to\ yd$

$$\left(\frac{7\cancel{mi}}{1}\right)\left(\frac{5280\cancel{ft}}{1\cancel{mi}}\right)\left(\frac{1\ yd}{(3\cancel{ft})}\right) = \frac{36960yd}{3} = 12{,}320\ yd$$

3) $11.2\ mg\ to\ g$

$$\left(\frac{11.2\ \cancel{mg}}{1}\right)\left(\frac{1\ g}{1000\ \cancel{mg}}\right) = \frac{11.29}{1000} = 0.0112\ g$$

5) $9{,}800{,}000\ mm\ to\ mi$

$$\left(\frac{9{,}800{,}000\ \cancel{mm}}{1}\right)\left(\frac{1\ \cancel{m}}{1000\ \cancel{mm}}\right)\left(\frac{3.29\ \cancel{ft}}{1\ \cancel{m}}\right)\left(\frac{1\ mi}{5280\ \cancel{ft}}\right) = \frac{32{,}144{,}000\ mi}{5280000} = 6.088\ mi$$

7) $435{,}000\ m^2\ to\ km^2$

$$\left(\frac{435{,}000m^2}{1}\right)\left(\frac{1km}{1{,}000\ m}\right)^2$$

$$\left(\frac{435{,}000\cancel{m^2}}{1}\right)\left(\frac{1km^2}{1{,}000{,}000\cancel{m^2}}\right) = \frac{435{,}000\ km^2}{1{,}000{,}000} = 0.435\ km^2$$

9) $0.0065\ km^3 to\ m^3$

$$\left(\frac{0.0065km^3}{1}\right)\left(\frac{1000m}{km}\right)^3$$

$$\left(\frac{0.0065\cancel{km^3}}{1}\right)\left(\frac{(1{,}000{,}000{,}000m^3)}{\cancel{km^3}}\right) = 6{,}500{,}000\ m^3$$

11) $5{,}500\ cm^3 to\ yd^3$

$$\left(\frac{5{,}500cm^3}{1}\right)\left(\frac{1in}{2.54cm}\right)^3\left(\frac{1yd}{36in}\right)^3$$

$$\left(\frac{5{,}500\cancel{cm^3}}{1}\right)\left(\frac{1\cancel{in^3}}{16.387064\cancel{cm^3}}\right)\left(\frac{1yd^3}{46656\cancel{in^3}}\right) = \frac{5{,}500\ yd^3}{764554.858} = 0.00719\ yd^3$$

13) $185\ yd/\min to\ min/hr$

$$\left(\frac{185\cancel{yd}}{\cancel{\min}}\right)\left(\frac{3\cancel{ft}}{1yd}\right)\left(\frac{1mi}{5280\cancel{ft}}\right)\left(\frac{60\cancel{min}}{1hr}\right) = \frac{33300mi}{5280hr} = 6.307\ mi/hr$$

15) $248\ mi/hr\ to\ m/sec$

$$\left(\frac{248\cancel{mi}}{\cancel{hr}}\right)\left(\frac{1.61\cancel{km}}{1\cancel{mi}}\right)\left(\frac{1000m}{1\cancel{km}}\right)\left(\frac{1\cancel{hr}}{3600\ \text{sec}}\right) = \frac{399.280m}{3600\ \text{sec}} = 110.9\ m/sec$$

17) $7.5\frac{T}{yd^2}\ to\ lbs/in^2$

$$\left(\frac{7.5T}{yd^2}\right)\left(\frac{2000lbs}{1T}\right)\left(\frac{1yd}{36in}\right)^2$$

$$\left(\frac{7.5\cancel{T}}{\cancel{yd^2}}\right)\left(\frac{2000lbs}{1\cancel{T}}\right)\left(\frac{1\cancel{yd^2}}{1296in^2}\right) = \frac{15000lbs}{1296in^2} = 11.57\ lbs/in^2$$

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?

$\frac{260mi}{8gal} = 32.5\ mi/gal$

$\left(\frac{32.5mi}{gal}\right)\left(\frac{5280ft}{1mi}\right)\left(\frac{1yd}{3ft}\right)\left(\frac{1gal}{4qt}\right)\left(\frac{1qt}{2pt}\right)\left(\frac{1pt}{2c}\right)\left(\frac{1c}{8oz}\right) = \frac{171{,}600yd}{384oz} = 446.875\ yd/oz$

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)

$\left(\frac{12pg}{1\,min}\right)\left(\frac{60min}{1hr}\right)\left(\frac{24hr}{1day}\right) = 17280\ pg/day$

$\left(\frac{17280pg}{day}\right)\left(\frac{30day}{mon}\right)\left(\frac{1ream}{5000pg}\right) = \frac{5184000reams}{5000months} = 103.68\ reams/month$

23) Blood sugar levels are measured in miligrams of gluclose per deciliter of blood volume. If a person's blood sugar level measured 128 mg/dL, how much is this in grams per liter?

$\left(\frac{128mg}{dL}\right)\left(\frac{1g}{100mg}\right)\left(\frac{10dL}{1L}\right) = \frac{1280g}{1000L} = 1.28\ g/L$

25) A car travels 14 miles in 15 minutes. How fast is it going in miles per hour? in meters per second?

$\left(\frac{14mi}{15\,min}\right)\left(\frac{60min}{1hr}\right) = \frac{840mi}{15hr} = 56\ mi/hr$

$\left(\frac{14mi}{15\,min}\right)\left(\frac{1.61km}{1mi}\right)\left(\frac{1000m}{1km}\right)\left(\frac{1min}{60\,sec}\right) = \frac{22540m}{900\ sec} = 25.04\ m/sec$

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 ft^2)

$\left(\frac{1acre}{3}\right)\left(\frac{43560ft^2}{1acre}\right)\left(\frac{1}{4}\right) = \frac{43560ft^2}{12} = 3{,}630\ ft^2$

$\left(\frac{3630ft^2}{1}\right)\left(\frac{12in}{1ft}\right)^2$

$\left(\frac{3630ft^2}{1}\right)\left(\frac{144in^2}{1ft^2}\right) = 522{,}720\ in^2$

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

$\left(\frac{25{,}800ft^3}{1\,sec}\right)\left(\frac{3600sec}{1hr}\right)\left(\frac{24hr}{1day}\right)\left(\frac{7day}{1wk}\right) = 15{,}603{,}840{,}000\ ft^3/week$