

Homework Assignment #4 (Significant Digits and Units)

Reading Assignment:

Chapter 6 in Engineering Fundamentals – An Introduction to Engineering, 3rd Edition, by Moaveni
Conversion Tables – Inside front cover and inside back cover of the textbook

Problem Assignment:

Write out the instructions and the given information with each problem. Show your work for each unit conversion problem (use dimension analysis).

- 1) Chapter 6, Problems 1, 2, 5, 6, 14, 16, 17, 18
- 2) Power (in watts, W) can be calculated using the formula

$$\text{Power} = \text{Force} \times \text{Distance} / \text{Time} \quad \text{where } 1\text{W} = 1\text{kg} \times \text{m}^2 \times \text{s}^{-3}$$

Calculate power for each case below and express the result in watts using the proper prefix and the proper number of significant digits.

Force	Distance	Time	Power
2.45 kN	3.84 mm	6.25 ns	1.51 GW
1.67 MN	6.97 μm	1.11 ps	
9.42 mN	7.04 am	8.88 μs	
0.384 TN	5.80 pm	0.837 ks	
8.40 GN	9.99 fm	7.22 Ts	
2.00 PN	1.58 Mm	0.248 Gs	

For the example above,

$$P = (2.45 \times 10^3 \text{ N})(3.84 \times 10^{-3} \text{ m}) / (6.25 \times 10^{-9} \text{ s})$$

$$P = 1.51 \times 10^9 \text{ W} = 1.51 \text{ GW}$$

- 3) A child's circular (actually cylindrical) swimming pool is 18.0 inches deep and 8.00 feet in diameter. How many gallons of water are required to fill it?